164 PAGE ISSUE FEATURING TWO TOP SCALE AIRCRAFT

RCM radio control MODELER

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THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

DAVE PLATT'S MAGNIFICENT
FOCKE-WULF 190

AN R/C OLD-TIMER
PLAYBOY, SR.

ULTIMATE SOARING
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RC MODELER

FEATURES

VOLUME 12 1975 NUMBER 4

MAY

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THIS MONTH'S COVER

This month's cover is enhanced by Miss Janice Hall with the famous Playboy Sr. on floats, free-flight champion of the 30's and 40's, and featured in this issue on page 24. Ektachrome transparency taken at Lake Murray, San Diego, California by Paul Denson.

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FROM THE SHOP

DON DEWEY

● As a magazine publisher, I have long been aware of the ever-growing demands placed upon members of our Industry in the areas of product engineering and service. I am also continually amazed at how members of our Industry — all modelers themselves — literally bend over backwards to meet or exceed those demands.

But this month there was a case in point which went from the sublime to the ridiculous.

During the early part of one week I decided to do some further test flying on a highly competitive 1/2A midget racer which we are planning to present as a construction article in a future issue of RCM. Having scheduled the flight test for a Thursday, and having invited Don Dombrowski and Fred Reese, our racing editors, up for their evaluation of this aircraft, I discovered on Wednesday morning that I only had one 5½/4 Cox Grey racing prop for my Kirn Kraft .051 engine. After a few phone calls I found that I was unable to locate this particular size locally and decided I'd have to go with one prop. However, I picked up the phone and called Jim Martin at Hobby Lobby International in Tennessee and asked him to send out a half dozen props at his convenience. Now, having talked with Jim on the phone at least twice a month ever since he started growing tomatoes behind his plant in Brentwood, Tennessee, I didn't take it too seriously when he said they would be here the next morning.

As Thursday morning rolled around and our resident racing editors joined me at the field for the test flights on the little pylon machine, a car pulled up and Jim and Debbie Martin stepped out and walked up to where we were standing.

"Here's your props, Dewey," said Jim, nonchalantly.

Now, despite Hobby Lobby's claim for fast service, that's ridiculous! I'll probably never know why he really was in Sierra Madre — maybe he just wanted to visit the big city. Anyway, I got the props and we even gave Jim a turn at the transmitter after getting the little racer up to an altitude where he couldn't do too much damage. The last airplane that Jim flew all on his very own was a Berkeley Bootstraps with a Super Aerotrol receiver. But one of the greatest thrills in this hobby is helping a new kid learn to fly.

One nice thing about his visit though — his wife Debbie is lovely, personable, outgoing, friendly, and normal.

Which just goes to prove that opposites attract . . .

★

A couple of issues ago we talked about the revolutionary new cyanoacrylate adhesive, Hot Stuff, from Satellite City. Since that time, RCM staff members have built another dozen models using this material almost exclusively and have found it to be excellent. We even stuck one in from a long way up and ended up with a large crumpled airplane — but virtually all of the joints glued with Hot Stuff were still intact, proving that the joint was stronger than the material that was being joined.

However, as with any new material, cyanoacrylate adhesives have certain inherent characteristics that make a thorough knowledge of the product mandatory. And, as with any paint, solvent, or adhesive that we use, certain precautions must be taken. We would like to share the following letter which we received from Dr. Kevin G. Geyer.

I am an eye surgeon and an avid modeler and have been using the cyanoacrylate glues since they first became available. While we do use cyanoacrylates on the eye to seal perforating injuries, I don't think this is a job for an amateur. To the best of my knowledge they have very low toxicity towards human tissues and if gotten into the eye would probably only leave the lids stuck shut for a couple of weeks. That can be an inconvenience.

Since your article in February 1975 RCM will probably cause a large number of people to experiment with the cyanoacrylates ("Hot Stuff," "Crazy Glue" etc.) I hope you will pass on the following three precautions:

1. *Wear safety goggles or glasses of some sort while handling this stuff.*
2. *Never pull off the cap with your teeth to get a quick squirt into a loose joint. You may have to see a dentist in a hurry. "Crazy Glue" and some of the others come with a cap presumably to extend the shelf life of the contents. The evaporation rate is so slow, however, that no harm should be done if the cap is left off throughout a gluing session.*
3. *Place a blotter under the work. The joints will easily come off the blotter when cured leaving a little fuzz around the edges. More important, though, is that your hands will not remain at the workbench for two weeks while you grow a new hide.*

Although you may still glue your thumb to your index finger or some other minor blunder, if the above precautions are followed there should be no major catastrophies. I think we all agree with you that the cyanoacrylates are a revolution in adhesives and will completely change many amateurs building "style." But let's not all of us get stuck together shaking hands about it!

Sincerely,
Kevin G. Geyer, M.D.

★

By the way, we mentioned in a previous issue that dimethylformamide (DMF) and Dimethyl Sulfoxide (DMSO) were both solvents for cyanoacrylates. Jim Teegarden of Terre Haute, Indiana points out that both

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RADIO SPECTRUM

BY JIM ODDINO

● I had hoped to answer a lot of questions this month, but I received a new item to evaluate that kind of turned me on, so I thought I might pass on the results of my tests.

The latest thing for the "man who has everything" is called a servo controller and is manufactured by RCS in Sunland, California. The servo controller was designed by Jerry Pullen, one of the pioneers in proportional R/C. Its purpose is to try to save your airplane for you in case you are hit by interference or if your airborne batteries are going dead. It goes in your airplane between the receiver and a servo. In a power airplane the logical place to put it is in the throttle control circuit. (In a glider you would probably put it on the spoilers.) If your batteries are low or the pulses from the receiver are not proper, such as might occur during interference, the servo will drive to a pre-selected position, logically low speed, which will tell you to get it on the ground or prevent you from taking off if you haven't done so already.

My first reaction when I heard the device described, was that we were regressing to the so-called "fail safe systems" of ten to twelve years ago. In those early systems, if the pulse train wasn't correct, all information would be locked out and all the servos would go to pre-set positions, (neutral on the control surfaces and low speed on the throttle). It didn't take long before the modeler realized that some control was better than none at all, with the result that the fail safe circuits fell by the wayside. The big difference with the servo controller is that you would still be able to make use of whatever control you had left on the control surfaces but you would get low speed which would force you to get the plane on the ground.

When you think about it you can probably remember three or four airplanes that would have been saved by such a device. I know of quite a few lost to batteries going dead and I've seen people try to take off with their transmitter turned off. I've also seen two people start a pylon race on the same frequency. All of these would probably have been saved by the servo controller.

The first test I ran was to discharge a battery down to about 4.6 volts. I hooked it up to a system with four servos and exercised the servos. After a few minutes the throttle servo began to oscillate from the position commanded by the transmitter to the position set by the servo controller. In the air this would cause your engine speed to go up and down a few times and hopefully give you time to get in a favorable position to land. A few seconds later, the servo drove to the low speed position and stayed there. All other controls continued to function normally and did so for about seven minutes, until I got tired and terminated the test. I know my plane wouldn't stay up for seven minutes with the engine idling. At this point I was very impressed. I powered the circuit with a variable power supply and measured the trigger point which turned out to be 4.53 volts. I ran the temperature up to 125 F and soaked the unit for two hours with no appreciable change. The next test was to drive it with a function generator so I could vary the pulse width and pulse repetition rate. If the pulse width is between .42 and 2.4 milliseconds it goes through to the servo. If it is less than .42 or greater than 2.4 the output of the servo controller goes to a fixed pulse width that can be set to anything between .58 and 2.5 milliseconds. A rep rate over 400 Hz or under 1.3 Hz will also give you the fail safe position. This means that if you get too many or not enough pulses you will get low speed. The unit I tested is for positive going pulse systems and draws 8.25ma in standby and 11.5 in fail safe. It came with Kraft Multicon connectors and is in a neat little package, 1¼" x 1⅛" x 9/16". The circuit makes use

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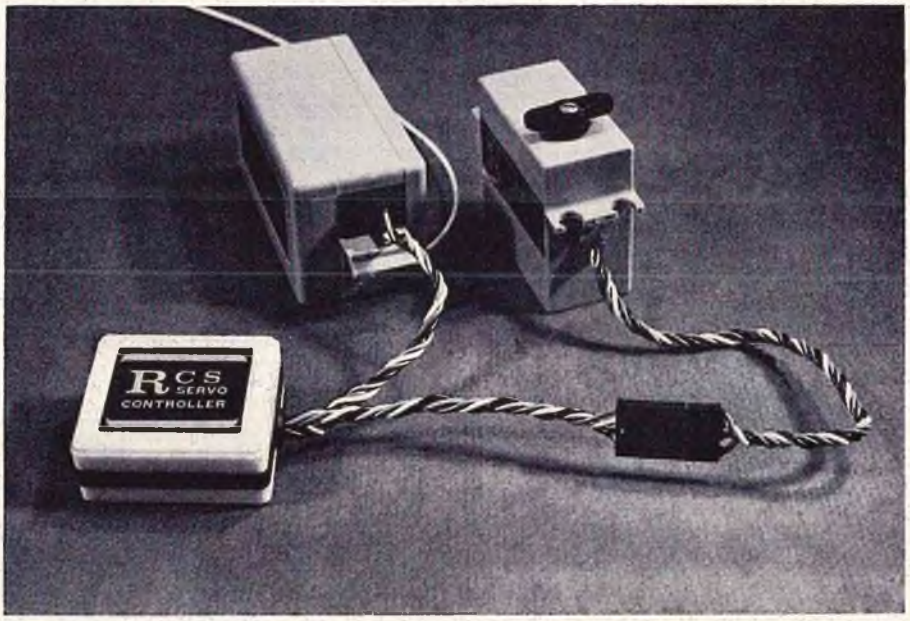

engine clinic

By Clarence Lee

● This month I would like to start the column off with a letter received this past week from Wally McAllister of Mac's Products who manufactures the "Mac's" line of custom mufflers and accessories. Wally is a bit disturbed over the recent banning of flow-through, or venturi, type mufflers by the FAI for FAI competition use, and justifiably so I might add! Wally's letter was sent as an open letter to the FAI, AMA, model magazine editors, club newsletters, etc. Many of you may have already read a copy in your club newsletter by the time this appears here. However, for those who have not, I felt that this matter is of a serious enough nature to run in this column.

AN OPEN LETTER TO FAI

Two years ago, FAI came out with a ruling for FAI pylon which allowed tuned pipes. Everyone immediately started looking around for tuned pipes. A couple of months later, when the pylon season commenced, those few good flyers who were able to get hold of tuned pipes for their engines won most of the races.

At the beginning of 1974, FAI came out with a specifically designed muffler which disallowed use of venturi mufflers. After two more changes, the rules were so confusing that even many tuned mini-pipes were being used in some FAI pylon events and the pylon modeler had to take sometimes two and three different kinds of mufflers with him to ensure that he would have the correct muffler for that area's event. FAI racing participation has fallen off greatly due to confusing changes in FAI.

Now with competition beginning in a couple of months and many of the Internats participants chosen, we receive the information that there are NO engine or muffler changes, "except" that venturi or flow-thru mufflers are disallowed for pattern as well. WHY!! FAI, do you mean that I can come to FAI competition for 1975 with a closed-end megaphone which amplifies the sound but which is called a muffler, and I am not allowed to compete with a quiet venturi muffler? Do I hear someone stating that venturi mufflers are louder than non flow-thru mufflers? My answer to you is: Is there a scientific law which dictates that a flow-thru type muffler cannot be as quiet as a non flow-thru muffler?

Now, FAI, what do you want from a muffler? Do you want it to quiet the engine? If you do want it to quiet the engine, then why don't you simply place a decibel limit on airplanes and allow the developers the freedom of all design possibilities.

We also hear from the latest ruling that you, FAI, are going to bring your testing equipment to the Internats and will there decide which is the best kind of muffler. Have the Internats been conceived so that FAI can design airplanes, engines, and mufflers, or are the Internats for the top national flyers to compete? If I were to compete at the Internats, I would want to come to win.

Most flyers who are going to have the opportunity to participate in the coming Internats have already designed their airplane, and chosen their engine-muffler combination. It is a terrible inconvenience to ask them, in such short notice, to make modifications to their selections. I, therefore, suggest that any changes written into the FAI rules become effective no earlier than twelve months after the rule is written unless it is a stringent safety factor. This would allow the modeler and the developer time to find acceptable alternatives.

Sincerely,
Wallace J. McAllister

P.S. – To all modelers. If you are in aggreement with any of these statements, please send a letter or postcard to your national modeling association president and let him know.

As you can see, gang, there has been some less than logical thinking by the FAI rules committee. What in the world difference does it make whether the muffler is of flow-through type, closed expansion chamber, perforated with holes, or whatever as long as it is quiet? The flow-through types do run cooler and, in general, cause less power loss, so if a manufacturer can develop a quiet muffler using this design type, then why should it be considered illegal by the FAI? It is noise we are concerned with, FAI, and the only limitation placed on mufflers used for competition pattern flying should be that of a decibel limit.

With the coming Masters tournament to pick the U.S. FAI team to compete in Europe this summer I would venture a guess that three fourths of the contestants will have been using mufflers of the venturi type. If the rule is not rescinded it will mean the purchase of new mufflers. This, in itself, is not so much of a problem as the fact that many of the power units in common use come as a muffler/engine combination with the muffler bolting or directly attached to the engine, e.g., Veco, H.P., Webra, etc. Fellows with this type of unit will be a little reluctant in being forced to purchase an accessory type clamp-on muffler. Of course, the simple way out will be to plug the opening in the end of the muffler. However, as the muffler was not designed to operate this way, there will also be a considerable drop in power, increased operating temperature, and the other bad side effects of a high back pressure muffler.

Assuming that this rule will be changed and a decibel limit set, then this, in turn, should be of a realistic limit. I understand a limit of 80 dB at 10 meters (32.8 feet) will be placed on mufflers used for the FAI Championships in Europe. Evidently the people suggesting this limit have had little experience with the muffling of model engines and sound levels emitted. I have conducted tests on just about every muffler available and **have yet to find one that can meet this requirement!** The majority of your more popular mufflers run in the 95 dB

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CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

● One fact that amazes me as I read the many fine newsletters that are currently being published is that the membership of clubs across the country is growing so very rapidly. For a long time we have all been aware of the fantastic growth that this hobby and sport is undergoing, and I know that all facets of it are mushrooming, but it is really brought home when you notice the club rosters growing monthly.

As most of you know, a lot of those new members will not stay with this sport for any length of time as it is a demanding one, both in time and in ability to cope with problems and disappointments. The latter is probably one of the reasons why you find so many really great people in this sport. Those who have a hard time trying to face a crash or a wipe out will gravitate to another hobby, while those of us who do stay, learn to come to grips with frustration, despair, and a bit of self analysis. All in all, it makes for a pretty tight knit fraternity. It's not easy, it's not all fun and games — it's not all Snoopy defeating the Red Baron. Lots of hard work go into getting each aircraft ready for flight, and if that flight ends in a devastating crash or even extensive damage, lots more hard work will follow before it's time to take to the sky again. Whenever a friend from another sport or hobby asks me about getting into R/C, I always welcome him, but, I try and make him acquainted with the pitfalls and the problems as well. I'm afraid that the spectator at the flying field may not really know just what he is getting into when he wanders into the friendly hobby shop for that first time.

This, then, is where a club can be of real service to the beginning flier. Not only is the club a place to meet other R/C "nuts," and a place to sign up for work at the flying field, but it should also be a source of information to the fledgling. It seems to me that a really successful club program should include a novice assistance program as a part of each meeting. Take a look at your own club membership. You have experts in many fields, why not use their talents to educate the rest of us? I have been asked many times about ways to conduct a successful club program of contests, a schedule of fun fly events and so on, but it seems to me that the one place that a club can be most successful is in providing help to not only the newcomer, but also the more experienced flier who just may not know the best way to get MonoKote around a compound curve, or how to cover a foam wing.

●

The death this week (early February) of a sister publication really did not come as a surprise to those of us who have been watching the magazine scene for some years, but it did come with sorrow to Don and I, and to many of you. I remember with fondness the years of "Air Trails" both before, and during, World War II. A lot of us cut our teeth on models that appeared in its pages "way back when." The rising cost of publishing a magazine coupled with the fantastic ability that the Post Office has of not being able to run its business correctly, and thus needing more and more money to do its job, has driven a great number of publications into their grave, and will drive more and more in the years to come. You can already note a shrinkage of magazines on the newsstands, and in the long run this will not be good for anyone.

●

Several months ago both Don and I wrote of the exploits of Sheriff Mel Bailey's "Air Force" in Birmingham, Alabama. Shortly after that issue appeared I received the following letter that I would like to pass along to you:

"Just a note to fill you in on Sheriff Mel Bailey's RC ordinance aircraft and a little behind the scenes look into the program.

After the first public demonstration, during which Clark Newman's (Bama Fliers) Kwik Fly was destroyed in flight when a grenade detonated prematurely, the Birmingham Sherrifs department contacted the two other Jefferson County R/C clubs, soliciting additional help.

Among those attending a meeting with the Sheriffs department were Wayne Chancey and myself from the Bessemer, Alabama RC Club. For personal reasons I elected not to participate actively in the program, however, Wayne joined the Sheriff's Reserve Unit and began developing the equipment necessary for hauling and deploying an explosive grenade or tear gas cannister.

During numerous conversations Wayne and I developed the design parameters we felt necessary for the aircraft and bomb release device. They were:

Aircraft

1) Flat bottom high lift wing with ailerons and flaps.
2) Good low speed stability.
3) Relatively high top speed.
4) Inexpensive.
5) Quick to build and easy to repair.

Bomb Release

1) Fail Safe (Ed. Note: You bet!)
2) Designed to either release an explosive grenade or, in the event of riot control, retain a tear gas cannister and pull the pin in flight to disperse tear gas over the crowd.
3) A self contained pod, easily attached to different aircraft.

As Chuck Cunningham pointed out in his January RCM article, we felt that a pattern ship would not fill the bill.

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SUNDAY FLIER

BY KEN WILLARD

● A couple of weeks ago I saw Half-A racing come of age. Up until then, if you had a hot engine and could fly a tight course, you'd have a good chance of winning even though you just used a standard Ace foam wing. In fact, racers with that wing were winning a good number of the events, although it was evident that some of the specially designed wings were going a bit faster.

Also, the number of contestants was relatively small. If you got more than ten guys together you were lucky. But with each succeeding event, the number kept growing.

Some of the better known Formula I fliers were starting to get interested, too. The expense, both in time and money, of Formula I was getting too great, even though the interest in racing hadn't waned. Half-A racing provided the outlet.

So, for the first race in the new year in these parts, I made a special effort to enter so my friend Dick Aubert wouldn't have to apologize to the Pioneers for a lousy turnout.

I should have stayed home.

Seventeen racers showed up — and there would have been more if some of the enthusiasts hadn't had family commitments that prevented them from coming.

But one who did show up was Joe Foster, one of the former top competitors in Formula I. And, as usual, he had done his homework. His racer was (and I use the past tense intentionally, as you will later understand) a simple box fuselage, sort of a mid-wing, with no dihedral, using aileron and elevator control. Also, it was a taildragger, and that makes for some pretty hairy take-offs at times.

Just before the races started, Joe put in a practice flight. There were a couple of other planes in the air at the same time. I was intrigued with the way his plane would overtake the others on the straightaway. After he landed, I took a good hard look at the design — particularly the wing section. With a chord of 7", and the minimum 7/8" thickness, he had a fineness ratio of eight; the maximum thickness was at 45% of the chord. A laminar flow section.

With the airplane's superior speed, and Joe's flawless flying, the outcome was virtually inevitable. He won all of his heats, and took home the first place trophy, together with the remains of his plane. Too bad about that. He had completed that last heat, but, as is his custom, flew a couple of extra laps. While doing so, he made the mistake of polishing the far pylon which I had just rounded a split second earlier. Blam!

We're both building new jobs. And even though my Hot Dawg was a good sport racer, it no longer is competitive. The unmodified foam wing, compared to the laminar flow wing, is visibly slower. And it isn't due to the engine, although you also have to get top rpms along with the faster wing if you are to realize its full potential.

As it always happens in racing, the refinements keep coming along, the speeds get faster, and unless you have a specially designed plane for the event, the odds against you are pretty great. That's too bad, in a way. One of the reasons I like Half-A racing is that you can put a job together in a very short time — particularly if you use the standard foam wing. But that's progress.

Maybe the answer is to have two classes — Standard and Unlimited. Standard would be required to use an unmodified foam wing, and Unlimited could use whatever the designer could dream up — and that could also include controls like coupled ailerons and rudder if desired.

Anyway, like I said, Half-A racing has come of age, both in quantity and quality of contestants. It's a fun event. Even though frustrating at times, as the engines act up, or you cut the pylon a bit too close (no flagmen, you know), or your job squirrels off the starting line and veers crosswind for a cartwheel.

◆ ◆ ◆

Product reports, like film reviews, are nothing more than the opinion of the individual making the report. Item: I tried the new Dow Chemical Urethane Bond, a single tube adhesive which eliminates the mixing of two ingredients as most epoxy bonds require. I found that it did just what the manufacturer claims — sets in two hours and takes twenty four hours to harden completely. I tried it with balsa to balsa, balsa to aluminum, aluminum to aluminum, balsa to plastic, and plastic to plastic. So far as I could tell, it worked with all combos. Yet I recently read a review of it which said otherwise. So what can you believe? I'll tell you. Believe yourself. Try anything new that intrigues your fancy. But try it on a test sample until you're sure it does what **you** want it to do. Then use it — or discard it if it doesn't meet **your** specification. I've seen some pretty glowing reports on materials over the past years, but when it comes right down to using it, nothing takes the place of personal experience.

Take radio systems, for example. What do I like? I like Kraft. I also like Cannon, and just lately, I've been impressed with Proline. But that doesn't mean that the other systems — EK, World, Futaba, Citizenship, Heathkit, RS, and many others aren't good. I just plain don't have any experience with them.

The way I see it, most all of the units now on the market must be pretty good, or they wouldn't have survived this long. And each one of them, at one time or another, has had to survive a bad spell.

Take Cannon, for instance. Basically a good unit, even I had some troubles with it, and kept bitching at Bill. When it worked, it was good, and when it didn't it was lousy. Bill seems to have found the problem,

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Ken Willard cusses his 1/2A engine which balked at the start of a race. You 'gotta have an electric starter for racing. Tom Minger photo.

QUARTER MIDGET

Quarter Midget

BY DON DOMBROWSKI AND FRED REESE

DON DOMBROWSKI

● Many clubs have muffler rules and possibly have felt mufflers would hinder the performance of racing .15's. This is just **not** true as we found out last month.

As an example, Mile Square was a Marine helicopter training base in Southern California and is one of the best flying sites in the country with thousands of feet of paved runways. Because of public pressure from the noise, all airplanes must be fitted with mufflers and pass a DB meter at less than 88 DB from 25 feet away. We used to race regularly at Mile Square until it was closed down last year to all flying. Responsibility for the field was taken over by the County Parks and Recreation Department and the field was re-opened to flying with muffled engines only. Last April, at Model Expo (a fund raiser for the American Cancer Society, held at Mile Square), several of us flew demonstration races with muffled Quarter Midgets. There were no problems with the mufflers but we continued to race elsewhere. Finally our club agreed to try a race at Mile Square with mufflers. Some experimenting with mufflers by the people in QMRC and the Orange Coast RC Club showed that the Du-Bro Mini Muffler would meet the noise limit on any of the current engines. With this information in mind, QMRC decided to adopt the Du-Bro Mini Muffler in stock configuration, using all of the plates and the washers provided as the only acceptable muffler to be used at this site for Quarter Midget racing. We did concede that Taipan owners could use the stock Taipan Muffler. The decision was hotly contested at the meeting, but the subsequent race was successful and without any argument or disqualification due to noise level.

Many of the members were skeptical as to how well the engines would run and what would be the level of performance. At first they felt the airplanes were slower, but was it only the lack of noise? The race times seemed to be about the same as without mufflers and, in fact, the fastest time of the day by Jack Stafford was only four seconds off the course record. Tom Christopher said his engine was only down about 500 rpm on the ground with the Du-Bro Muffler on his Super Tigre.

The only problem encountered using mufflers stemmed from over leaning the engines. There were more burnt-out plugs and engines sagging in the turns until the flyers got the right needle setting. Conversely, fewer engines died on idle check and almost everyone landed with his engine running. It seemed that the idle was improved.

Joe Zdankiewicz with his House of Balsa prototype Miss Dara.

FRED REESE

The mail is beginning to roll in now and it is vital to us in order to keep you informed on what is happening. Please include black and white photographs of special aircraft and, above all, give us your racing schedule or race dates as soon as they are decided. We are working on a two month lead time and will publish all race dates that we receive in time. We will also publish 1/2A and Quickie 500 or any other class races as we receive them.

■ ■ ■

We received a copy of the RAMS Horn from Seattle and also a nice letter from Dave Katagiri regarding QM and 1/2A racing in Seattle. QM has not yet really been established in the northwest, but 1/2A is going strong. Stu Arestad won the November race flying an original design of minimum dimensions using a loose, stock .051TD on suction with a cleaned up Tornado 6/3 prop. His fuel was a mixture of Fox 40-40 and homebrew 10% sport fuel. Stu doesn't recommend running on pressure "because it gets a little tricky to start them

RACE RESULTS

(Course — 400' QMRC Short Course)

Name	Airplane	Eng.	Prop	Radio	Time
1. Jack Stafford	P-51	K&B	TP 7/5N py.	PCS	1:42.2
2. Bob Novak	P-40Q(RCM)	K&B	TF 7/5N py.	RS	1:46
3. Harry Arance	Miss Dara	K&B	RevUp 400 7/6	Proline	1:58
4. Bill Racer	P-51 (Stafford)	K&B	TF 7/5 power	Kraft	2:18
5. Nick Nichols	Brown Racer	K&B	TF 7/5	Kraft	2:03

up, especially in the cold weather, and the added concern of having to get up in the air before the 15 second mark." Bob Hunt finished second and Dave Katagiri placed third with his Cut-Less III. Dave and Stu shared the fastest heat of the day flying the 7400 foot circuit in 1:37.

■ ■ ■

From Forest City, Ontario we received a race report from their Second Annual Quarter Midget Race. Despite the intermittent rain, and winds gusting to 30 mph, the pylon race was a success. Twenty-three contestants came from Ontario, New York, and Michigan to compete. This is up two contestants over last year. I am sure, had the weather looked promising early in the morning, there would have been at least 5 or 6 more. Interest in our area seems to be picking up with each contest held. Between rain showers we managed to complete three rounds of racing. Pete Waters from Livonia, Michigan led the way through all three rounds with his Taipan powered Rickey Rat. Second place went to Keith Shaw from Ann Arbor, Michigan, flying a "Goon" powered by a Super Tigre. Third was Bert Brian flying a K & B powered Rickey Rat. As yet, it looks as though there is no particular engine or aircraft design which seems to be the winning combination. However, competition is keener and the consistent starter and finisher seems to find his way well up in the standings. Counting the Canadian Nationals, there were three Quarter Midget races held in Southwestern Ontario as compared to one last year.

■ ■ ■

The Chicago Pylon Club will be hosting Formula One and Quarter Midget races in the Chicago area on a monthly basis. Their manpower problem has been aided by a unique program involving the pit crew members. By working as a flagman, timer, or lap counter for one contest, a non-racing individual may earn one year's free membership in the CPC. Additionally, any pit crew member working three contests receives a free jacket and tickets for a $100.00 prize awarded at the end of the season. The more contests worked, the more tickets received; the drawing is limited to pit crew members only. "We're very proud of our pit crew and fully realize that without them our racers would be in a real bind."

■ ■ ■

1/2A tip of the month from the RAMS newsletter, Seattle, Washington. *"If you are using a Cox battery clip you will get better starts if you solder the battery leads to the phosphor bronze contactors. This can increase the voltage at the glow plug element by up to 20%.* The factory connection is a simple pressure crimp. In time, the junction oxidizes and its resistance increases considerably. Mine measured a 0.2 volt drop across the junction when it was a year old. This could definitely be enough to make a difference on those cold days. To disassemble the clips, insert a thin blade

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Bob Novak's P-40Q in foreground, Gary Hawk's Stafford P-51, and unidentified racer take off at Mile Square Muffler Race.

Norma and Nick Nichols placed 5th with K & B powered, scratch-built Brown Racer. The Nichols don't miss any So. Cal. QM races.

Scratch-built QM P-40Q by Dave Katagiri, Seattle, Washington. Balsa fuselage, foam wing, covered with Super MonoKote. 63-209 airfoil, S.T. power.

SOARING

BY JIM SIMPSON

I would like to begin this month's column with a direct quote from an article written by John W.. Olcott which appeared in the January 1975 issue of *Flying* magazine. John is a well qualified full scale sailplane pilot and he has this to say about them:

" . . . Weight per square foot of wing area – or wing loading – is a critical factor in sailplane performance. If two ships are identical in all respects except wing loading, the sailplane with the lesser wing loading will be able to thermal more effectively than its rival. If strong thermals abound, however, and there is ample lift to carry a heavy ship aloft, it is more desirable to fly with high wing loading. The reason is that the maximum glide ratio for a sailplane is not affected by weight, but the speed where maximum glide is achieved increases with higher weight, so a high wing loading allows the competition pilot to fly his ship faster between thermals . . . "

John had a lot more to say but I elected to end the quote here because what has been extracted is already a considerable amount of knowledge to absorb and relate. We already know that our miniature sailplanes obey all the same laws of physics and flight dynamics that also apply to the 15-22 meter wingspsan jobs.

To compute the wing loading of your sailplane you must first determine the wing area in square feet then divide it by ounces of weight (total) and the result is your answer. If your craft is close to 6 ounces per square foot it is lightly loaded. If close to 12 ounces per square foot it is heavy. Before you rush right out and throw the heavy ones away, please read on.

To paraphrase John — heavy is not all bad. To consider the case we must first review the instructions for finding thermals with the light ones. It is said that with the light ones the nose will "bob" up and down upon entering a thermal head on. Also, that the craft will bank **away** from the thermal if flying close to it on one side. (This is because the rising air tends to raise the close wing and a bank-away naturally ensues.)

Our problem is how do we know when these things occur if we are flying a heavy wing loading (fast) sailplane? Often, we could fly right through a thermal and not see any of the previously mentioned signs because our heavily loaded plane is so fast!

One of the most reliable solutions is the Thermic Sniffler which is available from Soaring Products, P.O. Box 117, Kensington, Maryland 20795. This device is essentially a small pressure sensitive, altitude sensing chamber which has an airborne transmitter to relay its change to a small transistorized ground receiver which you monitor. A simplified description of how it works is as follows:

The entire apparatus with exception of the power source (small 9v transistor radio battery or 225 mah nickel cadmiums) and antenna (two 17" flexible wires) is contained within a clear plastic chamber approximately 1.25" diameter by 5.75" length. There is a very small orifice in one end which is connected by a tube through the thermistor block to the inside chamber. As the Thermic Sniffler rises in altitude, the higher pressure air which is trapped inside will rush through the orifice which, in turn, causes a tone generator to increase in frequency. This tone is normally about 500 cps and is relayed by the airborne transmitter (which operates at about 147 MHz thus requiring an FCC license to operate) to the monitor receiver which you can carry in your pocket. Your ear can detect this change in tone and, of course, the tone change correlates to movement, thus, rising tone means rising sailplane — decreasing tone is a sinking condition! This ingenious creation weighs only 1.9 ounces, excluding battery, and is an invaluable aid to knowing what your high performance sailplane is up to (so to speak).

The only other really successful method of knowing what such a high performance sailplane is up to is just about as exclusive as the Thermic Sniffler. It is the keen eyesight and good reflexes which all kids seem to have naturally. If you doubt this just examine the record! The really beautiful part about this is that kids who can't afford the sniffler really don't need it and us old fossils who can — DO!

Next month we will continue this discussion as it relates to the two distinct philosophies of flight.

SAILPLANE HINTS & KINKS

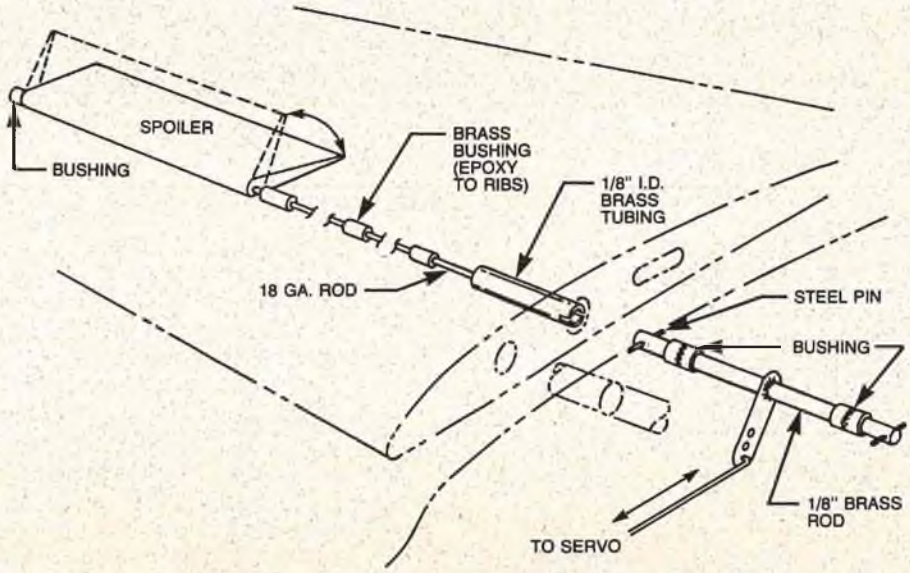
For putting any weight in gliders or airplanes use the plastic 35 MM film cans. Fill with #8 bird shot and epoxy. Your weight can either be measured out ahead of time or just fill the whole can up and then cut with a hacksaw for button shaped weights that can be slipped into any small area. From John J. Bruner of San Diego, California.

Use a simple dress snap for aerodynamic canopy hold-down. (Because of vibration, this method is not recommended for use with engines, only gliders.) I mount the "male" part of the snap in the canopy cover and put the "female" in the canopy compartment. This method has proved very successful in use with my current gliders. From Joseph J. Beshar of Dradell, New Jersey.

PROBLEM: Retrieving the Hi-Start line.

ANSWER: When announcing and advertising the meet each contestant is requested to bring an assistant in order to enter. The assistant is subject to 1 hour of scheduled retrieval duty at the time of entry at the discretion of the contest committee. (A pilot may perform this duty himself if he chooses not to bring an assistant.) In this manner the meet moves like clockwork. As an example, a meet with 32 entries lasting 3 hours has 4 retrievers at all times which is very adequate. Since the number of retrievers required is proportionate to the number of pilots you will always have enough retrievers enabling the use of one winch or Hi-Start if desired for the entire meet since retrieval is rapid. □

Try this spoiler installation on your next thermal chaser.



ASW-17 SPOILER INSTALLATION BY JOHN TIDEY

PLAYBOY, SR.

Joe Elgin's famous Free Flight design of the 30's makes its debut as an RC old-timer. You'll find it has no peer. By Paul Denson.

Take a look at the kit you are flying — nine chances out of ten you know who designed the plane, probably because he flew the ship to a National Championship at one time or another. Goldberg became famous because of his Sailplane, Zipper, and Clipper. Sal Taibi flew his Powerhouse and Brooklyn Dodger. Today, Mark and Rod Smith have flown the Windward and Windfree to victory in many National Sailplane contests. These people are known by all modelers because they flew their own planes and received the publicity they so well deserved.

Have you ever heard of the Playboy? Oh! Sure, it was a kit that was put out by Cleveland way back in the '30's.

A good plane? Yes, it did win a large number of contests, rumor has it that it eclipsed all kit planes as a contest winner. Ever see them around any more? No?

Check out the old-timer contests, it is right in there with the best. Look through any model magazine and see how many pictures of this pylon beauty you will find. It is still the most beautiful Free Flight plane you will ever see.

Free Flight? Sure, and try R/C too. You will see Playboy flying in the pure form with spark plug, coil and condenser. You will see her with a glow engine and three channel radio searching out the thermals and floating like a big 7 ft. feather.

Who designed the Playboy? Well-er-uh it was a Cleveland kit and you can get information from John Pond about her.

I asked you, "Who designed her?" I didn't know either and I was flying one myself. So I went to the dean of old-timers, John Pond and asked him. He told me he thought it was Joe Elgin — he had flown with Joe many years ago, but in answer to another query, he did not have the slightest idea where I might find him. "You might try some of the other old-timers" and this I did.

I wrote the AMA and asked Frank Ehling, I wrote Frank Zaic, I asked Clarence Mather, I went up to Lake San Marcos and talked to the curator of the model museum, Russ Berrera — you would think that a lineup like this would at least have some idea. They all gave me clues, but nothing definite. Since Cleveland Model Supply Co. had been in Cleveland, I should write someone there and perhaps he would know. It was pointed out that Dick Korda was a long time resident of that Ohio city. While looking up Dick's address in the Cleveland telephone directory in the library, it dawned upon me to look and see if a Joe Elgin was there too. There was just one Joseph Elgin listed therein. The next

Miss Janice Hall poses with the author's Playboy Sr. on floats. Photo taken at Lake Murray, San Diego, California.

LEFT TO RIGHT: Joe Elgin, Dick Korda, Bob Besse, Chet Novak, John Wullschager, George Reich, George Vasenko, Harry McCall. Photo taken in 1939 at the Nationals, the year Dick Korda won the Wakefield event.

day I dashed off two letters with high hopes. The letter to Dick was returned for one reason or another known only to the postal service. Two days later a letter arrived from a Joe Elgin postmarked Cleveland. It took guts to tear open the letter as this was my last avenue. It was a short letter admitting to being the right Joe Elgin and saying, "Let's talk about the Playboy series — it has been a long time." Much of the following is from subsequent correspondence with Joe.

Today thirty-five years later, the name Playboy almost seems up-to-date. From years of experience in Free Flight, indoor and outdoor rubber, a small Free Flight gas job evolved. As gassies went in those days it was relatively small, "junior size" I guess you would call it, but extremely successful as a flyer. It performed! When it was scaled up to 7 ft. wingspan, kitted and christened with the, then ridiculous name, Playboy, it became a powered sailplane — a real floater. Flown with an O & R .60 up front it started a new page in the history of modeling. In the winter of 1939 the kit hit the market and Bill Schwab built the first Playboy Sr. He went on to win many contests, first in Cleveland, first in Akron, and sixth in the Chicago NATS. This is the plane that broke the world's record twice within 7 days. That was just the start and she is still going strong today.

The original kit was $3.95 complete, less engine. Try $39.50 today for the same kit — it doesn't seem out of place. Then look around at your local hobby shop. There wasn't much difference in putting the kits together back then. If things got busy, you stopped your tasks at the drawing board, went back and helped run balsa through a

R/C VERSION OF THE PLAYBOY SR.

Designed By: Joe Elgin, modified for R/C By: Paul Denson

TYPE AIRCRAFT
Old-Timer R/C
WINGSPAN
80 Inches
WING CHORD
10¾ Inches
TOTAL WING AREA
750 Square Inches
WING LOCATION
Pylon Mounted
AIRFOIL
Undercamber
WING PLANFORM
Constant Chord Center Section
Elliptical Tip Panels
DIHEDRAL, EACH TIP
7" (polyhedral 2" at break and 8 inches at tip)
O.A. FUSELAGE LENGTH
40¾ Inches
RADIO COMPARTMENT AREA
(L) 10" X (W) 3" X (H) 3¾"
STABILIZER SPAN
27½ Inches
STABILIZER CHORD (incl. elev.)
7 Inches (Average)
STABILIZER AREA
175 Square Inches
STAB AIRFOIL SECTION
Flat Bottom
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7½ Inches
VERTICAL FIN WIDTH (incl. rudder)
6 Inches (Average)
REC. ENGINE SIZE
.29-.35 Cubic Inch
FUEL TANK SIZE
6 Ounces (round)
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Three
CONTROL FUNCTIONS
Rudder, Elevator, Throttle
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 48 Ounces
Wing Loading ..... 9.23 Oz./Sq. Ft.

LEFT TO RIGHT: Stan Hill, Carl Wheeley, Joe Elgin and Dave Kneeland. 1953 U.S.A. Power Team at Cranfield, England - - - Dave Kneeland – World Champion.

gang saw that could cut up to 8 sheets at a time. "I think all model builders often wonder about the sawdust we've inhaled in our lifetime. But in the woodshop you did it in one afternoon."

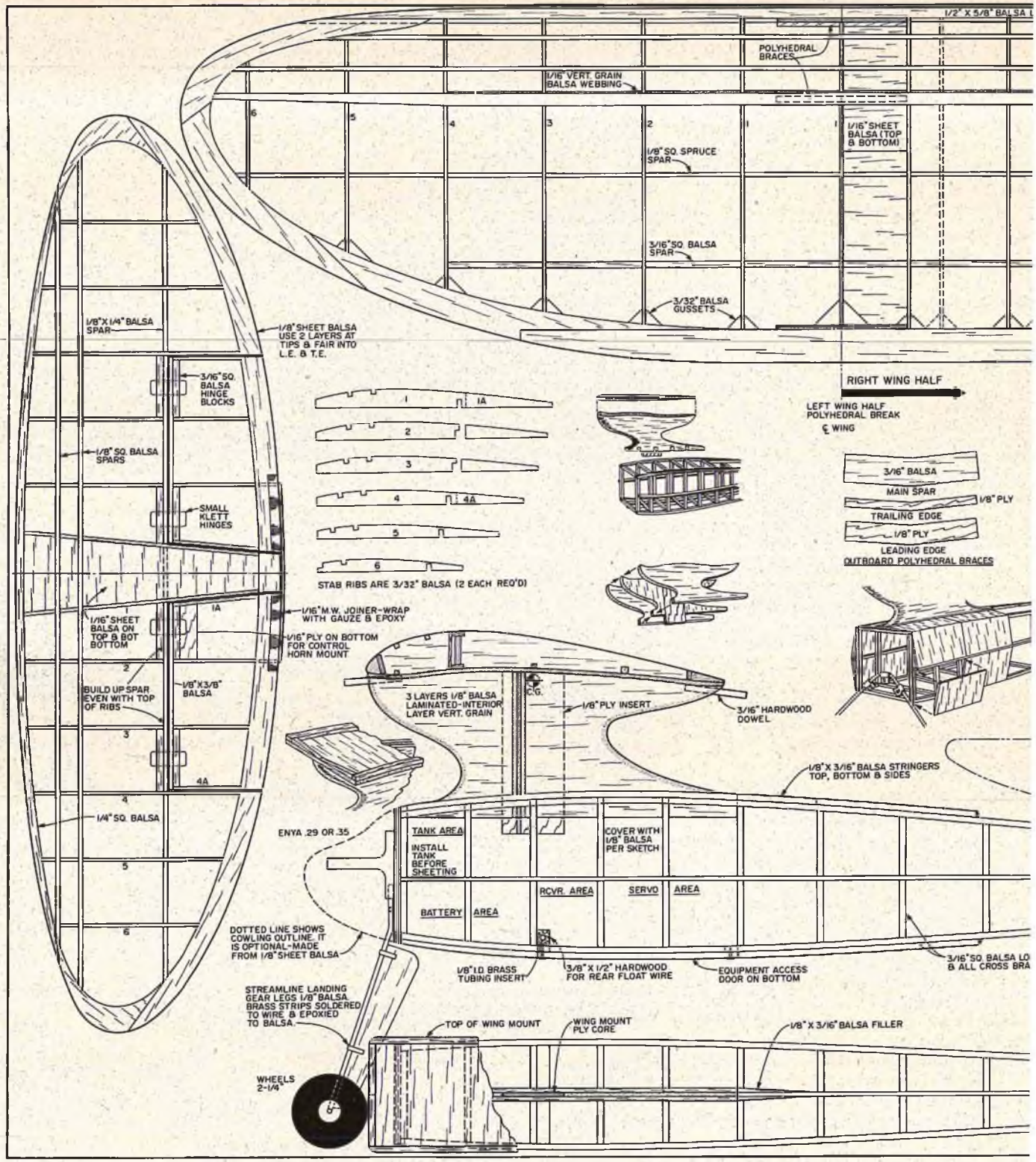
Cleveland Model and Supply Co., Inc., owned by the Pachasa brothers, put out two other Playboy kits — the Junior, from which the whole series evolved, was powered by an O & R .23 and had a 46" wingspan and was priced at $2.50. The Baby of the family, ready to fly with batteries, coil, condenser and engine, weighed under 16 ounces. The 33" wingspan Baby, purchased for a whole dollar, would correspond to the 1/2A planes we are flying today with TD .02's.

Cleveland — it was a good place for a model builder in the '30's and '40's — in fact, it was the hub of the model world and the model company that bore the city's name did a large job in publicizing the area. Who has not sat by the hour and looked at the ads with a picture of each plane they put in the model magazines. One would be hard pressed to find an old-timer who has not built a Cleveland Kit. There were many names that also made Cleveland famous. A local contest would have appeared like the Nats of those days: Dick Korda, Chet Lanzo, George Reich, Red Hillegass, and Jerry Kolb are some of the guys who represented two fine clubs, the Cleveland Balsa Butchers and the American Airlines Gas Model Club. Dick Korda won the Wakefield in 1939, Reich did it in 1960, and many of the other flyers, including Joe Elgin were members of the U.S. teams in Wakefield, FAI or Nordic.

About this time WW II came along and most of the modelers felt there must be a niche in the flying end of the armed forces for them. Joe Elgin became a navigator on a B-17 and, after 19 missions over Germany, a FW 190 knocked them out of the air. He spent 16 months in a prisoner of war camp. A modeler is a modeler wherever he may be. "I scraped glue from furniture joints, split wood (not balsa) to its finest with razor blades and used rubber obtained from suspenders and elastic. I was able to construct some simple stick models that actually flew out of the barbed wire compound. The German guards were very cooperative and actually retrieved the models for me. Whenever I flew, the other prisoners playing baseball would stop and watch. It was a lot of fun."

Joe started as an apprentice lithographer after his year at Cleveland Model Supply and is still in that trade today. After WW II he continued his model plane hobby as a member of the 1951 Wakefield Team, the year the contest was held in Finland. One week later they flew the first FAI meet in France. On his first flight he lost his Arden .09 powered ship OOS. He maxed, but the ship was never recovered and, since that was his only plane, he was out of the contest.

At the 1953 Cranfield, England FAI meet, Dave Kneeland became World Champion and the U.S. Power team won



first place. Stan Hill, Carl Wheeley, and Joe Elgin were the other members of that team. The Playboy Sr. was now 15 years old.

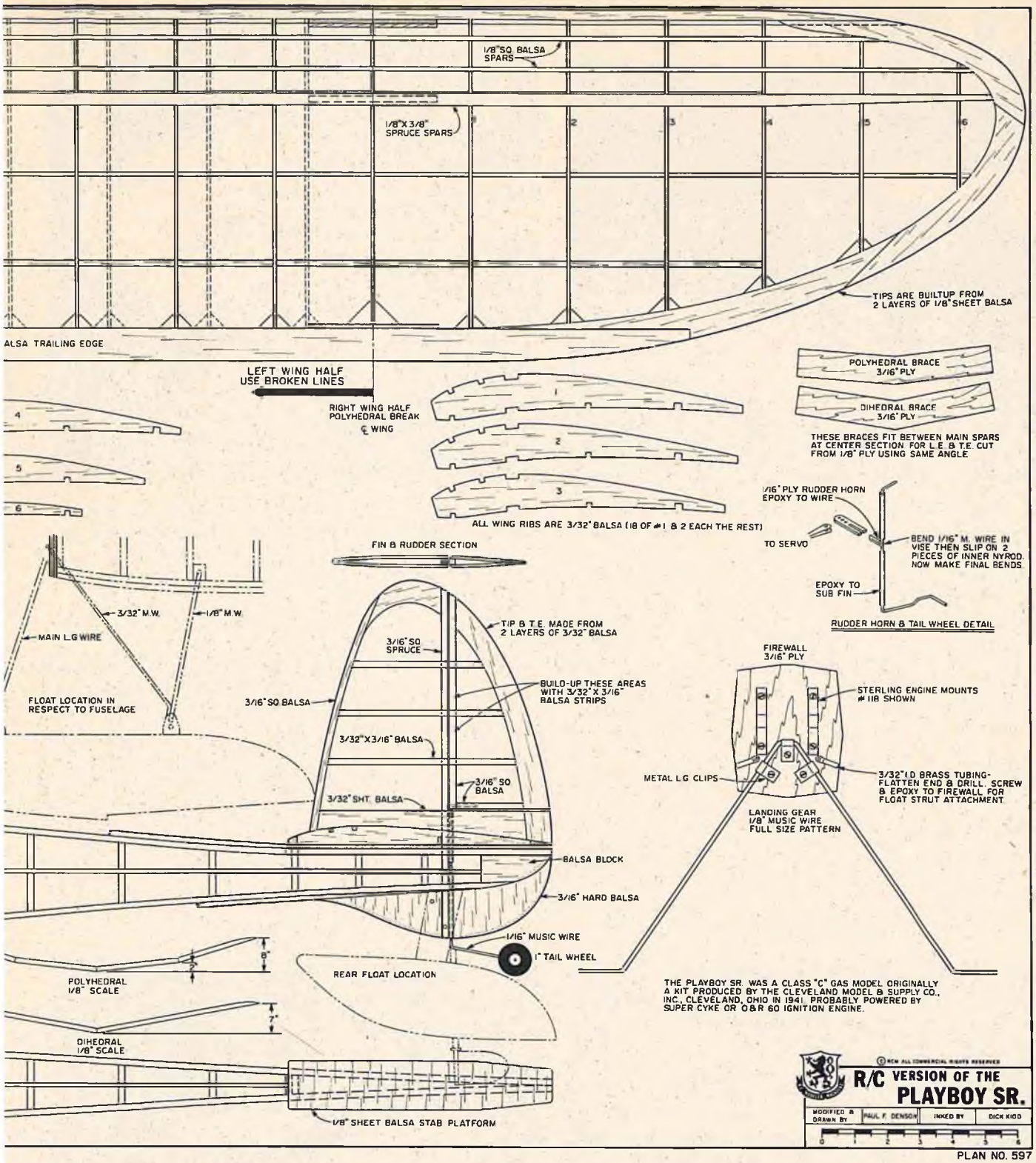
Joe Elgin's interest in flying hasn't stopped since — he still flies indoors but since he started to fly the 'real thing' about 6 years ago it is more fun to visit a strange field, rent a glider, and do some soaring, now he is up there in person where the Playboy has spent these past 35 years searching and floating from thermal to thermal.

CONSTRUCTION

The plans for the Playboy are pretty much self-explanatory. So was the last kit I built and it was the hardest ever, so perhaps a few words are in order — particularly having to do with the modification for R/C.

Extremely important is the beefing up of the wing to stand the stresses placed upon it by movable control surfaces, after all, you are going to be tempted to do an occasional loop or snap roll, and the wing must be strong enough to take it. Even though the spars are spruce and you have 1/8" ply sheet dihedral braces, the main spars must be webbed with 1/16" sheet vertical grained balsa out at least to the polyhedral break. I had not webbed the prototype and recently snapped the wing just outboard of the dihedral brace pulling out of a dive before going into a loop. The bottom spar broke the glue joint between it and the dihedral brace and the top spar failed. If it had been webbed this wouldn't have happened.

Because of the pylon on top, entrance to



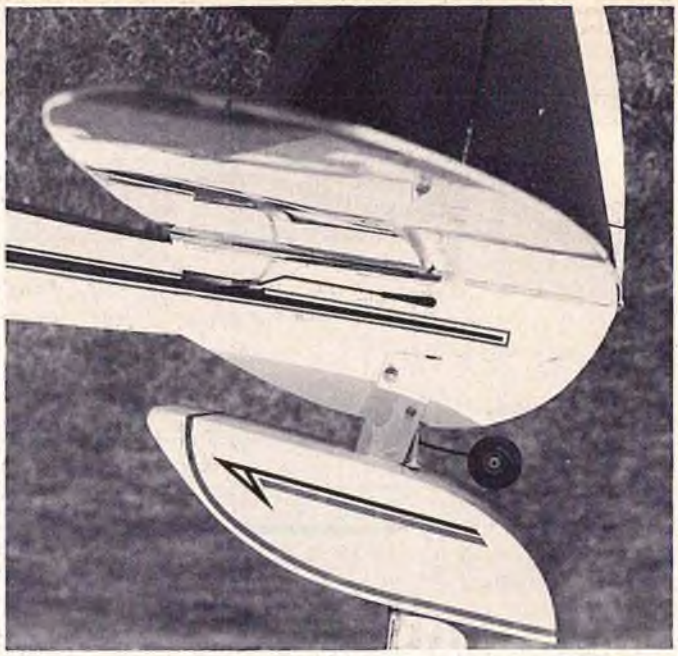
PLAN NO. 597

the flight pack must be through the bottom. Finish the cross grain planking on the front of the fuselage then remove the section designated as the equipment access door. Don't forget to build the fuel tank area before planking the fuselage. The fuel tank may be removed through the access door, if necessary. I used the largest cylindrical fuel tank that would fit the space, in this case a 6 ounce tank. A .29 will run for about 15-20 minutes at half throttle on this much fuel.

Make sure the 3/16'' square spruce vertical piece of the fin extends through the sub fin. Since it passes through the stab it will weld the tail assembly into a compact unit. Furthermore, if you decide to use floats it will be the hardwood point of attachment for the rear float. If there is even a small chance that you intend to fly the Playboy Sr. on floats, install the 3/8'' x 1/2'' hardwood cross member in the fuselage before planking — it may be added later on but is difficult to do so.

As an R/C trainer, the Playboy Sr. has no peer. My 15 year old young friend knows, no matter what position it gets into, just let go of both controls and it will get **itself out** of trouble. It is too inherently stable to stay in any position but right-side-up. Don't try to fly it inverted — it can get into that position but, since the airfoil is designed for lift, when inverted it lifts **down** and **fast.** It would decidedly be a way to get out of a boomer thermal, quickly.

I must give credit to Joe Elgin for the design and drawings, some of which I



traced. The sketch of the pylon, and the one showing the planking, were drawn from the original which was done by James Powell, a great illustrator who did all the fine sketches showing details which words or 3-views couldn't compete.

Try the Playboy Sr. on floats. A greater thrill is hard to find as she rises up on her floats gently kissing the top of each wavelet then lifting clear, leaving a twin row of droplets across the surface of the water as she moves serenely into the blue sky.

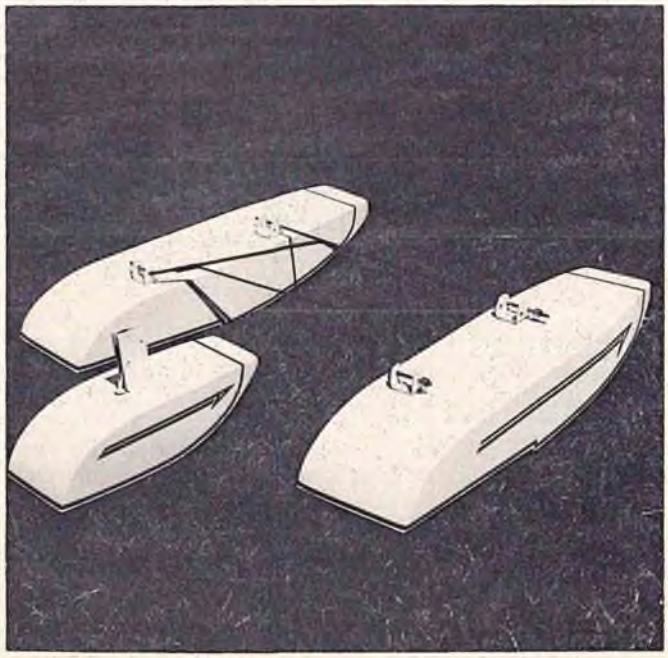
ANTIQUE AND OLD-TIMER FLOATS

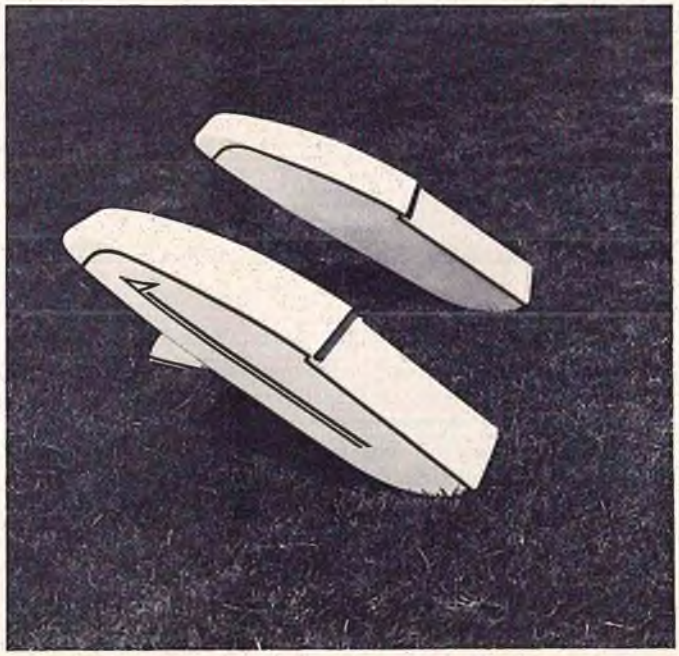
Flying R/C old-timers falls into two categories, that of contests with various and sundry rules and Sunday Flying. After trying a loop, a few touch and go's, you get way up there, cut the engine and see how many thermals you can catch. But, you find you want something else to slip in-between. Wait until you put floats on old faithful!

There are floats available in kit form, made of plastics and even plans for floats in RCM, but these modern floats do nothing for the aesthetic value of an old-timer or antique. (As a matter of fact, some would say neither does R/C!) While doing research on another project in the Flying Manual Aviation's "How-to-Build" Handbook for 1933, I ran onto a set of seaplane floats designed for the Pietenpol Air Camper by Sam Rabl. These floats, weighing only 32 lbs., were for home-built planes up to 600 lbs. of flying weight. In the article were 6 pictures of the finished floats for various planes and all 6 pairs were different from the plans, so I guess if those early flying builders could experiment, so be it. These are my experiments in the model float field.

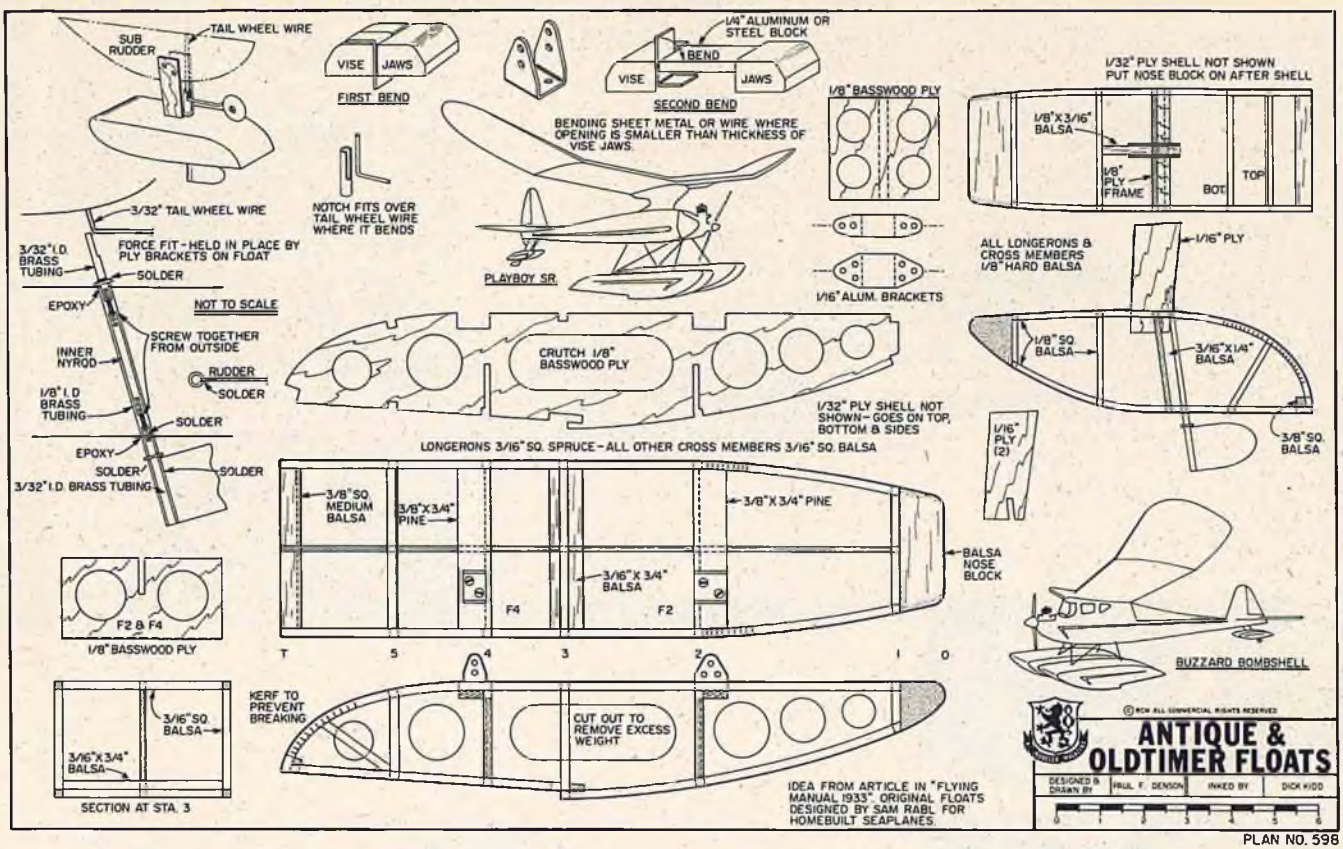
Build a pair, and the first take-off is one you will remember forever. Push her out into the lake, then add a little throttle to see if she will taxi. Try a water turn or two to see if the water-rudder is effective, then aim her upwind. Pour on some power, a little more, just a hair more, and up she comes out of the water like a giant water bug on stilts, kinda skittering across the water leaving a pair of twin wakes. With a splattering of drops on the surface she is airborne and climbs gently into the sky.

Joining the crowd at the lake or the beach is easy — the floats aren't that difficult to make. These are two important things to keep in mind, however, if you are flying from salt water: Stay away from steel fittings whenever possible. If they are necessary (and landing wires are) clean them, then coat with zinc chromate and paint with a good fuel proof color. Second, you are in a new medium — water — and it can get in almost anywhere, so protect your radio — if you get it wet in salt water, always have fresh water to wash it immediately, not later when you get home





FULL SIZE PLANS AVAILABLE — SEE PAGE 152



— it will be too late when you find that corrosion has already set in. Since the floats are meant to be in the water, they must be constructed absolutely water tight. I use 5 minte epoxy and model cement since the aliphatic resin glues will break down if they get wet.

You will now get your introduction to boat building since these floats are built like most small boats, upside-down. Construct the two sides from 3/16" square spruce, using balsa for the cross members. Near the stern, where the transom should be, it will be necessary to make a few saw cuts, cerfs, so the spruce longerons can make the sharp curve. Cut the crutch and formers F2 and F4 from 1/8" basswood ply. The latter may be obtained from one of the larger hobby dealers and it is much lighter and less expensive than birch aircraft ply.

Cut the two 3/8" x 3/4" pine cross members to length and taper the ends of the one at F2 slightly. Next, lay in place on the top view, put the crutch over them, and glue it in place. Make sure the crutch is square with the building surface. Interlock formers F2 and F4 over the crutch and glue them to the pine cross members. It might be well to insert the 3/16" x 3/4" balsa step block through the crutch since it would be difficult to insert it after the sides are glued on.

Place the two sides on edge on the plans, line up and glue to the ends of the pine blocks, formers F2 and F4 and the step block, forming rigid box. Allow the glue to dry thoroughly then bring the forward ends together, cerf if necessary, and glue in the bow spacers. Put in the 3/8" square balsa transom block. It may be planed to shape either before or after being installed. Add all other cross members at this time.

The grain in the side skin runs forward and aft. On the top and bottom the grain runs athwartship — that's cross-wise to you airdales. When putting the bottom skins on, it is imperative that the glue joints, particularly at the step, be water tight. Follow the installation of the bottom with the sides. Before installing the top, go inside and lay a bead of glue along every seam where the skin meets a longeron or cross member on the sides and bottom. Don't tell me it isn't necessary — this old sea dog had one float pop a seam and it is extremely disheartening to remove a float and hear the water sloshing around inside. How do you get it out? How do you dry it out inside when you do?

Add the top skin, using strips of masking tape to assure a good glue joint where the skin comes down over the transom block. This part is always submerged when the plane is in the water.

Painting is, of course, an aid in waterproofing, but don't depend upon the paint to fill a badly glued seam — the first twist or bump will open it enough to let the water pour in. Why does the water want to go in there anyhow? The float is full of air, that should keep the water out. Perhaps there is a physics law to explain the whole thing. I was going to put a funny in here, like Gumperson's Law, or Allen's Axiom, but a possible reason dawned on me. There it is, the float, sitting on the hot sandy beach waiting to go in the water, the heat from the ground warms up the float, the air expands inside, forcing some out through the screw holes and other minor imperfections. Then, when you are ready, you put those hot floats in the cool clear water and the air is cooled and it condenses, creating an area of low pressure inside the float. The same principle that allows your plane to fly in the first place forces the water into the floats like sipping cider through a straw.

Would a pressure relief tube in the top of the float stop this? While we are being ridiculous, how about putting a bike tire valve in the float and pressurize the interior of the float — as long as the air is busy trying to get out, the water can't get in!

There is a possibility of using only two floats, however both of my old-timers — a Buzzard Bombshell and a Playboy Sr. — have such long tail moment arms, they will sit horizontal on the workbench with floats, but put them in the water and down goes that tail, necessitating the small rear float. If you moved the floats further back and your plane has a short moment arm, you could probably get away with only two floats. The general installation rule is, the top of the float is parallel to the thrust line. This makes a nose high landing necessary or you will find that it is possible to stub a float toe and flip the plane. Be sure to flare the plane slightly as you land.

When applying the floats to my planes I used the front bracket for the regular landing gear wires and added a structural member in the fuselage more or less above the rear bracket. An "N" strut may be necessary to stop forward and aft rocking. A 1/8" rod through the second hole in the forward bracket acts as a spacer bar to prevent the floats from splaying out on landing.

Much to my surprise, it was determined during a picture taking session that the floats

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The first RC Stand-Off Scale model of the famous Helldiver, which was used in carrier based combat raids against Rabaul, Kwajalein, Entiwetok, The Marshalls, and the Marianas in World War II.

BY DON WILLIAMS

This .60 powered version of the Curtiss SB2C-1 is extremely easy to build for a scale model and flies quite realistically. It has no inherent bad flight characteristics and will make you look like even a better pilot.

CURTISS SB2C-1 HELLDIVER

I have been modeling for thirty-one years and I cannot recall ever seeing the Helldiver modeled before — either in C/L or R/C — although I could be wrong in the C/L area as I haven't kept up with this phase of our sport/hobby for several years.

As for R/C, I cannot see why it hasn't been done since it has a lot of potential. Although it is a taildragger it has a wide track landing gear and this makes for relatively easy ground handling. It has ample wing area and a thick airfoil section which adds up to excellent flying characteristics as well as very slow stall speeds. It has a huge tail section which doesn't hurt anything at all. The upper portion of the fuselage is about half canopy and is very easy to duplicate as most of it is wrap-over type. An added plus are the nice big fillets which streamline the aircraft and make it very clean looking as well as reducing drag. The fuselage is large enough to accommodate any equipment you wish to use. The wing span is 60'' which is roughly 1¼'' to the foot and designed to utilize a .56 to .60 engine.

The XSB2C-1 Helldiver was conceived in 1938, test flown the first time in 1940, and delivered to the Navy for carrier operation in 1942. It was used in combat for the first time in 1943 in raids against the Japanese held Rabaul. It was also used at Kwajalein, Eniwetok, the Marshalls, and the Marianas.

In addition, it was tested by the Army and was known as the A-25A Shrike. Marine Squadrons also received Helldivers for use as land based dive bombers. For armament the Helldiver carried two .30 caliber machine guns in the rear cockpit and four .50 caliber machine guns in the wings. It could carry two 1000 lb. bombs internally and two 500 lb. bombs externally in the wing racks, and travel at a speed over 300 mph.

It was not a small aircraft. It had a wing span of roughly 49' and a length of approximately 36'. There are a few added inches to these figures but I just rounded them off into approximate feet for this Stand-Off Scale model.

CONSTRUCTION

I usually start with the wing first as I really hate to build them (sound familiar?). It's a job that has to be done so get it out of the way. Besides you will need the wing as soon as the fuselage is constructed.

Start the construction by cutting out all the parts. Build the wing up side down so as to keep the top flat. Pin the top main spar to the plan and glue all the ribs in place. Next, glue the bottom main spar in place and the 3/16'' square rear bottom spar. Then glue the 1/4'' square leading edge to the ribs and let dry. The second wing panel is built in the same manner and the two are joined with the 1/8'' ply dihedral brace and the 1/8'' ply gusset at the leading edge.

The pushrods may be installed at this time and, when this is done, cover the entire wing with 3/32'' sheet balsa starting with the bottom trailing edge sheet. Next do the top trailing edge sheet, the bottom leading edge sheet and so on. If fixed gear are to be used, be sure to install the landing gear blocks before the wing is sheeted. Retracts are another story but the wing is deep enough to accept most any retracts on the market today.

Fuselage:

Begin the fuselage construction by cutting out the sides. These will have to be made from 1/8'' x 8'' sheet or you will need to laminate a 4'' sheet to a 3'' sheet in order to have a sheet that is wide enough. Just make sure that, whichever way you decide, the sheets match as closely as possible. Near the tail you will have a double curve and it is very important that both side sheets have, as nearly as possible, the same tension.

Glue the fuselage doublers in place. (Be

sure to make a left and a right fuselage side.) Glue the 1/4" square along the bottom of the fuselage sides aft of the wing saddle and the 1/8" x 1/4" along the top as shown on the plan. Set these aside to dry and cut out all the fuselage bulkheads and the 1/8" x 1/4" spreader for the tail. Glue the 1/4" square cockpit floor support to F-3 and the 1/8" x 1/4" stiffeners to the top and bottom of F-6, F-7, and F-8.

Next, glue the fuselage together at the tail, inserting the 1/8" x 1/4" spreader in-between. Do no taper the spreader. Clamp the tail together, making certain the sides are square. When this assembly is dry, dampen the sides and glue bulkhead F-5 in place. Use masking tape or rubber bands to pull the sides in and let dry. Dampen the sides again and add bulkheads F-6, F-7, and F-8, using the same method to pull the sides in around the formers. The hard part is now done.

Glue the firewall in place and then F-2, F-3, and F-4, dampening the sides and pulling in with the masking tape. After all this is dry, and the tape is stripped off, the cockpit floor slipped in. Notice that it is cut cross-grain and is in several pieces. Slip all the pieces in from the front and slide them back in place. Now glue them from the bottom. Everything becomes rigid at this point so make absolutely certain your fuselage is in perfect alignment before gluing. Do not force fit any of these parts. In fact, it would be better if they were a little on the loose side since a force fit can misalign all your beautiful work. I had to cut mine loose twice before I discovered what was happening!

Now install F-3T, F-4T, and F-6T. F-3A, F-4A, and F-6A, are 1/8" ply canopy frames and will be installed much later. When F-3T and F-4T are dry, cover with 1/8" sheet balsa. At this point you should drill the holes for the engine mount, fuel lines and throttle pushrod while the firewall is still hanging out there in the open.

The upper front and the turtle deck are now strip planked with 1/8" x 3/8" strips. It may be suggested that you cut your own strips for this. In this way they will be more uniform in overall consistency. Start at the bottom and place one on each side. Continue in this manner until it is all covered and then glue the chin block in place.

Sand the bototom of the fuselage flat and lay it on the 3/4" bottom block. Mark along the fuselage sides with pen or pencil and cut to shape. The 3/4" block may seem heavy but once it's hollowed out it's light enough. If NyRod type pushrods are to be used, now is the time to install them. Now glue the bottom block in place. Cut the cowl sides from 1" block and glue in place along the front chin filler piece. At this time you can also drill a 1/8" hole for the tail wheel strut. This hole will later be filled with a piece of inner NyRod. It is easier to drill the hole now than after the rudder is installed. Try it, you'll like it.

Carve and sand the fuselage to shape. Cut the stabilizer and elevator from 1/4" sheet and install the stab. Cut the rudder from 1/4" sheet and install it also. When this is dry, cut out the filler blocks and glue on top of the stabilizer, one on each side of the rudder. Let dry and carve and sand to shape. Sand the whole fuselage down nicely and fill any cracks with Dap spackling compound and sand again.

Glue the 1/32" ply fillet bases in place and, when dry, add the 1/16" sheet balsa fillets. Sand and fill with more Dap.

Finishing:

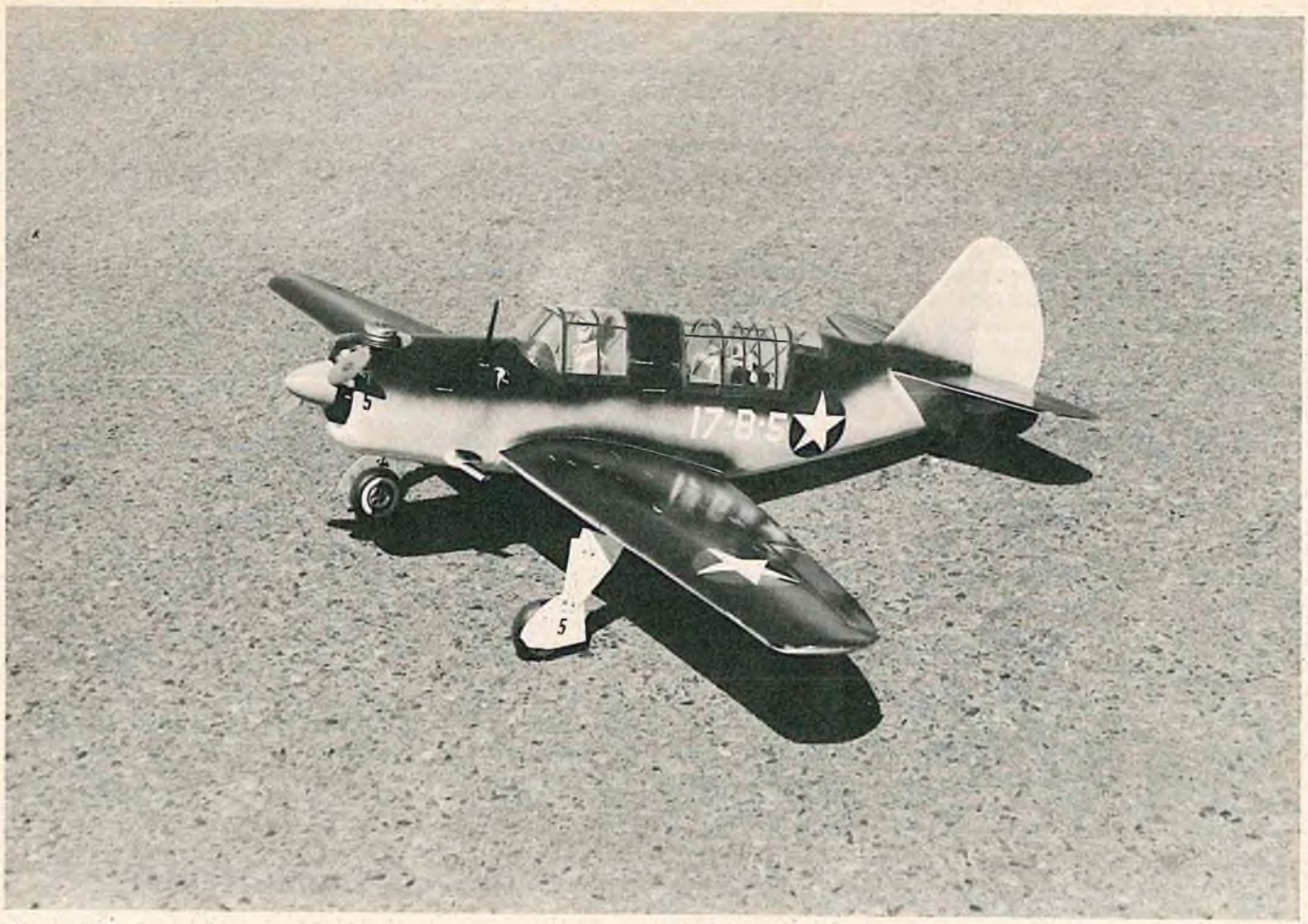
The aircraft should now be ready for covering, using your favorite method. I will describe here how I do it. You do as you like, but I find this method easiest for me.

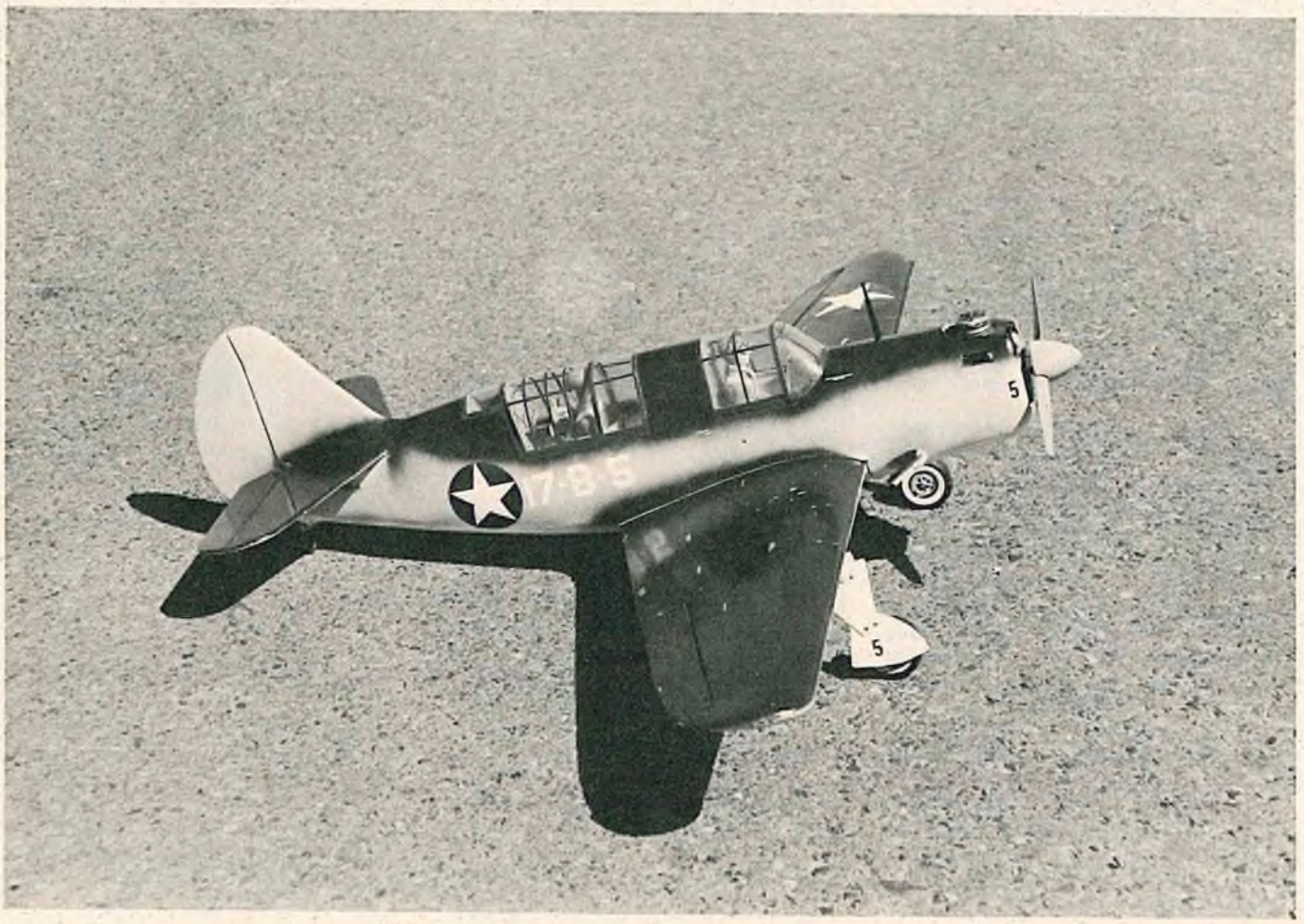
Brush on two coats of clear dope, letting each dry and sanding between coats. At this point you can cover the aircraft with whatever you wish. I use silkspan, heavy on the wings, medium on the fuselage, and light on the tail. I use silkspan religiously because I have found that other coverings can cause a lot of internal damage in a hard prang where you have a broken wing, etc. On the other hand, with silkspan, and with the same break, the damage is usually in the immediate stress area and nowhere else so repair is much easier. Also, the repaired

CURTISS SB2C-1 HELLDIVER

Designed By: Don Williams

TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
60 Inches
WING CHORD
12½" Root — 5⅜" Tip
TOTAL WING AREA
531.5 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Swept T.E.
DIHEDRAL, EACH TIP
3° (1-7/16" at tip rib)
O.A. FUSELAGE LENGTH
44 Inches
RADIO COMPARTMENT AREA
(L) 9" X (W) 4½" X (H) 2½"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (incl. elev.)
6 Inches (Average)
STABILIZER AREA
132 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
8 Inches (Average)
REC. ENGINE SIZE
.56-.61 Cubic Inch
FUEL TANK SIZE
12-14 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Five
CONTROL FUNCTIONS
Rudder, Elev., Ailerons, Throttle, Flaps
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 104-112 Ounces
Wing Loading ..... 29.27 Oz./Sq. Ft.





area is much easier to conceal than with other types of covering. By tearing the paper rather than cutting it it will feather right in almost by itself with no raised edges to have to sand down or fill around. I have also found that it goes on, (at least for me), a lot easier than the other coverings and fills very rapidly so you don't add a lot of weight by having to put on coat after coat. It only requires about three coats of clear dope and you're ready to go on to the next step.

Spray on a coat of "Hot Rod Grey" auto primer and let dry. Sand this down with 320 wet-or-dry used wet. The primer sands very easily so be careful while sanding. Sand only until you see light spots showing through the primer. These are high spots and if you sand any further you will be sanding into the covering. At this point, wash the aircraft with clean water and dry with a tack cloth. Let it set for at least 1/2 hour to make sure any other moisture has evaporated and spray on a second coat of primer. Sand this coat lightly and watch for any light spots. If there are any, repeat the process a third time. If there are none you are ready for the color.

Since the "Helldiver" is depicted in the 1943 naval camouflage color scheme it is tri-colored — two shades of blue and white.

Spray the light colors first, starting with the white. Spray the bottom of the fuselage and stabilizer, also the wing to just past the landing gear struts. The strut covers will also need to be painted white. Now, when the white is dry, spray on a light blue. Spray the underside of the outer wing panels, the fuselage sides, and the rudder this color. When this is dry, spray dark blue on top of the fuselage, upper surfaces of the wing and stabilizer. None of these colors should be masked so the over-spray will give a fading, one into the other effect. Don't overdo the over-spray, though, or you can ruin the effect. Practice on something else until you can do it reasonably well and then apply it to the aircraft. The insignia and large lettering is cut from trim MonoKote. For color scheme refer to Profile Publication #124.

Cockpit Detail:

At least some cockpit detail is a must on this aircraft. It just looks too empty without it.

An instrument panel and pilot were used in the front cockpit, and guns in the stored position, and a gunner in the rear cockpit. These add quite a bit to the overall effect.

To make a very simple instrument panel that looks good, take a piece of black plastic and cut to shape. Next, using different size brass tubing in your drill, cut the instrument holes. A word of caution is due here. Place the brass tubing where you want the hole to be and add some pressure before starting the drill. Otherwise the tubing may "walk" and ruin your panel. Also clean the piece of plastic out of the tubing before cutting the next hole or the same thing may occur.

When cutting the hole, you will get a slightly raised edge around each hole. Do not trim this off. It makes a dandy rim around the instrument.

Now that all the holes are cut, cut a piece of white plastic to the same shape as the black piece and glue to the backside of the black one with plastic cement. Take a simple "Flair" pen and draw the instrument in each hole and you're all done unless you want to add a few knobs and switches here and there as I did. You'll be surprised how good it looks and the difference it makes in the overall appearance.

The pilots were 2" scale and a balsa block had to be added to the bottom of each one and carved to shape in order to make them high enough for the cockpit. You could add a lot more detail to the aircraft than I did but even with very little it looks good.

The antenna post on the cowl side is detachable and the receiver antenna goes up through it and back to the tail for a further scale look. I had originally intended for the rear cockpit to be open and the guns sticking out in the open air but then I thought of all the oil and dirt that would collect there with hardly any way to clean it so the guns were placed in the stored position and the cockpit closed in. It looks good this way and it's sure a lot cleaner!

The only part of the canopy that should be molded is the front canopy and this is very easily done, as I will explain further on. The rear canopies are cut from .015 clear plastic and simply wrapped over the canopy frame and glued. Tape was used to simulate the frames on the outside.

The front canopy was molded over a balsa block mold right on top of my wife's kitchen range. This can be done if you have an electric range. If not you will have to go back to the "old oven trick."

Set the mold up on blocks so that when it is raised about 6" it will give you plenty of room to work. When the coils on the range are red hot, hold the plastic 12" to 15" above the burner, using gloves. It only takes seconds so be careful. Now, when the plastic sags (it may even smoke a bit) flop it onto the mold and push down as evenly as you can. Hold for a few seconds till it cools and — presto — a canopy! Now just trim and fit it to the aircraft. The hardest part of the whole thing is carving the mold and that's not really hard either, being balsa. Glue in place and use tape for the canopy frames. The front canopy was molded from .030 clear plastic.

Flying:

The day I picked to test fly the "Helldiver" was beautiful. The sun was shining brightly and the temperature was in the lower 60's with a light breeze blowing. How's that for mid-Winter? By the time I called a friend of mine and we got to the flying field, however, the winds had become much stronger and were somewhat gusty. As luck would have it we also had a cross wind. These were certainly not very good conditions for testing a new aircraft! Several of the fellows were already there and, after some picture taking, I decided to go ahead with it. This meant that I would have to take-off across the runway and clear a barbed wire fence.

After taxiing around a little I gathered up my nerve and moved out to the edge of the runway, turned into the wind, and let her rip. There was no problem. I cleared the fence by at least 20 feet but I had a bad left turn and had to pick the left wing up quickly. The aircraft was taken to altitude and trimmed out. It was found that it is fast and very responsive to the controls but not overly so. I also remembered that I had forgotten to balance the wing. The left panel was heavy and that explained the left turn. The rest of the flight was uneventful and the first landing was not bad at all considering the wind conditions. I had to land at an angle to the wind and turned into it at the very last second. As luck would have it, I didn't even scrape a wing tip.

The next weekend the ship was taken out again and no problems were encountered at all. I have only had one mishap with this aircraft since its maiden flight and that was because I got one wheel into very soft dirt on a dead stick landing and it flipped over. There is still a small flat spot on top of the rudder that I never fixed as a reminder not to get into soft dirt with a taildragger.

Don't let the idea of this aircraft being conventional geared scare you off. It handles so easily on the ground that almost anyone could handle it. All that is necessary for take-off is to line up into the wind, add power gradually, but steadily, and make minor corrections with the rudder if necessary.

Once you are airborne, climb on out and get a little altitude (that's the best friend you have with a new aircraft), and trim the ship out. Fly around some and get the feel of it. Now bring her in low and fast right in front of you so you can get a look at it. Looks good doesn't it? The aircraft is pretty big and doesn't look as if it's moving very fast at altitude but that low pass proved differently didn't it? It's pretty fast isn't it?

Now throttle back and set up an approach for a landing. There's no need to be afraid that it will stall, so slow it down to where you need just enough power that it won't land. I believe you will find that you can almost walk that fast. How's that for slow flight?

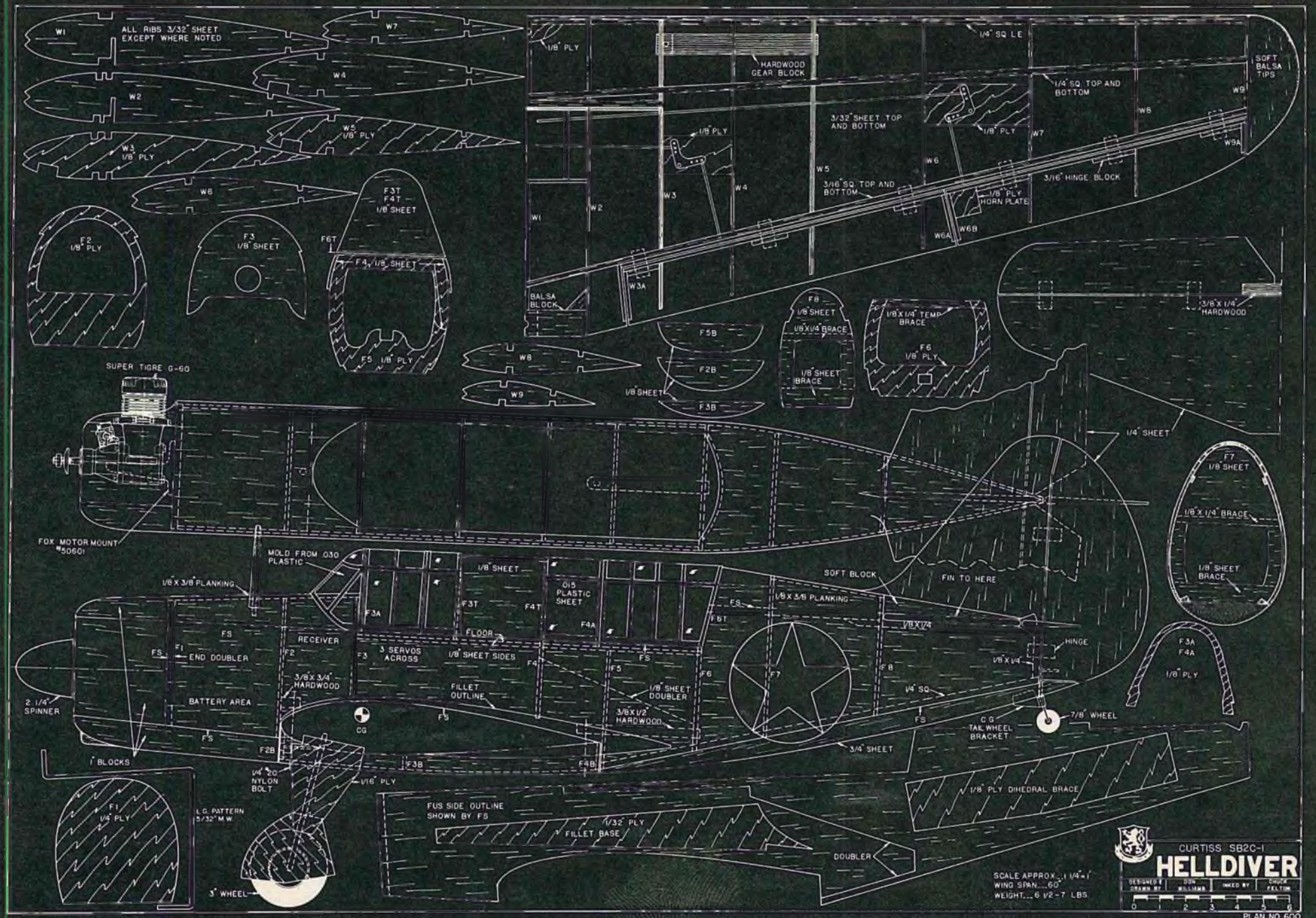
On your next flight do some rolls. Fly inverted — it will fly beautifully that way. Stall it — the stall should be straight forward and very gentle. This aircraft has no bad tendencies that I have found and could even make you look like a better flier than you really are. Good airplanes are that way and this is a good one. Besides it looks nice and will get plenty of comment at the flying field.

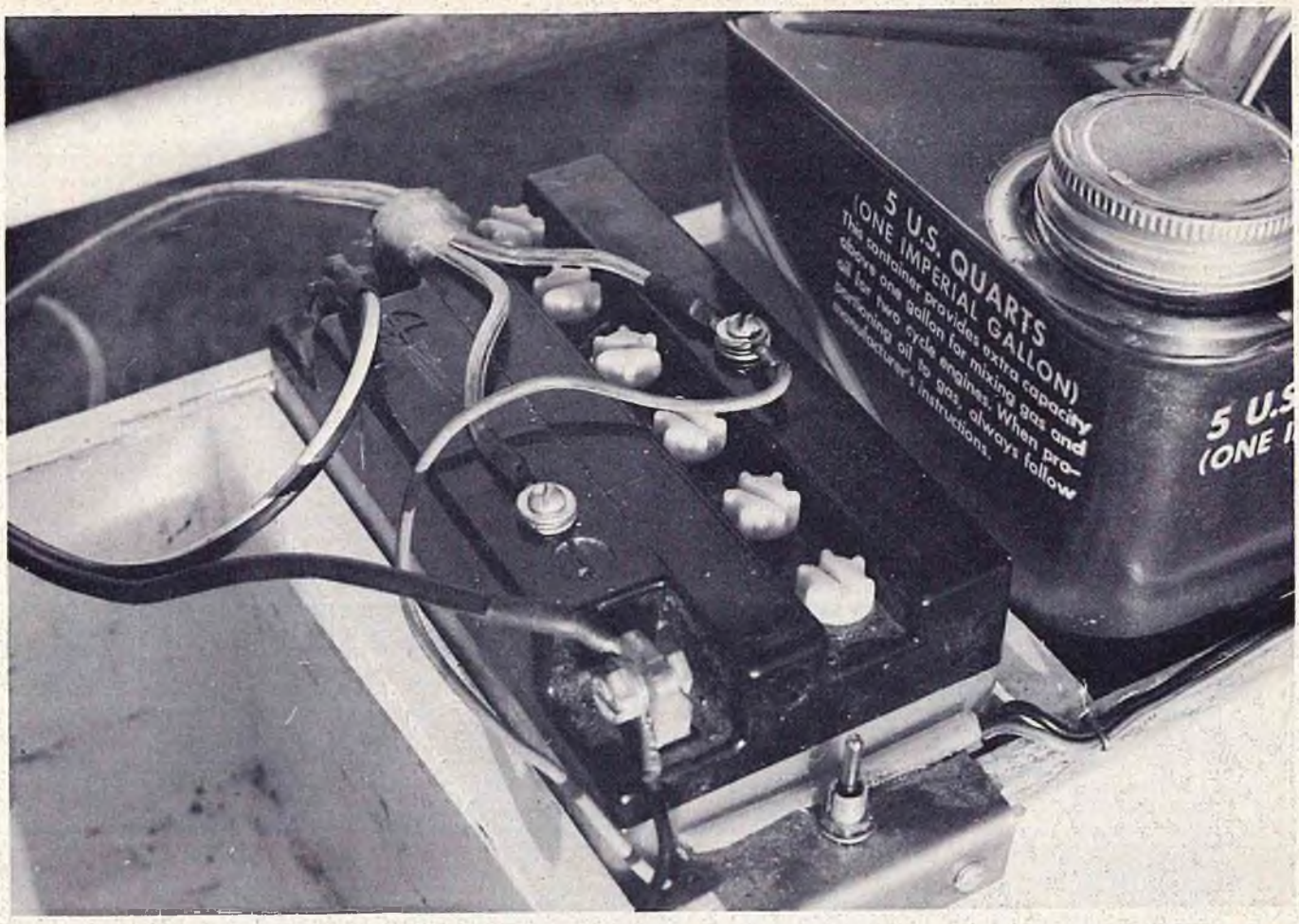
Just to give you an idea of how good this aircraft really is, there is a fellow club member who is a devout pattern flier and who rarely builds scale type models but liked the Helldiver so much he is building the second prototype model of which he only lacks painting at his writing.

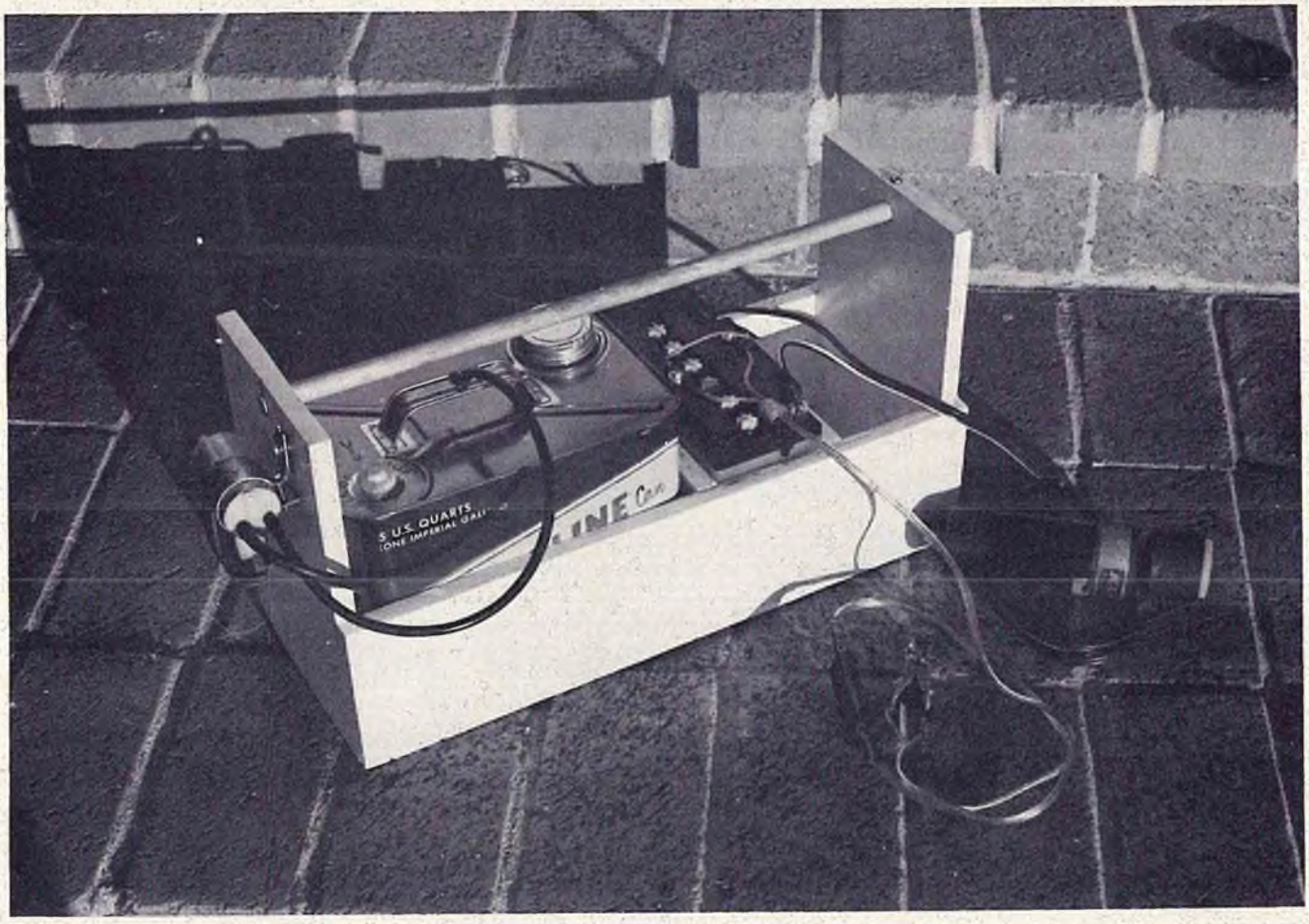
Two things make this project worthwhile to me and those are: (1) It looks like an aircraft and (2) it flys well. Yours should fly as well if built according to the plans.

Good luck and happy landings. □

FULL SIZE PLANS AVAILABLE — SEE PAGE 152




5 U.S. QUARTS
(ONE IMPERIAL GALLON)
This container provides extra capacity
above one gallon for mixing gas and
oil for two cycle engines. When pro-
portioning oil to gas, always follow
manufacturer's instructions.


5 U.S. QUARTS

Don't have a power panel for your fuel pump, glow plug supply, and electric starter? Dan Reiss shows you how to get the voltages you need from your own

12 VOLT BATTERY

There are several power panels around that will allow you to get both your glow plug and electric fuel pump voltages from your 12 volt starter battery. They all work, more or less, and they all cost you money that you don't have to spend. Those different voltages are already in that battery.

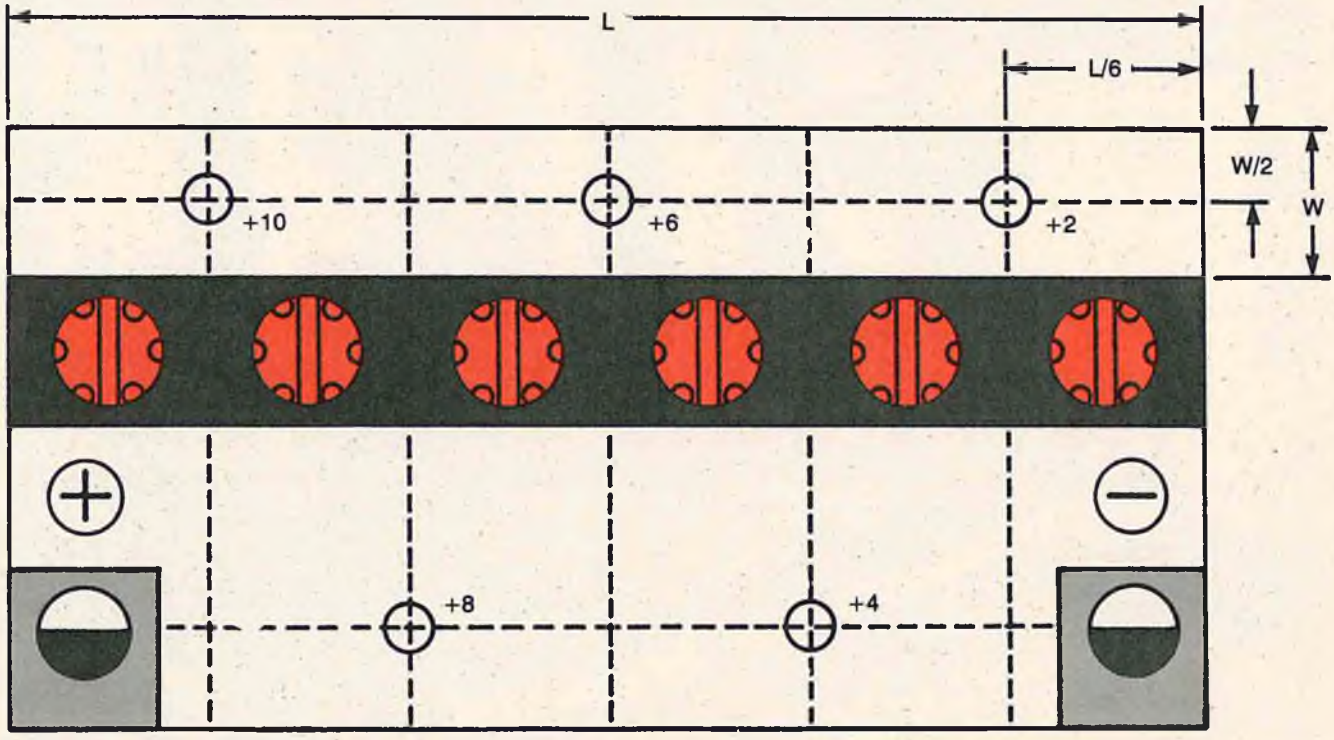
As you probably know, your 12 volt batttery is made up of six two volt lead acid cells connected in series. This will allow you to obtain anywhere from 2 to 12 volts in two volt steps. All you need to know is where to tap into your battery to get them.

The top of your battery should look something like the sketch accompanying this article. If it doesn't, don't go away disappointed. Follow the philosophy described and you should still be able to figure out what to do. Scribe the dashed line that goes from terminal to terminal on top of the battery. Do the same at the point indicated by w/2 across the channel there. Measure the length of the battery and scribe in the five dotted lines separated by L/6. The series connections between the cells are shown at the cross points of these lines as +2, +4, +6, +8, and +10 in reference to the negative (−) terminal.

Center punch the cross point of the pump voltage you want, usually either +4 or +6. This will become your positive terminal when used in conjunction with your battery's negative. Now, chuck up a 1/8'' drill. Get it perpendicular to the top of the battery at the point you have chosen and slowly drill down. You'll go through about 3/8'' of plastic and epoxy before hitting a lead terminal. When you feel the increase in resistance, inspect the bottom of the drill's flutes for lead chips. If you see some, you are there. Change to a 1/16'' drill and proceed in another 3/8''. Take either a number six, or number four, wood or sheet metal screw and tighten it into the hole. If the going gets tough, open up the 1/16'' hole. Now there's your new pump voltage terminal ready to use.

The glow plug voltage is obtained in the same way. Repeat the above process at either the +4 or +8 cross lines if you have chosen +6 for your pump. If your pump runs on +4 then go to the +6 or +2 points. Since two volt glow plugs are few and far between, that two volts will have to be reduced. Go down to your local Radio Shack and buy a package of two of their .47 ohm, 10 watt resistors. Epoxy them side by side and twist their end wires together so that they are in parallel. Get about 36'' of lamp cord and cut one of the wires near the middle. Separate it from the adjacent wire at the cut and then remove enough material to solder in the resistors. Tape the whole thing together and mount your glow plug clip to one end. Solder on some mounting lugs to the other end (this will give you more surface contact for better current conduction) and screw them under your new found two volt terminals.

Wasn't too hard, was it? Hardly took any time at all and look at the money you saved! □



Lee Renaud's AQUILA

The ultima Thule in Standard Class competition

The sport of R/C Soaring has advanced rapidly in technology and performance during the past five years. Radio systems, accessories, launching methods and aircraft design have been improved and refined so that today's models provide outstanding flights in all conditions of terrain and weather conditions. The thrills and aesthetic reward of flying with the eagles has attracted many new modelers until R/C sailplane flying has become a major segment of radio control modeling. We believe that the Aquila represents another step forward in the state of the art of aircraft design and flight performance.

Standard Class sailplanes offer many advantages over their Unlimited Class counterparts, particularly in cost and ease of transportation. However, most design development has been in the larger ships particularly for thermal duration tasks, as the larger ships *theoretically* fly better. Despite this, Standard models have completed very successfully in major contests flying against the larger ships. Mark Smith won the 1974 LSF Tournament outright and Dave Shadel narrowly missed winning overall in the 1974 Soar-Nats with a two channel Standard Class ship. For 1975 contests the NSS rules permit unlimited control functions and the use of thermal sensors in Standard Class.

The Aquila (pronounced ah-keel'-ah as in tequila) provides Unlimited Class performance with a Standard Class model. This has been achieved by aerodynamic design and structural refinement. It is, basically, a chopped wing span Unlimited Class model.

The wing chord is 9'' to increase Reynolds number and provide increased wing area. We feel that these factors are more important than the reduction in induced drag from higher aspect ratios. The wider chord provides greater visibility at high altitudes since the width of the wing is more significant than the span. The increased area also provides higher launches as it will carry the weight of the launch line better than the smaller area ships. (As long as all models are flown on the same launch equipment and the launch device is sized to lift the big ships the smaller ships are at a disadvantage.)

The airfoil is a medium thickness, flat bottomed section with a low entry point. The leading edge radius is fairly large to provide a soft stall and the high point is located at 30%. Our experience shows that this type of airfoil performs better than the undercambered sections under all conditions except dead calm. Since some wind seems to prevail during most contests, the ease of building and covering far offsets the minor loss of performance under atypical conditions.

The wing planform with constant chord center panels and double tapered tips is nearly as efficient as an elliptical planform and much easier to build and repair. Positive Hoerner tips are utilized to reduce tip vortex

TYPE AIRCRAFT
Standard Class, Competition Sailplane
WINGSPAN
101.25 Inches — Flat
99.0 Inches — Projected
WING CHORD
9" Center Panels
5.75" At Tip
TOTAL WING AREA
810 Sq. In. Effective

losses and increase effective span. This style tip is used on the full-scale Duster sailplane and discussions with Hank Thor, the Duster designer, while researching a scale model convinced us that this type of tip would improve model performance. Polyhedral is used because of the superior turn characteristics over Vee dihedral. The change in leading edge radius on the tip panels eliminates tip stalling and avoids the loss of lift caused when wash out is used for this purpose.

The use of a large diameter joiner and double shear webs in the center panels provide a very rigid wing. We believe that span-wise wing flex causes significant reduction in launch height and can contribute to poor handling while flying in gusty air. The overall wing structure is quite light but very strong and rigid, while still retaining a low moment of inertia around the Center of Gravity.

WING LOCATION
Mid-Fuselage
AIRFOIL
Flat Bottom 9.6% Thick
WING PLANFORM
Constant Chord Center Panels
Double Taper Tip Panels
DIHEDRAL, EACH TIP
Polyhedral 4% Center
8% Tip

The empennage design features a lightweight structure with thick sections and all flying control surfaces. The diamond section airfoil provides excellent control response and avoids premature stalling problems inherent in flat plate surfaces. The stabilator provides positive pitch control with less drag than a conventional elevator surface. Detachable stabilator panels and rudder permit packing in a smaller box for ease in transportation. Two complete models can be easily packed in a box measuring 10" x 12" x 50".

The fuselage design is conventional and provides a large accessible radio compartment and room between the wings for a thermal sensor. Ballast space is provided to hold up to 20 ounces of C.G. weight plus extra nose weight. The structural design provides a lightweight and easily aligned fuselage. The canopy and overall lines are very scale-like and contribute to the Aquila's beauty. While not as quick to build as a slab sided box the extra carving and sanding pay off when you examine the finished model.

Optional lift spoilers are incorporated in the design. These are very effective (more than those on the Grand Esprit) and provide

O.A. FUSELAGE LENGTH
46.2 Inches
RADIO COMPARTMENT AREA
(L) 11" x (W) 2.2" x (H) 2"
STABILIZER SPAN
25.2 Inches
STABILIZER CHORD (incl. elev.)
4.7" Average (flying stab.)
STABILIZER AREA
106 Sq. In. (13.1%)

exceptional glide path control with minimum pitch disturbance. They provide a controlled means of descent from high altitude and also stabilize the ship while landing in turbulent ground conditions.

Recently, there has been a great deal of controversy regarding two-function versus unrestricted Standard Class contest rules. Frankly, we don't understand what the fuss is all about. Certainly spoilers provide more control of the model and increase the pilot's available options for his flight plan. They are not, however, a cure-all, and will not magically place the model on the landing spot. Pilot skill and practice is still the major determining factor in winning contests and this will be true under any set of rules. Trying to write rules to legislate a "beginner's" event has never worked in modeling or any other competitive sport. Personally, we like spoilers and will fly with them as often as possible. However, if rule changes prohibit their use in competition flying we'll just tape the blades closed and keep on flying. The Aquila will slow up and land easily without spoilers so the choice is up to you. If you have three servos try the spoilers for an added dimension in R/C Soaring and don't knock it until you've tried it!

The spoilers can be very useful when slope flying as they permit landing in very restricted areas. Instead of flying behind the slope into the normal sink area, turn closer in and extend the spoilers. This technique is

STAB AIRFOIL SECTION
Diamond
STABILIZER LOCATION
Mid Fin
VERTICAL FIN HEIGHT
10 .1 Inches
VERTICAL FIN WIDTH (incl. rudder)
4.7 Inches Average
REC. NO. OF CHANNELS
2 Minimum, 3 Optional

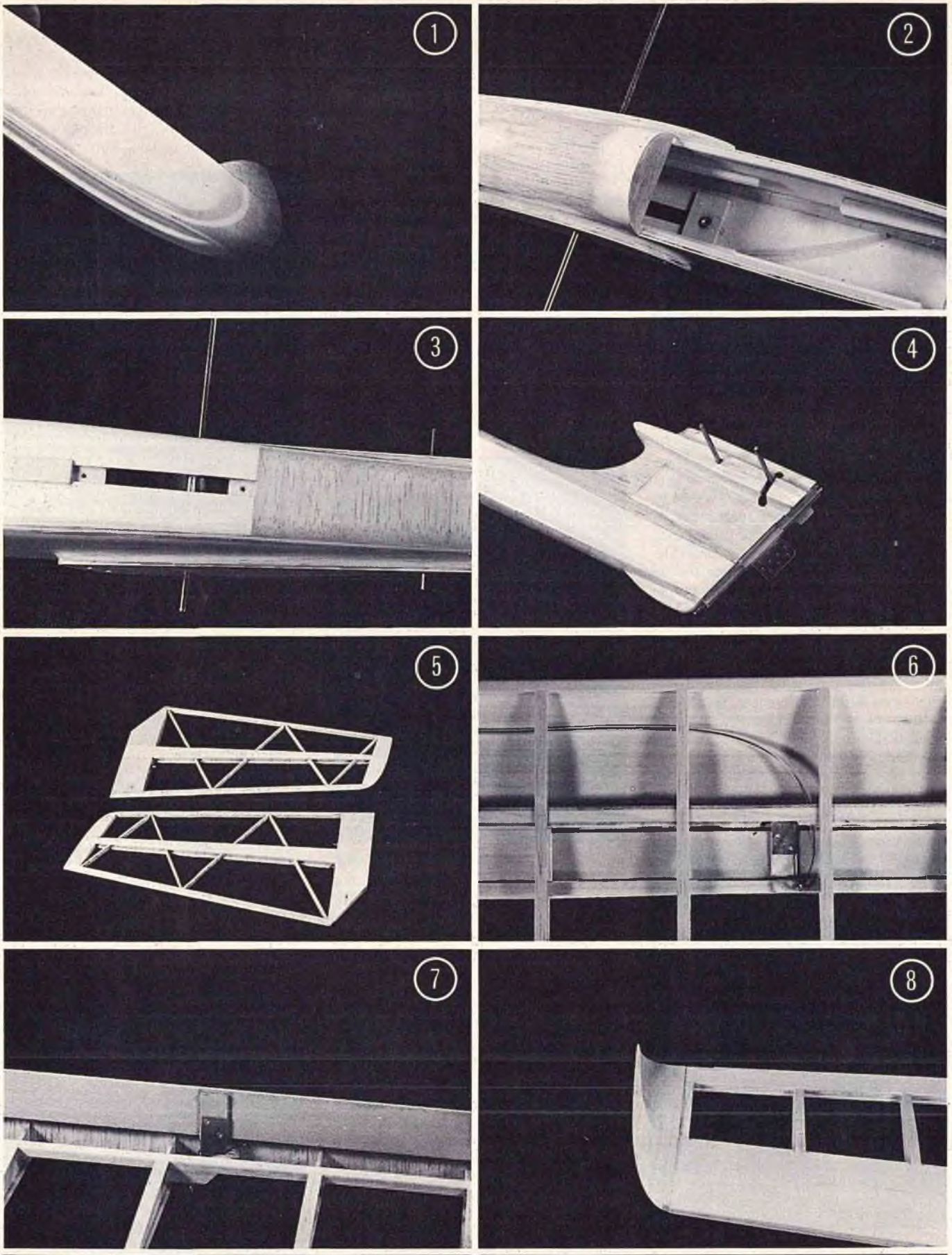
a lot easier on the model than landing in the trees or trying to fly into the ground.

Since the spoilers reduce the lift of the wing, they effectively increase the wing loading of the model. We have had good results when flying on the slope by cracking the spoilers open in windy conditions. The same technique seems to work well when thermal flying in strong winds, but further experimentation of this technique is required.

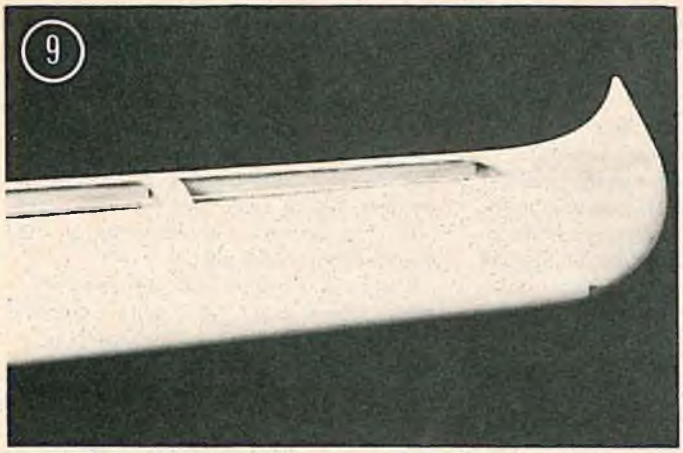
Let us know if you try this technique as a substitute for ballasting the model.

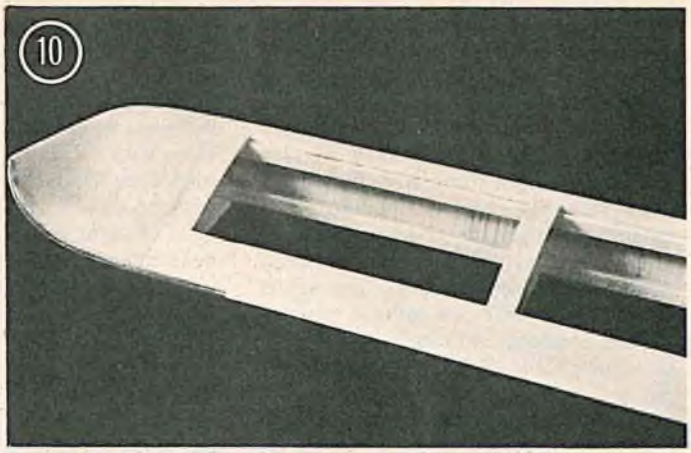
The flying characteristics of the Aquila are outstanding! The ship has a very broad speed range in the un-ballasted condition and will really smoke if a little down trim is fed into the elevator. By adding up-trim and holding some up-stick she will really slow down to walking speed without dropping a

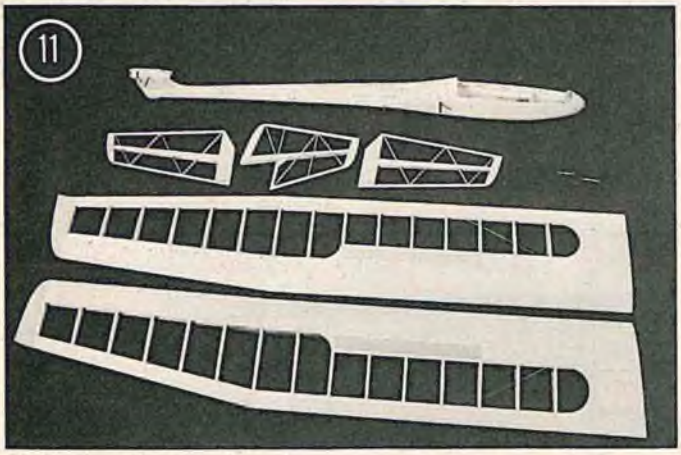
CONTROL FUNCTIONS
Rudder, Elevator, Optional Spoilers
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply, Spruce
Wing ..... Balsa, Ply, Spruce
Empennage ..... Balsa
Weight Ready-To-Fly ... 40-44 Oz. w/spoilers
Wing Loading
7.5 oz./sq. ft. without ballast,
10.0 oz./sq. ft. with ballast

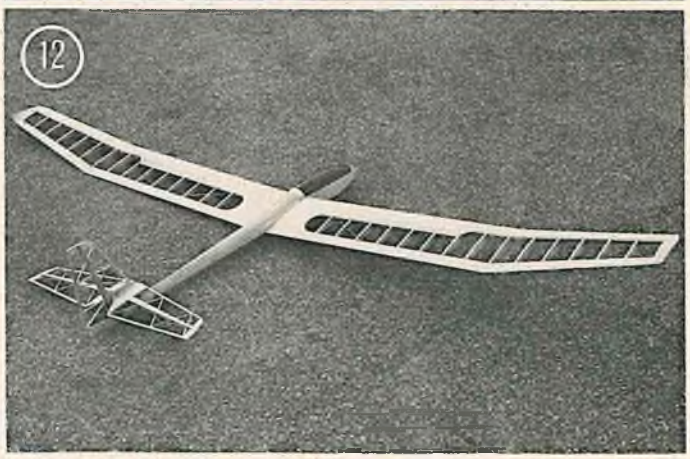


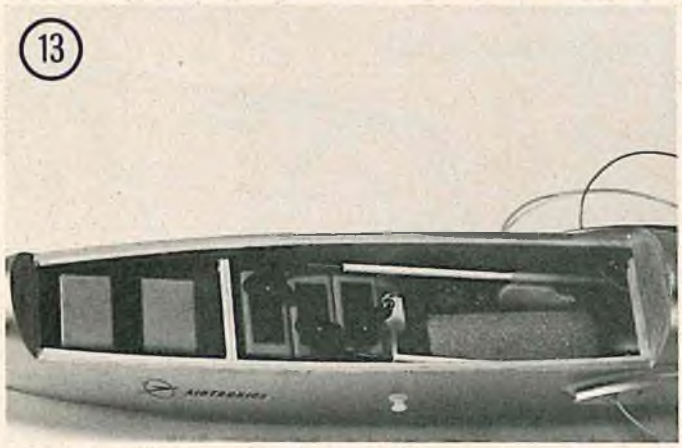
(1) Fuselage nose final sanded and ready for finish. Note contour lines in plywood, providing a guide when shaping. (2) Radio compartment with servo rails and pushrods installed. Nylon tubing for internal antenna. (3) Slot in plywood bottom and mounts for towhook bar. (4) Completed fuselage tail section with stabilator joiners in place. Hinge pin and rudder hinge ready for rudder installation. (5) Stabilator panels ready for covering. Trailing edge brace not installed yet. (6) Bottom view of spoiler bay showing routing of spoiler cable and control horn. (7) Spoiler blade in extended position toothpick retainer on right side of spoiler horn. (8) Tip block rough carved and sanded.

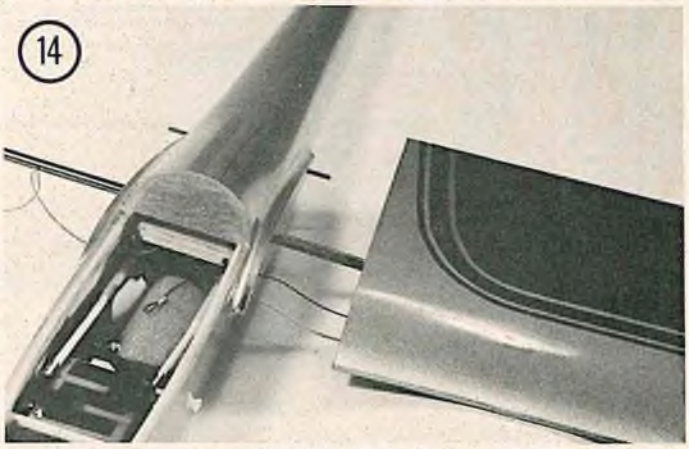


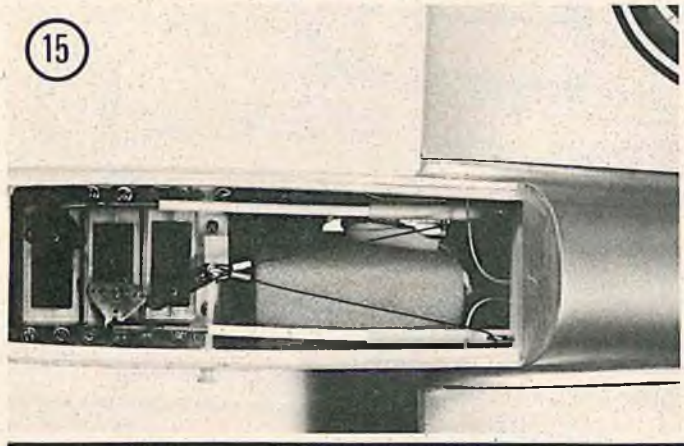


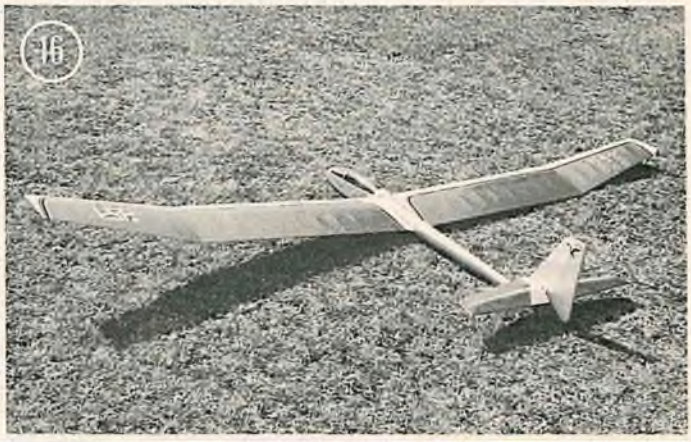












(9) Front view of the wing tip after final sanding. (10) Rear view of wing tip block after final sanding. Note how reinforcing wire acts as a guide when shaping the block. (11) All parts sanded and ready for covering and painting. (12) Even without the covering, the classic beauty of the Aquila is evident in the framework. (13) View of the radio compartment with RS Systems installed. (14) View of the spoiler hook-up lines. (15) With the wings in place, the spoiler lines are attached to the servo. (16) The finished Aquila – the ultimate ship for Standard Class Competition.

tip. With normal trim and stabilator throw, stalls must be deliberately introduced. The stall is soft and straight ahead with no tendency to fall off. Rudder control is very positive and effective in all conditions. Turns are flat without skid or slip tendencies. Tight turns with high bank angles are easily achieved by holding a little up-stick to maintain glide path. When properly trimmed you can set up a thermal turn and neutralize both sticks. The Aquila will hold the turn for several minutes without additional command — in fact we have flown for 15 minutes without touching the transmitter. Lift response is very positive and provides strong visual response. Even when you can't find the lift the Aquila will!

Tow characteristics are excellent. With the hook properly positioned she will climb like an arrow and get higher much faster than any other ship we have flown. On a heavy duty surgical tubing Hi-Start, point the nose up and heave javelin style while holding a little up-stick. Alternately, launches from a six volt winch are also superb.

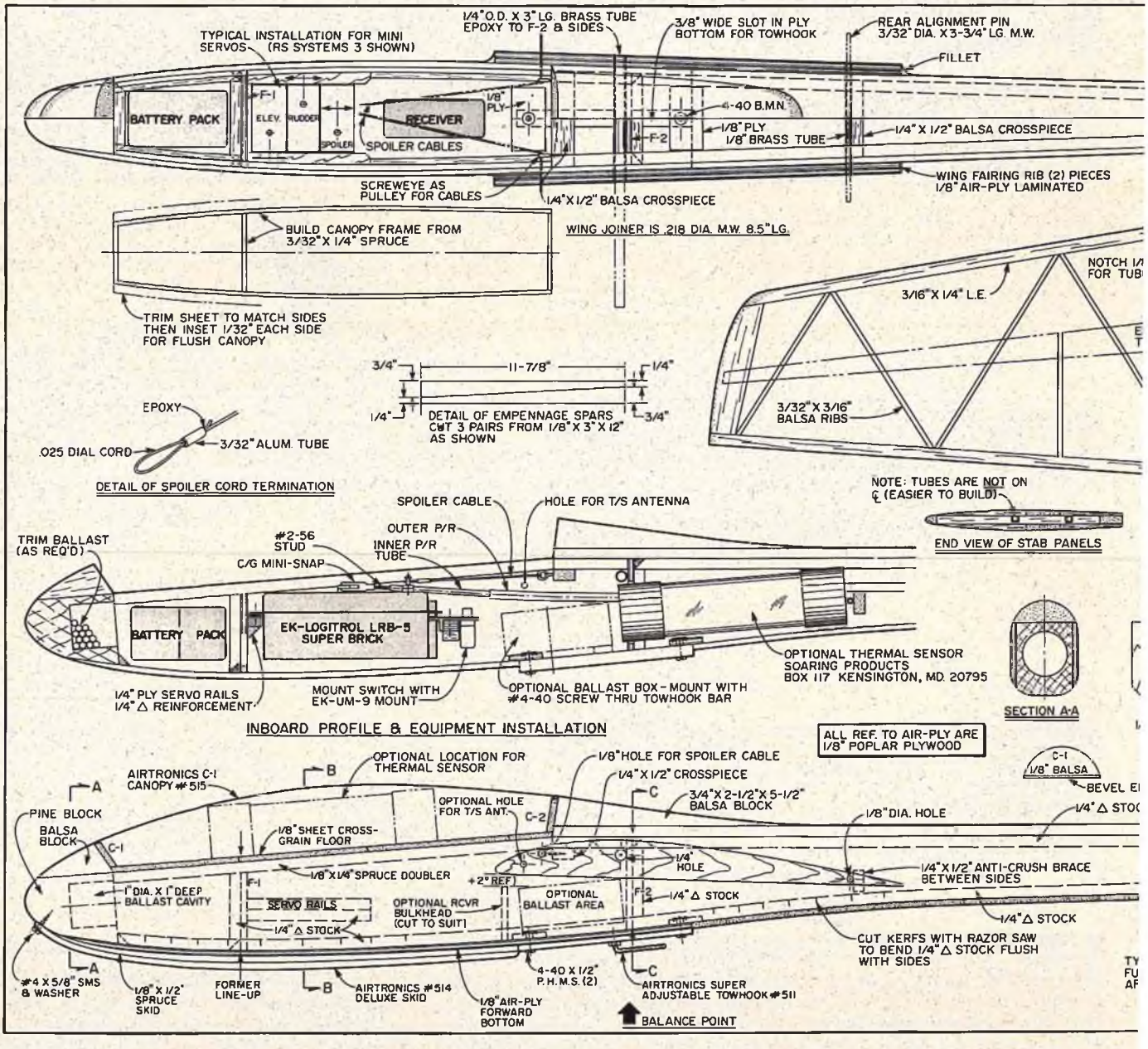
Handling is also great. Despite the high performance potential, the Aquila is a very easy ship to fly. Control response is immediate with no adverse characteristics. In fact, we think the Aquila is as easy to fly as an Olympic with the advantage of better penetration. If this sounds like the kind of sailplane you would like to fly, clear off the workbench and get started. If you are a serious contest flier, build two so that you have a back-up model available throughout the contest season.

Read through the building instructions and study the plans to familiarize yourself with the design before starting construction. We suggest that you cut out all parts before starting assembly creating your own kit. This method reduces overall building time and lets you build several parts simultaneously.

Cut out all balsa wing ribs using ply templates and the sandwich method for the center panel ribs. Cut the tip ribs in pairs using the outlines on the plan. Pre-cut the shear webs by trimming a sheet of balsa 2-13/16" wide and using a small square to cut 3/4" high webs. Cut the 1/16" ply webs and dihedral ties. Cut the tip blocks to outline. Use a table saw, or plane, to pre-shape the spruce leading edge to the shape shown on the plans.

Laminate two 2" x 9¼" pieces of 1/8" poplar ply together with contact cement then cut into two 1" wide strips. Cut 2 pieces of 1" x 9¼" 1/16" thick plywood and stack together with the 1/4" thick ply blanks. Rubber cement the root rib template to the face of the stack and drill the holes through the stack using a drill press for accurate alignment. Be certain the holes are accurately positioned in all ribs since the holes are used to align the wing panels. Shape the outer contour while the ribs are stacked together.

Cut the fuselage sides from 1/8" poplar



plywood tack glued together for accurate alignment. Drill holes for the brass tubes, spoilers, and cables, again making sure the holes are accurately positioned. Check alignment with the root ribs and correct any errors.

Note: If you are not able to obtain the 1/8" poplar ply (Sig-Lite or equivalent) you may substitute hard 1/8" sheet balsa with a 1/32" ply doubler contact cemented inside from the noseblock to the forward edge of F-2. Cut F-1 1/16" narrower than shown on the plan to compensate for the doubler thickness. Cut the nose block, towhook mounts, and former F-2 to match the plans. Cut the 1/4" balsa top block to match the top view of the plans and slot 3/8" wide at the aft end to receive the fin. Cut the forward floor to shape and slot for the towhook bar. Now you are ready to start assembling the model.

You will need a flat surface at least 48" long and 10" wide into which you can push pins to build the model. No special jigs or tools will be required. Cut the plan to fit your work surface, tape down and cover with Handi-Wrap or the equivalent.

We don't recommend the use of model airplane cements for structural assembly. Wilhold aliphatic glue or similar glues can be used for all joints except the brass tube installation. 5-minute epoxy such as Hobbypoxy Formula 4 or Devcon are quite useful. Hobbypoxy Formula 1 is used to assemble the wing trailing edge joint and install the wing tubes.

Our own prototype airplanes were assembled completely with Hot Stuff, except for the Formula 1 joints and the side nose block joint. Several months of flying has shown no structural failures and we totally recommend its use. It's not inexpensive but the time saved in building is fantastic. We framed two ships in the time normally required for one by using Hot Stuff.

All of the hardware called out on the plans is available from Airtronics, P.O. Box 626, Arcadia, California 91006. The canopy, towhook skid and stabilator control horns are normal hobby shop accessories. A special scratch-builders kit including these items plus spoiler hardware, wing and stabilator joiners and tubes is available on direct order from Airtronics for $9.95 postpaid. Airtronics will release a complete kit for the Aquila in the near future for those who prefer to enjoy pre-cut parts.

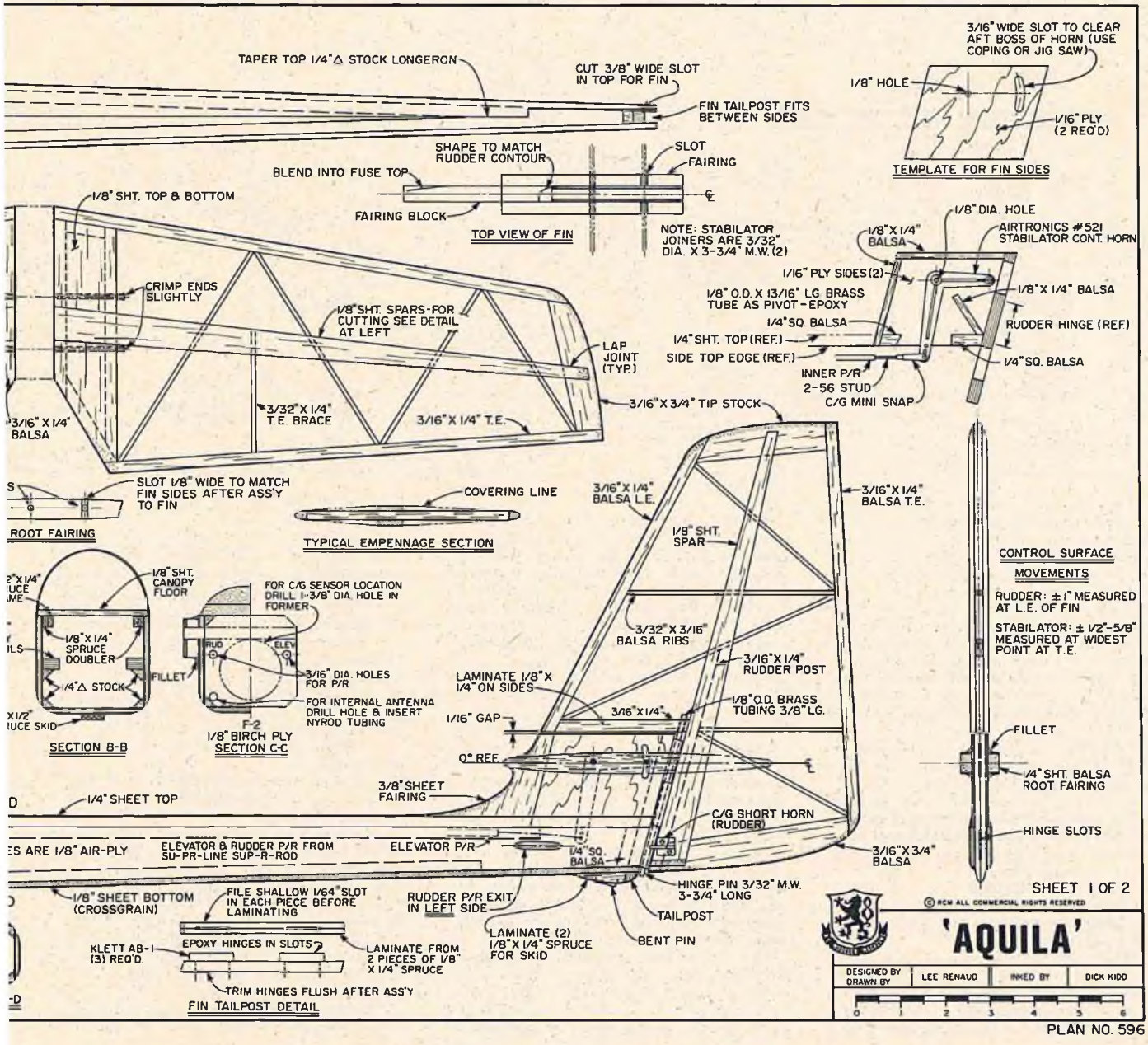
CONSTRUCTION NOTES
STABILATOR

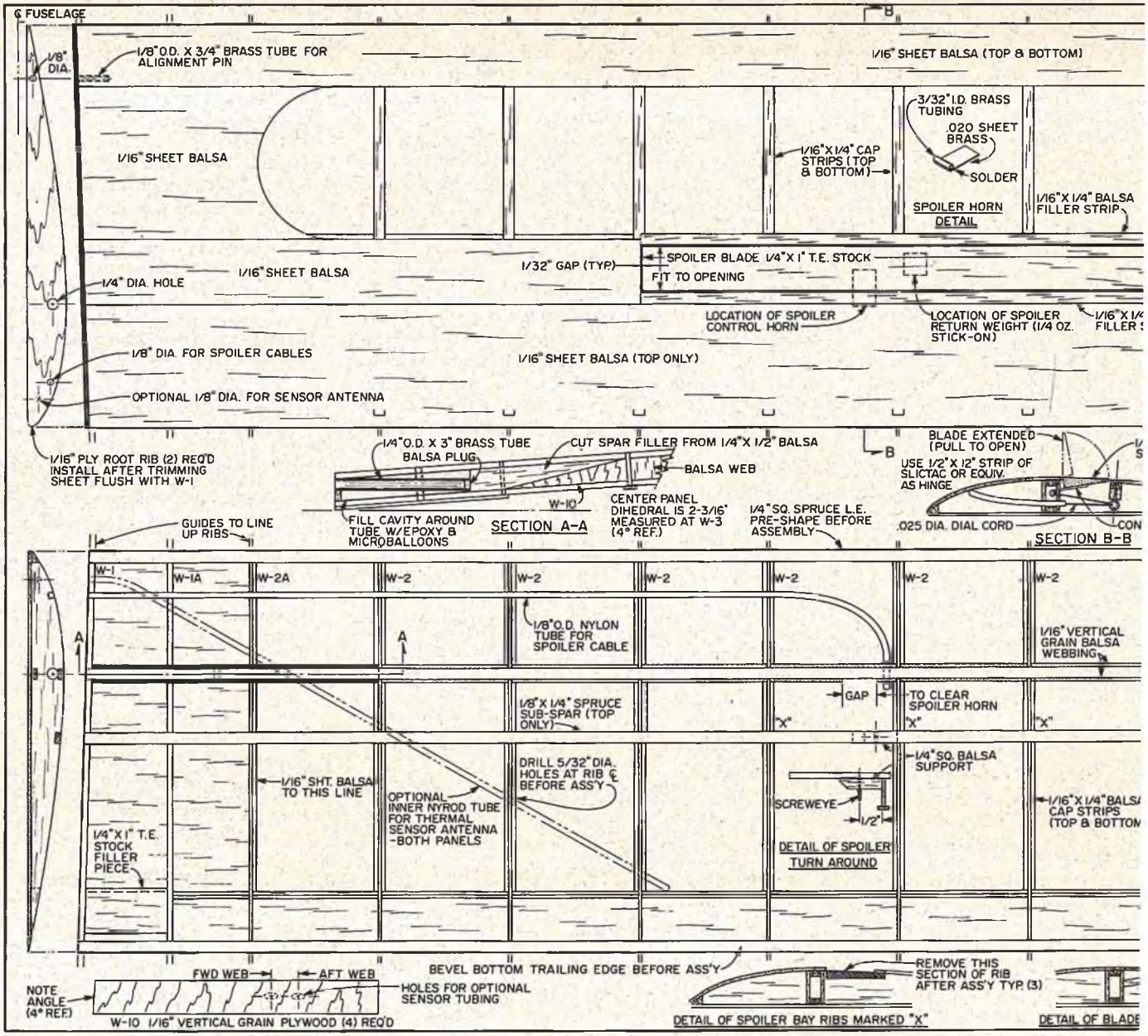
1) Cut the leading and trailing edges for both panels from 3/16" x 1/4" stock and pin in position over plan. Cut the tips from 3/16" x 3/4" stock and fit snugly. Fit the center section strips and glue all outline joints.

2) Cut the ribs from 3/32" x 3/16" stock and fit tightly. Glue all ribs in place.

3) Strip the tapered spars from light 1/8" x 3" sheet and install the spars. Cut and fit the 1/8" center section sheeting and glue in place. Let this assembly dry thoroughly.

4) Remove from plan and pin down again in inverted position with the spars and center sheet against the plan; use scrap 1/8" sheet to shim the leading and trailing edge.





5) Cut notches in the center ribs for the forward brass tube. Check fit carefully and be sure tube is square and parallel to the work surface. Insert 3/32" joiner in aft hole in control horn and 1/8" brass tube in forward horn hole. Cut two pieces of brass tubing 1½" long and slip over the wire joiner.

6) Position forward tube in the notches and cut notches for the aft tubes using the horn as a spacer to locate the aft tubes. Check alignment and epoxy all tubes in place. Crimp the ends of the tubes slightly with pliers.

7) Install tapered spars and center sheet and let dry completely. Use a razor saw to cut the forward tube flush with the root ribs and remove horn. Block sand face of root flat and square.

8) Cut stabilator fairings from 1/4" x 1/2" stock and drill 1/8" diameter holes for the forward brass tube and rear joiner. Spot glue fairings to stab roots.

9) Carve center sheet and root fairings to airfoil shape, plane corners of leading and trailing edges. Block sand structure blending spar ends into tips as shown on plan. Round leading and trailing edges and tip. Do not remove root fairings at this time.

RUDDER

1) Cut the outline from 3/16" x 1/4" stock and pin in position over plan. Cut tips from 3/16" x 3/4" stock and fit tightly. Glue all outline joints.

2) Cut the ribs from 3/32" x 3/16" stock and fit tightly. Glue all ribs in place.

3) Strip the tapered spars and install the spar and 1/8" x 1/4" filler on the root ribs. Let dry thoroughly.

4) Remove from plan and install right hand spar and filler.

5) Cut a slot in the rudder post for the rudder hinge but do not permanently install hinge now. Make slot approximately 1/8" longer than hinge to provide vertical adjustment when fitting rudder to fuselage. Use hinge as a guide to drill a 3/32" diameter pilot hole through the root rib, then enlarge hole to 1/8" diameter with small rat-tail file. Cut a 3/8" length of 1/8" O.D. brass tube, deburr ends and epoxy into root rib using hinge and 3/32" diameter hinge pins to check alignment.

6) Carve and sand spars and outline to shape shown on plans.

WING

The wing construction sequence described assumes a limited working area and no special jigs. If your work area permits we suggest that both wing panels be built at the same time for reduced building time. If you have a hinged building board the center and tip panels can be joined on the board permitting even quicker construction.

The plans show optional tubes installed for the antenna of the optional Thermic Sniffler. We suggest that the holes for these tubes be drilled in the ribs and ply shear webs before starting assembly. The nylon tubes are installed after basic assembly is complete and before adding the top sheet and capstrips.

We also suggest that you install the spoiler tubes and spoiler frame even if you do not plan to use spoilers initially. In this way the opening can be cut out of the covering and the spoilers added at any time. Do not omit the 1/8" x 1/4" spruce sub-spar even if you have no intention of adding spoilers since this spar adds significant strength.

1) Seven sheets of 1/16" x 3" x 36" balsa are required for the wing. The hardest stock should be used for the trailing edge strips and the lightest for the tip panels. Prepare the sheet before starting assembly as follows: (Mark each piece after cutting for easy identification during assembly.)

a) Cut one sheet into two 18" lengths and trim off triangular piece 5/8" wide at one end. These are the tip leading edge top sheets.

b) Cut one sheet into two 18" lengths and cut four pieces tapering from 1⅜" to 1". These are the tip trailing edge sheets.

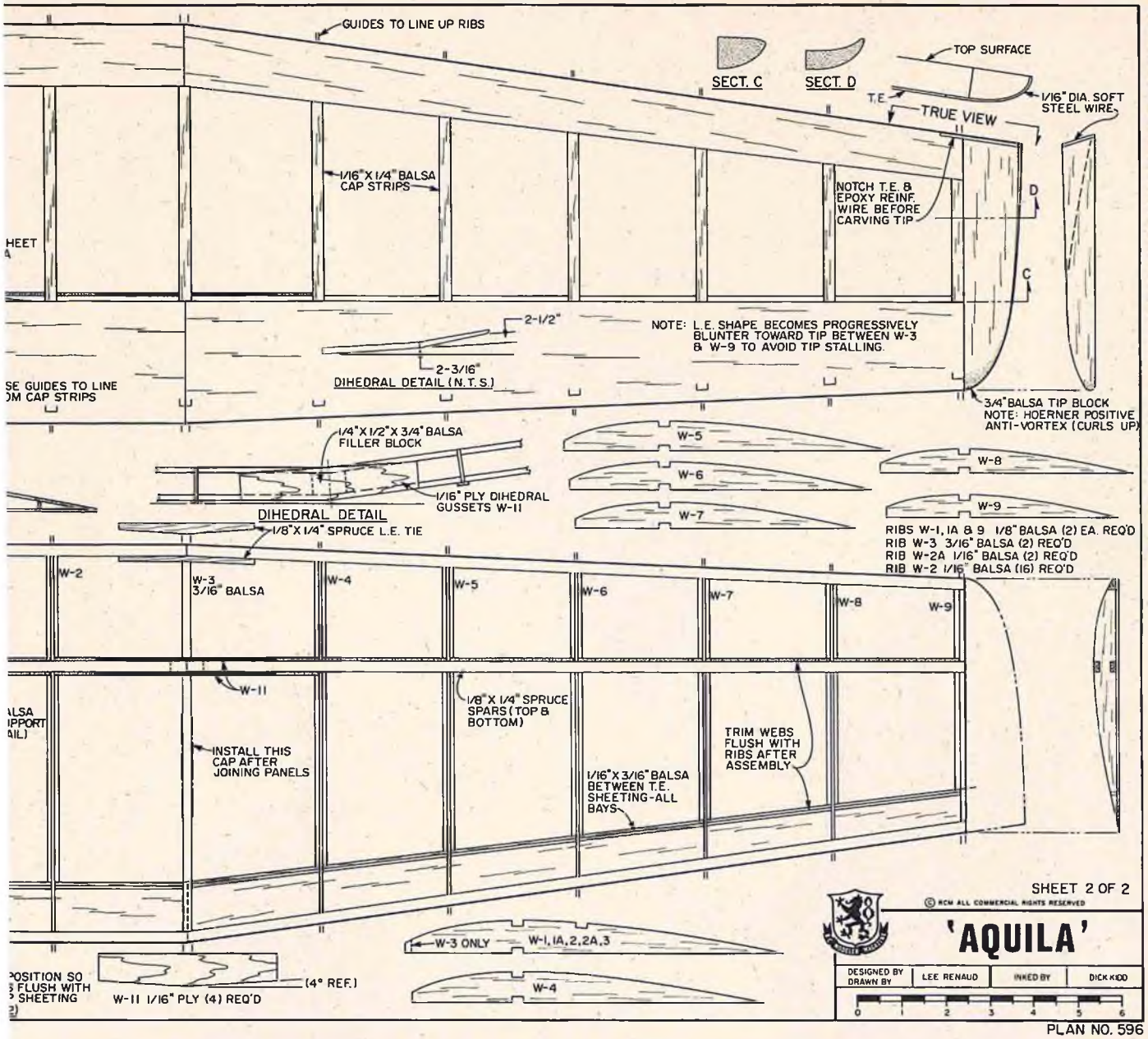
c) Cut two sheets 30" long for the center leading edge top sheet.

d) Cut two sheets 30" long and then cut these into four strips 1⅜" wide for the center panel trailing edge sheet.

e) Cut one sheet 12½" long and then cut two strips 1-7/16" wide from this piece for the top sheet out to the spoiler bay. Cut pieces 4" long for the bottom center sheet. The rest of this sheet and the 6" cut-offs from steps (c) and (d) are used for the top center aft sheet and the small piece outboard of the spoiler bay.

2) Taper the aft section of all four trailing edge pieces as shown on the plans. Pin down trailing edge sheet, fitting the inboard end of the tip sheet tightly against the center sheet but do not glue this joint.

3) Pin shaped spruce leading edge in place. Cut and fit bottom center sheet and glue in place. Cut all bottom



capstrips to length and glue in place. Note that the cap at W-3 is not installed until the panels are joined.

4) Glue W-1 in place using the end of W-10 to tilt this rib outboard slightly. Note that the leading edge is 1/4" outboard of the trailing edge to match the fuselage sides.

5) Cut the 1/8" x 1/4" spruce spars to length and glue the bottom spars to the center sheet and all capstrips using the ribs to locate the spar accurately.

6) Install all ribs except W-1A, W-2A and W-3 gluing to capstrips leading edge, spar and trailing edge sheet. Use the pre-cut shear webs as spacers to locate ribs and keep them square. Be sure ribs are tight against the bottom caps using pins as required to ensure proper location.

7) Glue the top main spars in place checking that the spar is flush with the top surface of all ribs. Add the sub spar.

8) Install the forward ply shear web W-10 and all forward balsa shear webs except in the bays adjacent to W-3. Be sure that the webs fit tightly against the bottom capstrips and top and bottom spar faces and use plenty of glue to ensure strong joints!

9) Cut ribs W-1A and W-2A apart at the spar notch and trim to clear W-10. Install forward portion of these ribs. Note that the aft section of the ribs and aft W-10 are not installed until later.

10) Glue all aft balsa shear webs in place. Note the gap to clear the spoiler horn. Fit and install the 1/16" x 3/16" trailing edge supports and the 1/4" x 1" T.E. filler blocks between W-1 and W-1A. Use the 1/16" ply root rib to locate the notches for the spoiler cable tubing. Cut notches, drill hole through shear webs and install nylon tubing. Be sure the tubing does not project above the upper rib contour.

This completes the basic wing assembly. Let it dry thoroughly (at least eight hours if using aliphatic glues) before removing from work surface. The second wing panel must be completed through this point before continuing assembly.

11) Sharpen the inside end of the 1/4" O.D. x 3" long brass wing tubes with a #11 X-Acto blade. Using the 1/16" ply root ribs to locate the hole and use the tubing as a drill to cut through W-1. Leave the balsa plug in the end of the tube to prevent epoxy from getting inside the tube. Check that the hole is adjacent to the forward W-10 and the bottom edge of the top spar. Use a rat-tail file to correct any misalignment.

12) Cut the tapered spar fillers from 1/4" x 1/2" stock and epoxy to the top and bottom spars and W-10. Sand the outer surface of the tubes with coarse sandpaper and clean thoroughly with acetone or similar solvent. Push tube through W-1 and against the end of the spar filler in both panels. Insert the 7/32" diameter wing joiner into both tubes and set panels flat on the work surface with the trailing edge facing toward you. Block up both panels so that each polyhedral joint is raised 2-3/16" above the work surface. Check alignment carefully being certain that there is no sweep in either panel and that the rod is parallel to the work surface then spot epoxy the tubes in place with 5-minute epoxy and let dry thoroughly.

13) Check alignment again and correct any errors before continuing, then remove the joiner. Mix up a generous batch of slo-drying epoxy and micro-balloons or use slo-dry filled epoxy. Pack the cavity around the tube completely with epoxy holding the panel with leading edge down to keep epoxy in place. Coat the edge of the top and bottom spars and face of the spar filler as well. Install the aft ply web, W-10, and use clothespins or clamps to squeeze it tightly against the spars. Clean off any excess epoxy and let dry before removing clamps. Install aft portion of ribs W-1A and W-2A.

14) Trim the tip shear webs and trailing edge supports flush with the top contour of the ribs and spars. Prop up tip panel so that the bottom surface of W-9 is 1¼" above the work surface and block sand the leading and trailing edges and spar ends hand launch glider style. Prop up center panel so that W-1 is 2-3/16" above work surface and block sand. Set center panel flat and raise tip rib 2½" above work surface and check fit of joints; re-sand if necessary to correct any errors.

15) Pin the center panel in position then apply glue to L.E., T.E., and spars and butt the tip panel against the end with the bottom of W-9 2½" above the work surface. Cut a 3/4" length of 1/4" x 1/2" stock and glue between the spar ends at the joint. Lay some scrap 1/16" shims under the spars about 1½" each side of the joint and glue both W-11 dihedral braces in place. Check that the bottom edge of the braces are flush with the bottom spar face and resting on the 1/16" shims. Use plenty of clamps to secure the braces. Install balsa webs at each end of W-11.

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Dave Platt presents an off-beat aircraft that is a masterpiece in realism

FOCKE-WULF 190 D-9

One of the requirements that manufacturers list when considering subjects for a new scale kit, is that the plane should be well-known.

In some ways, this attitude is not very complimentary to modelers since it assumes the kit will only sell if the customer is familiar with the plane already. Put another way, it is feared that modelers are dumb enough to refuse a possibly excellent model rather than be educated to something they didn't know.

Before anyone gets mad about this, let us admit that when the investment in a new product runs into many thousands of dollars, some caution is understandable. The manufacturer feels he doesn't need any built-in disadvantages to help him lose his shirt on a new model. All indicators, as far as can be determined, should be positive.

And yet, although an established favorite often outsells a more off-beat subject, there are scale fans who say that you can tell the level of a modeler's sophistication by the ships he makes — meaning that the worn out subjects are for beginners, while the esoteric types are for the connoisseurs and experts.

I candidly don't know if any of this is true, but if so, is there a compromise to be found anywhere? Could there be some plane that is well-known, and yet qualifies as interesting, off-beat and having the "expert" flavor?

The Focke-Wulfe 190 D-9 is such a subject. No fighter from World War II is more famous than the FW 190. Both its quality as a weapon, and the manner in which its superb design influenced fighter thinking everywhere, have become legendary. Even so, as good as it was, the F.W. 190 was not beyond further development. The *P-51* and the Japanese *Kawasaki 61 "Tony"* had both been improved vastly by almost accidental engine changes. This happened again in the case of the F.W. 190, the switch from the BMW radial "fighter" engine to the Junkers in-line "bomber" engine giving a great boost in performance. Also — to us the most interesting part of the story — the looks of the aircraft dramatically changed; in place of the crisp and pleasant lines of the A-series, the D's long nose and tail, and exaggerated gun-breech fairings, gave a malevolent and evil appearance, adding a lot to the "character" of the airplane.

At the time when this model was designed, it was uncertain whether it would ever be kitted, due to the factors previously mentioned. However, a combination of the Nats win in Stand-Off Scale and a quite unexpected level of interest in the model itself dictated events. We're rather heartened that a subject from left field can be popular when all the vibes are right. The future looks good for further deviations from the corny old "standards."

AERODYNAMICS

The force arrangement used in this model is as follows: Engine straight ahead (no down or side thrust).

The semi-symmetrical wing is mounted at +2° incidence and the stab at +1½°, giving a zero-zero alignment resultant when the 2° washout is considered.

This is exactly the same set-up we used in the past two or three designs and has proven itself very reliable. Especially good is the

low speed stability of the model. You can reduce the throttle and increase the up elevator until the ship is hanging at a very high angle, moving so slowly that most ships would have flicked onto their backs long before. Apart from the novelty of hovering the model, there is little real usefulness in having so low a stall speed, but it sure gives a good feeling of security when making slow landings.

For some reason, perhaps the very long tail moment, this ship is quite exceptionally smooth. This writer isn't exactly known as the world's greatest pilot, but has had no trouble in beating 80 points flight score in each contest entered.

CONSTRUCTION

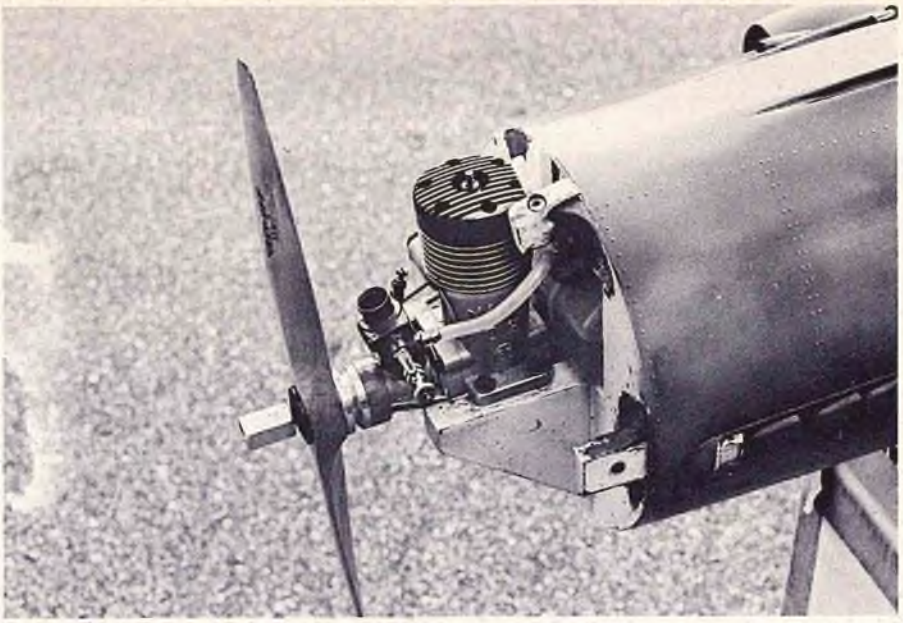
For the modeler who has a few balsa-built aircraft in his past, this model will present no problems. Absolute newcomers to the hobby should wait; scale RC loses too many potential adherents because of failure caused by inexperience.

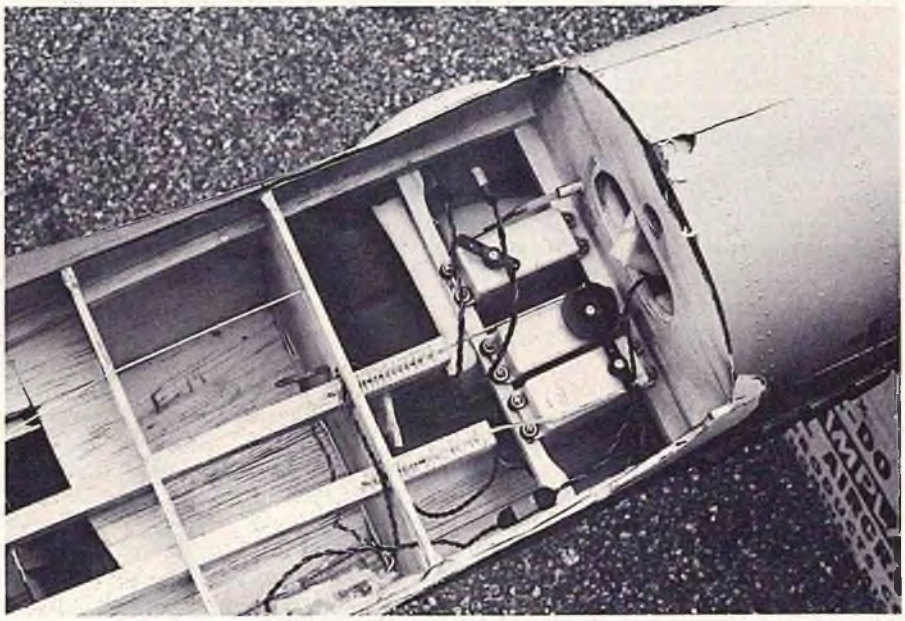
The wing should be built first as it will be needed to complete the last stages of the fuselage. The 2° washout comes in automatically due to the "jig" strip laid on the plans while building and sheeting.

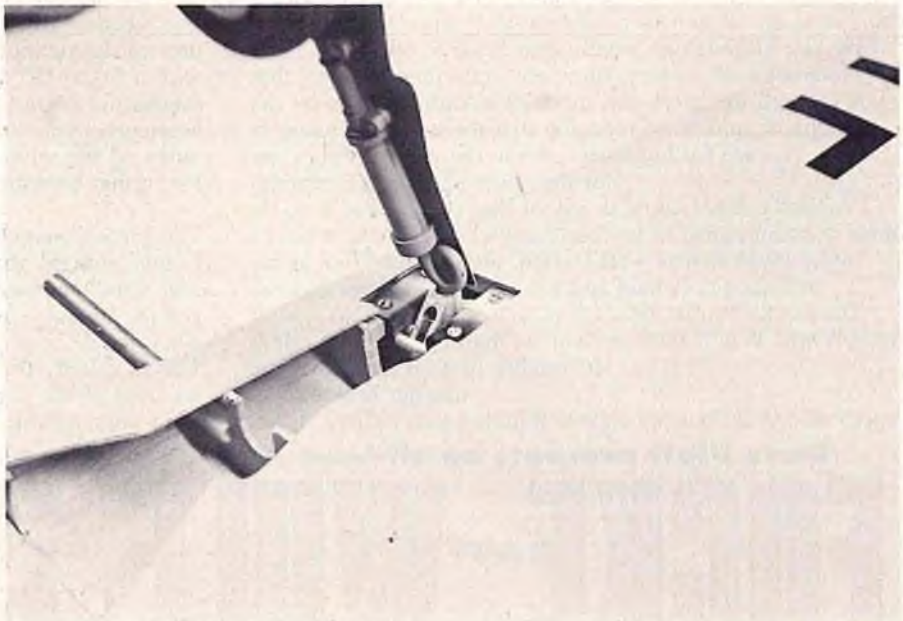
The fuselage is built around a basic horizontal crutch. The top formers are glued to the crutch, then the upper half is skinned. After removal from the board, the lower former halves are added and skinned.

The tail surfaces are simple sheet devices. When gluing on the stabilizer, have the rest of the model assembled (wing screwed to the fuselage) and block the model up on a level surface so you can check incidence settings. Play with the blocks until the wing-root is at *exactly* 2° incidence to the table. When it is, glue on the stabilizer, checking the measurements for a 1½° incidence on the stab. Along with getting a warp-free wing, this stage is the single most vital operation in the whole project of building the model.

Some parts of the design, being somewhat difficult in shape, have been moulded from plastic and are available to the magazine plan builder. The F.W. 190



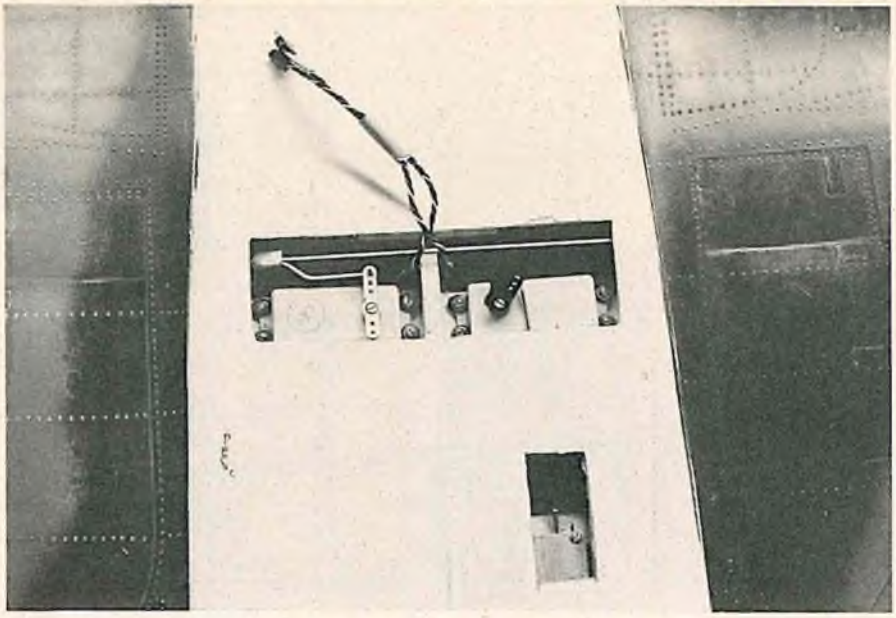


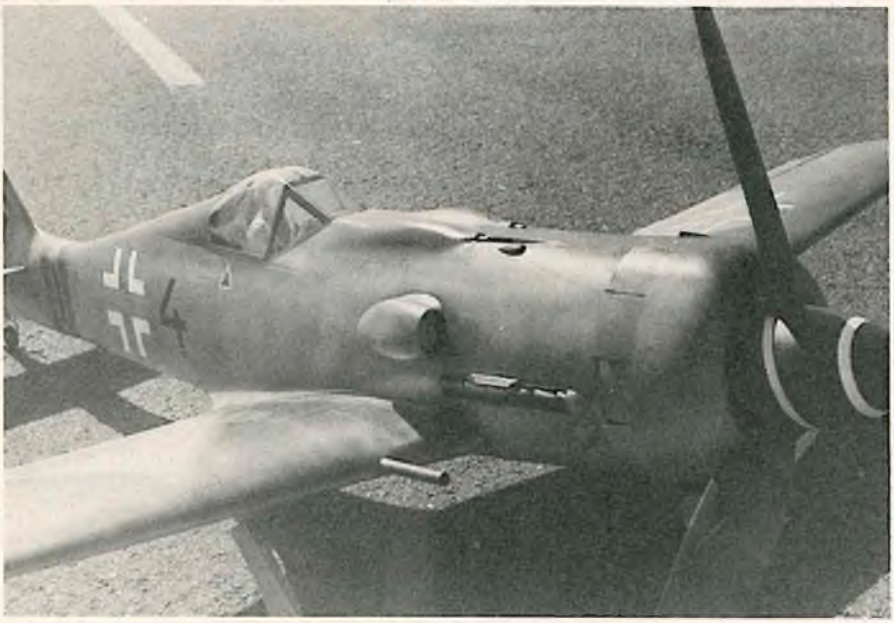


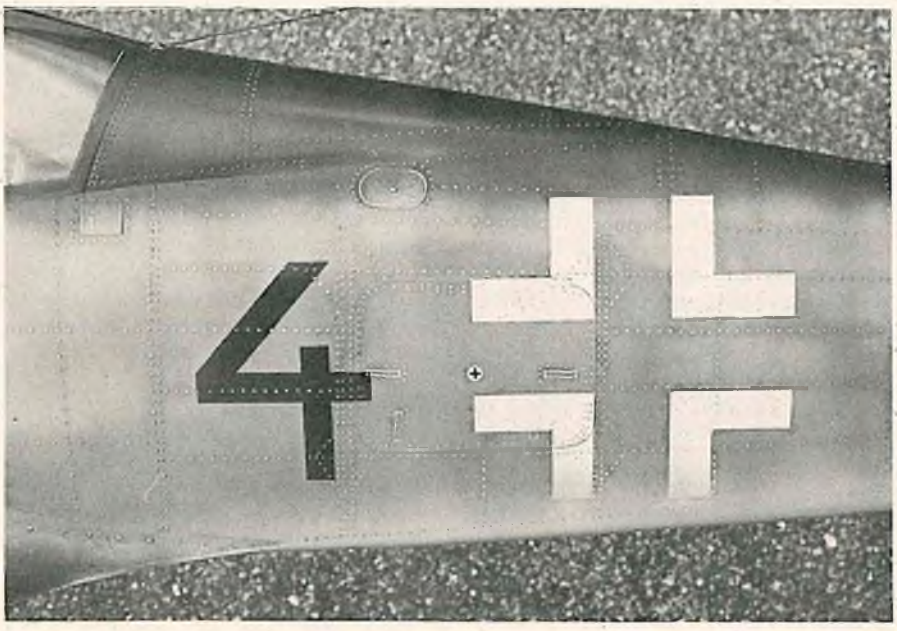
TOP: Very tidy power plant department. Square tank slips into boxed recess. Dave advises model be flown without cowl, first few flights.

CENTER: Plenty of room for the radio, but get it all up front. Servos mount directly to rails - - - plastic servo trays too flexible, spoil trim.

RIGHT: Left hand Rom-Air retract unit in place. Removal for maintenance very simple.







FOCKE-WULF F.W.190 D-9

Designed By: Dave Platt

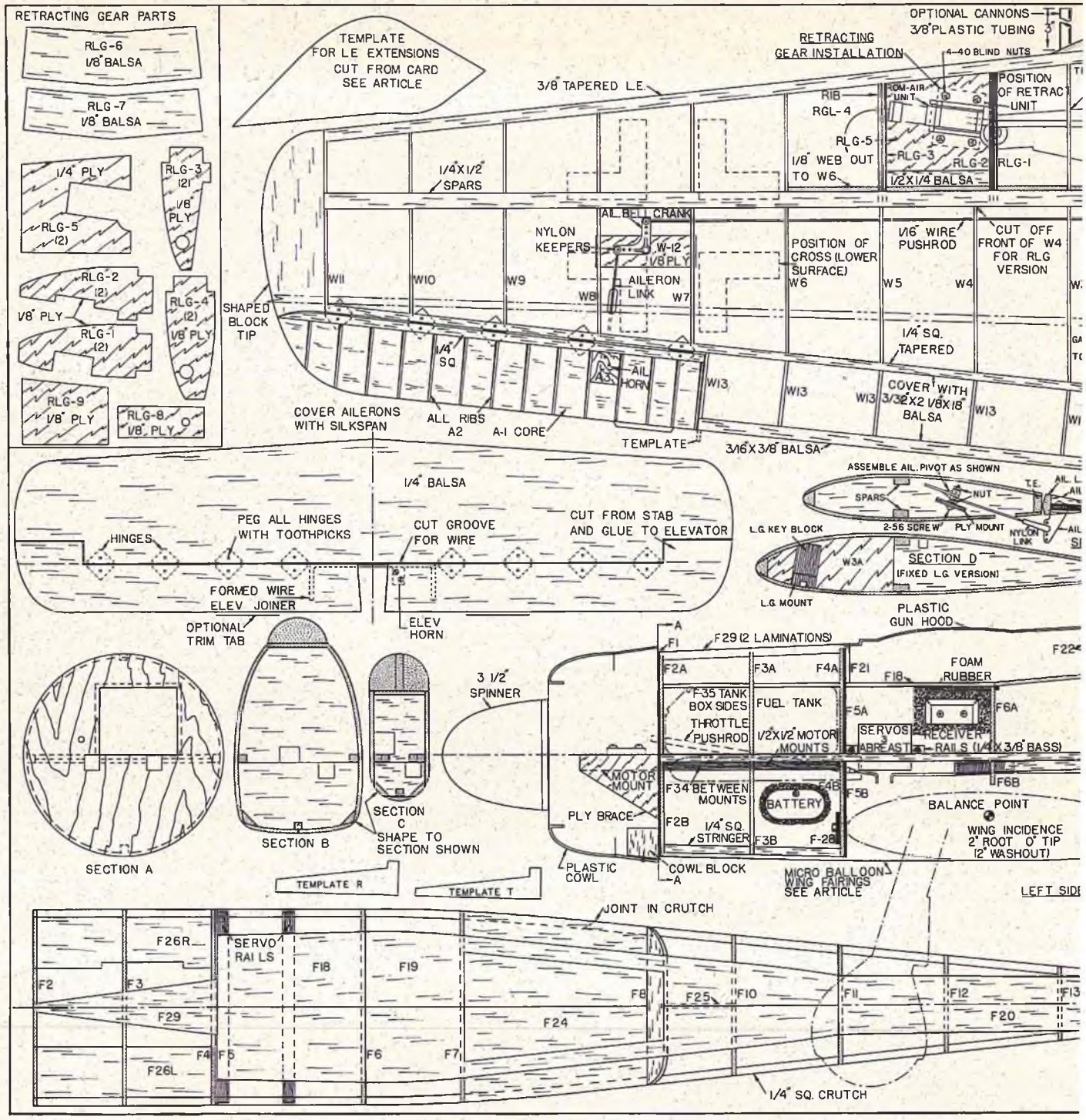
TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
65 Inches
WING CHORD
11" (average)
TOTAL WING AREA
710 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
3¼ Inches
O.A. FUSELAGE LENGTH
58½ Inches
RADIO COMPARTMENT AREA
(L) 4½" (W) 5½" (H) 3"(serv. & recr.)
(L) 2¾" (W) 5½" (H) 2½" (batt. pack)
STABILIZER SPAN
23 Inches
STABILIZER CHORD (incl. elev.)
5⅛ Inches (average)
STABILIZER AREA
118 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
7¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
8 Inches (average)
REC. ENGINE SIZE
.60 Cubic Inch
FUEL TANK SIZE
14 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
5 With Retracts
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail., Retrac. L.G.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Weight Ready-To-Fly	128 ozs. with retracts
Wing Loading	25.96 Oz./Sq. Ft.

TOP: Wing root carries all RLG equipment. "Window" in skin to grease valve periodically.

CENTER: Gun blisters, supercharger intake, long nose all combine to bestow deadly appearance.

LEFT: Rivet pattern adds little to building time, much to character of model.



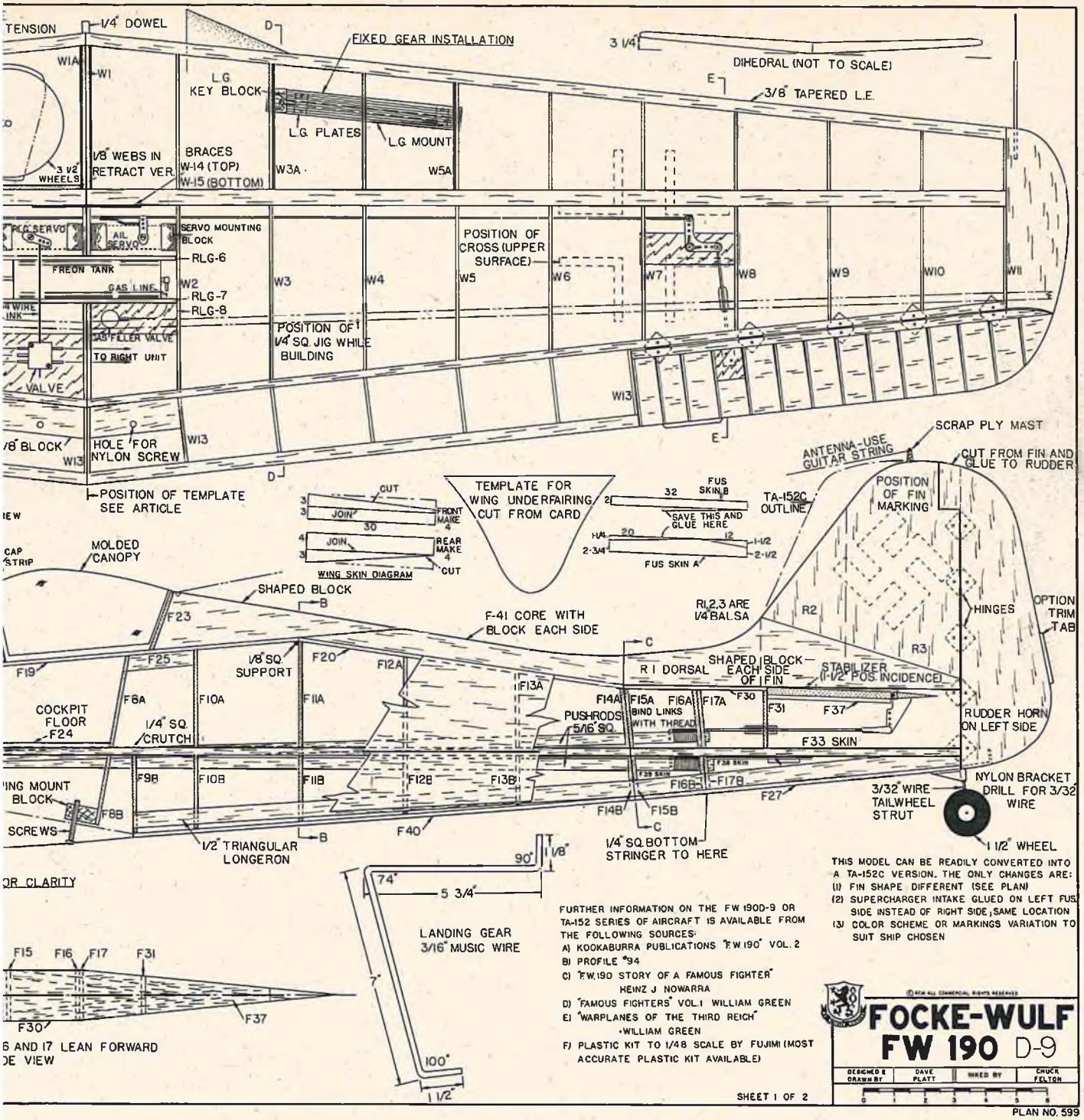
D-9 set contains canopy, cowling, gun hood, exhaust banks, supercharger intake, decals and complete building/flying instructions. Cost is $17.95 postpaid from Dave Platt Models, 1300 W. McNab Road, Ft. Lauderdale, Florida 33309.

The leading edge extensions and the fairing under the center section of the wing are made in an unusual way. This is an example of how some of the newer materials coming into fashionable use in modeling can be adapted in cute ways. Phenolic Micro-balloons, a brown dust-like compound, mixed with polyester finishing resin, makes light, rigid and easy-to-sand parts, as well as being useful in its original purpose as a filler. The mix can be poured into paper templates taped to the model, and when it sets up, can be refined by carving or sanding to proper shape. Needless to say, this operation uses only a tiny fraction of the skill (and time) it would take to carve blocks of wood to the required shape.

DETAILS

There has been a good deal of controversy about the "rights" or "wrongs" of including surface detail on Stand-Off Scale models. Those in opposition maintain that the whole essence of the Stand-Off event was intended to be its simplicity, and the ability of the not-so-expert modeler to compete on even terms. Extra detail on the models runs counter to these aims, it is said. On the other hand, the fellows who are going to the more detail approach have reasons for this. To them the Stand-Off event is a stepping stone on the way to true scale and the incredible standards of detail and accuracy demanded in that event. They want to "learn the trade" by trying out their techniques on Stand-Off models.

We're not going to take sides in this issue because, frankly, we believe that both sides make an equally good case. The F.W. 190 we flew at the Nats didn't have surface detail, but as the photos show, our present one does. In this case, it wasn't that we were trying out techniques. Our reason was based on "cost effectiveness" logic; the improvement to the overall impact of the



model compared to the time taken to incorporate the panels and rivets made them a bargain. In other words, we're saying that when a model takes 4-6 weeks to build anyhow, details which add only 2 or 3 evenings are well worthwhile when they help the appearance so much as these do. The rivets are simple and amazingly fast to apply — use thinned out Elmer's white glue and hypo to apply it. The various hatches (dinghy compartment, etc.) are cut out of thin metal foil or pressure sensitive vinyl ("Contact").

Then, too, we have always been suspicious of the concept of events that newcomers can compete in "on an equal basis." However simple an event may be, guys who have learned more will have a better chance. Like it or not, there can be no legislation that will cancel superiority.

FLYING

Most modelers, understandably, are so all-fired to see a new scale model in the air that sometimes they neglect vital things and end up with pieces. The first time you get this model on the field, please allow it the benefit of patient preparation.

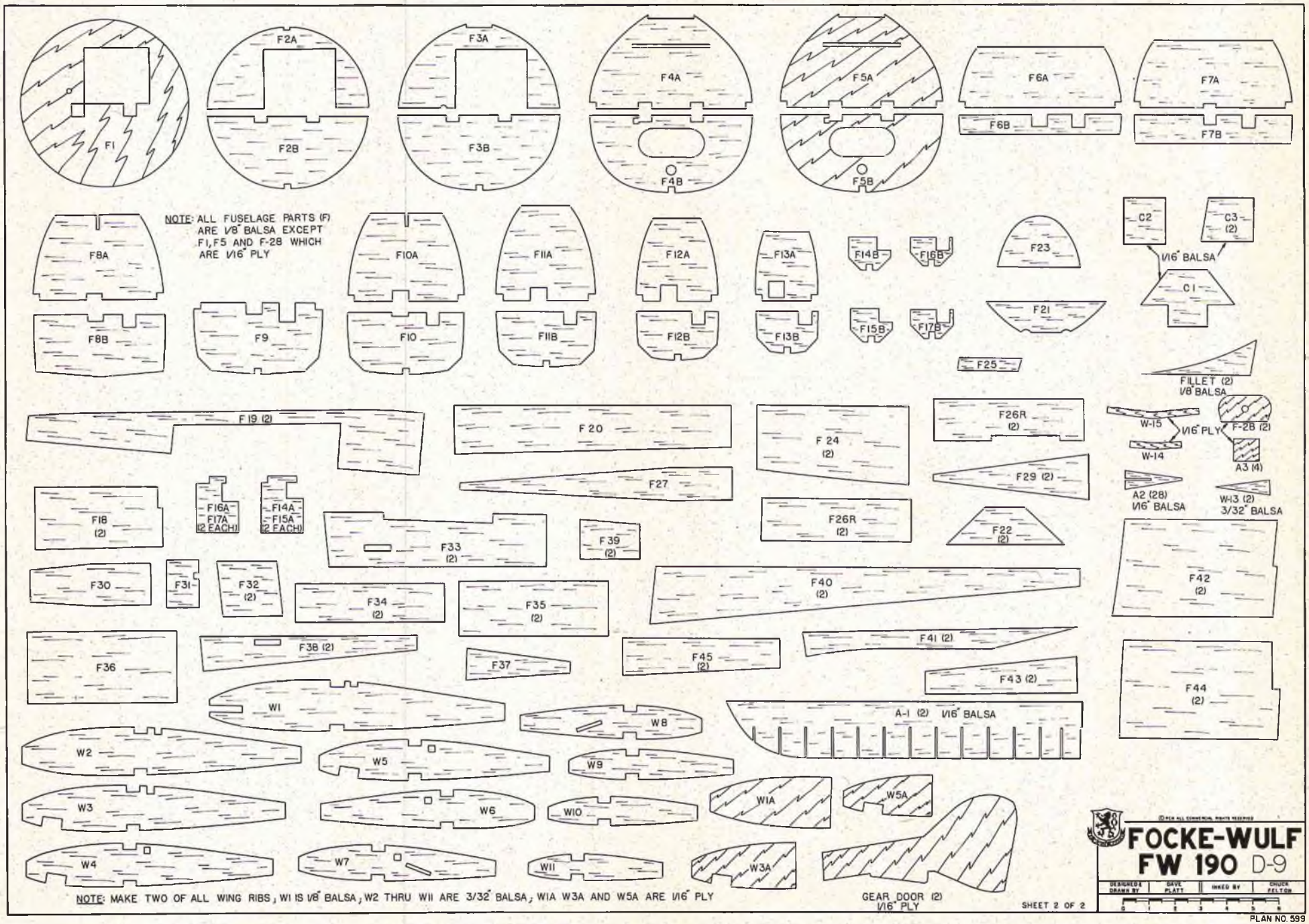
Start the engine and adjust the needle for reliable high speed, with no lean-out tendencies when you hold the ship pointing vertically up. Good. Now adjust for an idle, the slower the better but, most importantly, *reliable*. Range check the radio *with the engine running*. Check the retracts and all controls, many times!

Leave the cowling off for a few flights. It will be easier to readjust engine settings often needed on first flights. When everything works well and you can start the engine at idle position without fuss, fit the cowl on.

Unquestionably the most important (yet most underrated) factor influencing how well a model flies is *trim*. Newcomers to RC often wonder how someone can learn to fly, say, inverted flight mere inches off the ground and so *smooth*, not a single correction visible in a pass maybe 100 yards long. The secret is that the pilot isn't doing it. The model is flying on its own. The trim

text to page 80

FULL SIZE PLANS AVAILABLE — SEE PAGE 152



HERE'S HOW

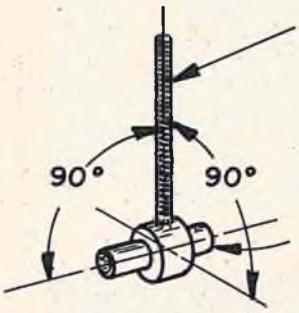
BY JERRY SMITH

GOTTA PAIR OF 1/8" WHEEL COLLARS? IF YOUR ANSWER IS YES, THEN YOU HAVE A GOOD START TOWARDS OWNING THIS EASY TO BUILD AILERON COUPLER. AND — IT CAN BE BUILT IN A VERY SHORT TIME. THE MAIN FEATURE OF THIS COUPLER IS THE RADIAL MOVEMENT IN THE CONNECTING ARM. THE OUTPUT ARM OF THE SERVO, WHEN ROTATED TO MAXIMUM EXTREMES, CAUSES BINDING UP AND DOWN MOVEMENT IN THE AILERON PUSH ROD. ANOTHER POINT. WHEN LOCATING THE AILERON SERVO WITH RESPECT TO THE PUSH ROD, IT IS NOT NECESSARY TO LINE UP THE HOLE IN THE OUTPUT ARM WITH THE PUSH ROD. THE COUPLER WILL TOLERATE MISALIGNMENT. OF COURSE, THE CLOSER THE BETTER. THE RADIAL MOVEMENT IN THE ARM TAKES CARE OF THESE PROBLEMS.

THE CONNECTING ARM ROTATES ON THREADS THUS ELIMINATING THE NEED FOR A SPECIAL DRILL SIZE TO ATTAIN THAT SELECT, NO SLOP FIT BETWEEN THE COLLAR AND SCREW. ONE OTHER IMPORTANT POINT. THE 4-40 MACHINE SCREW MUST BE CUT OFF TO 9/32" IN LENGTH. A LONGER SCREW MIGHT POSSIBLY INTERFERE WITH THE SERVO CASE.

WHEN BUILDING THIS AILERON COUPLER, I FOUND THE DREMEL MOTOR TOOL WITH A NO. 402 CUT-OFF WHEEL EXTREMELY USEFUL. GREAT FOR CUTTING BRASS TUBING AND MUSIC WIRE CLEAN AND SHARP. SCREWS CAN BE CUT SO CLEAN THAT THE THREADS WILL ENGAGE READILY. IF YOU DO YOUR OWN BUILDING, YOU OWE IT TO YOURSELF TO TRY THIS FINE TOOL!

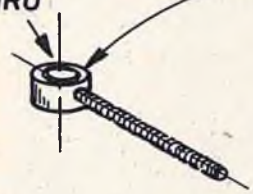
CONNECTOR ARM CONSTRUCTION



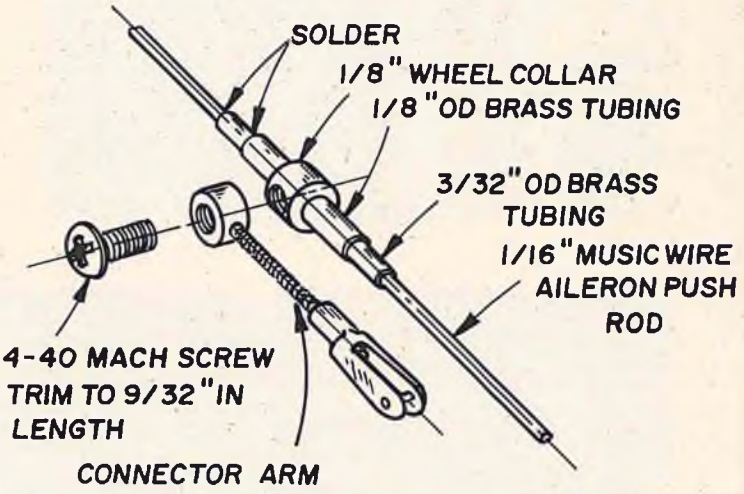
DUBRO RIGGING COUPLER. SOLDER INTO TAPPED HOLE IN COLLAR AGAINST BRASS TUBING. USE STAY BRIGHT SOLDER FLUX.

SHORT PIECE OF 1/8"OD BRASS TUBING.(REQUIRED TO BUSH HOLE FOR TAP)

4-40 TAP THRU

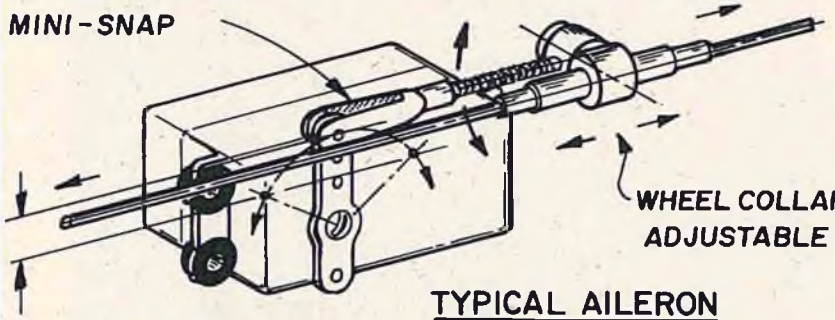


CUT OFF TUBING FLUSH WITH BOTH SIDES OF COLLAR. CHAMFER HOLE WITH LARGER DRILL BY TWISTING BIT WITH FINGERS.



AILERON COUPLER ASSEMBLY

GOLDBERG NYLON MINI-SNAP



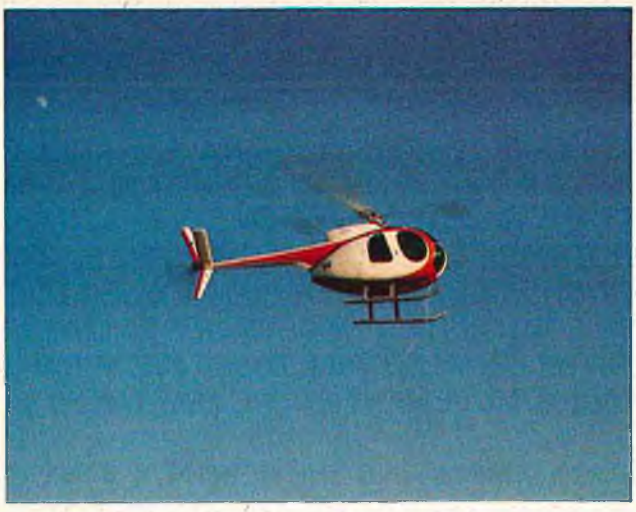
WHEEL COLLAR ADJUSTABLE

DISTANCE TAKEN UP BY RADIAL MOTION IN ARM

TYPICAL AILERON COUPLER HOOKUP

MATERIALS REQUIRED

1/8" WHEEL COLLAR (2)
DUBRO RIGGING COUPLER
GOLDBERG MINI-SNAP
1/8"OD BRASS TUBING
3/32"OD BRASS TUBING
4-40 MACH SCREW
SOFT SOLDER
STAY BRIGHT SOLDER FLUX



RCM PREVIEWS THE DU-BRO

TRI-STAR

PHOTOS AND TEXT BY GRADY HOWARD

Du-Bro Products of Wauconda, Illinois proudly announces the birth of triplets. The names of these triplets start with Tri-Star, the name of Du-Bro's new .40 powered helicopter. Now, let's get on to the triplets individual names. These are: the Scorpion, the Hughes 500, and the Enstrom.

The Tri-Star is, just as the name indicates, three stars. These three helicopters will undoubtedly be the stars of the helicopter field in the very near future. The Tri-Star is the very least complicated of any helicopter kit that this writer has seen to date. As an example, on my visit to the Du-Bro factory in January, I was very surprised when Dave Gray, the designer, took the Tri-Star apart and then told me to put it back together. I did put it back together in a very short time and was really amazed at its simplicity. Granted, the rotor head and tail rotor assembly were not disassembled; but the engine, gearing, clutch, tail rotor drive, heat sink, fan and tail boom were all removed.

After reassembling the Scorpion version of the Tri-Star, it was time to flight test it. Here came another surprise. The wind was blowing 20 to 30 mph, and Dave said for me to try it. Well, this nearly scared me to death! I don't even like to fly my Shark in that much wind, much less a new and unfamiliar machine. Well, my fear was completely unfounded, for the Tri-Star handled the wind with ease. I flew around the field a couple of times and then Dave took over and really put the Tri-Star through its paces. I would estimate the speed on straight and level flight as between 60 and 70 mph.

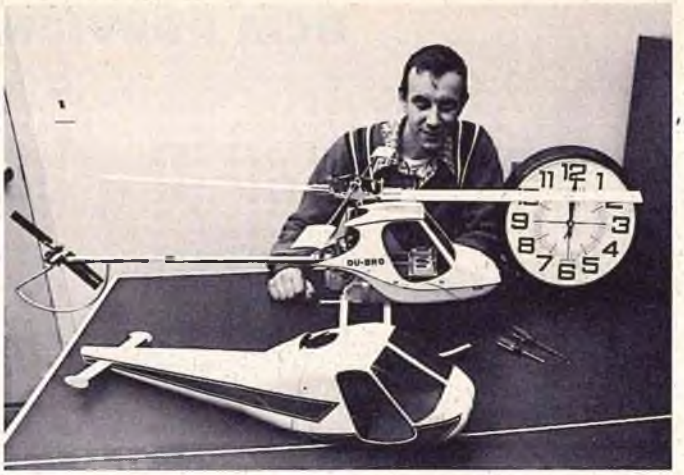
The unique feature of this machine is, that it can be flown without any fuselage at all, and then any of the three fuselages can be put on without any trim changes and with very little flight characteristic change. No other helicopter kit on the market today can offer this feature. Dave Gray sat down with the Scorpion version on the table in front of him and in just 5 minutes he had an Enstrom helicopter in its place. Then Dave went from the Enstrom to the Hughes 500 in 7 minutes, and this included changing the landing gear mounts!

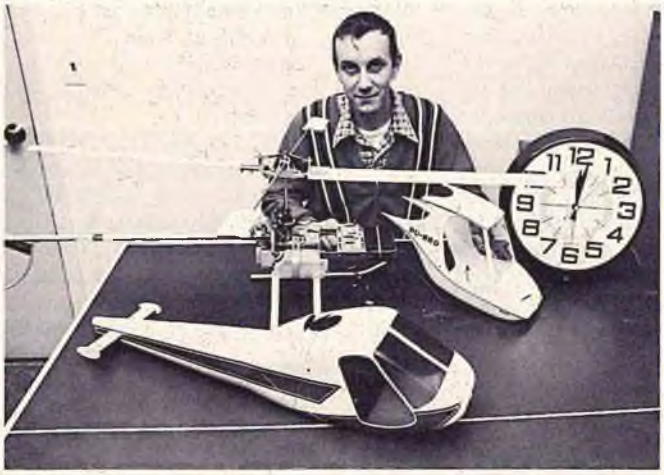
The Hughes 500 and the Enstrom versions of the Tri-Star are just perfect for the brave soul who wants to compete in Stand-Off Scale. This helicopter is capable of the required maneuvers in Stand-Off Scale and then your options can be scale operations such as hovering, sideways flight, backwards flight, stall turn, and 360° hovering turns.

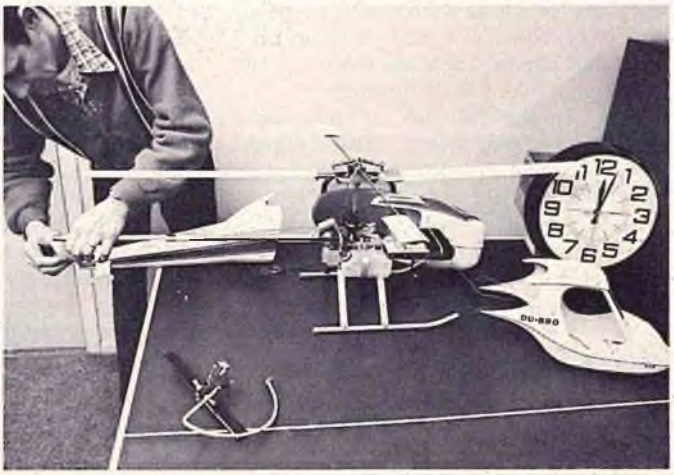
The Tri-Star kit comes with the Scorpion fuselage as its standard configuration. The Hughes 500 and the Enstrom fuselages are offered as options. The projected price for the Tri-Star kit is a low $198.00. The

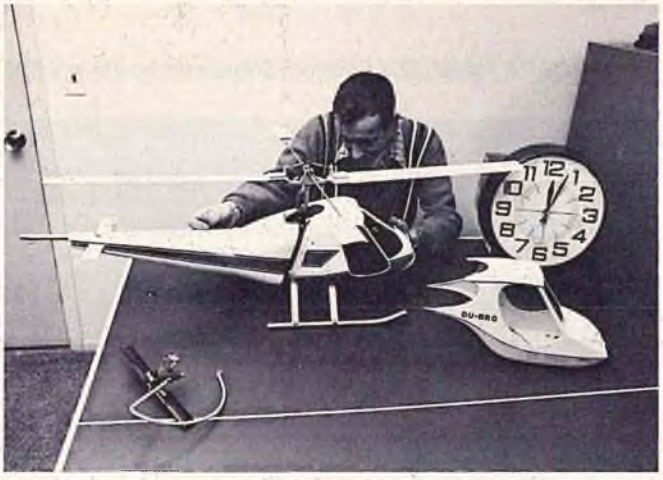
BELOW: The Tri-Star with the kit version of the Scorpion fuselage. OPPOSITE PAGE: The Enstrom Shark and Hughes H-500 versions offered as fuselage options.

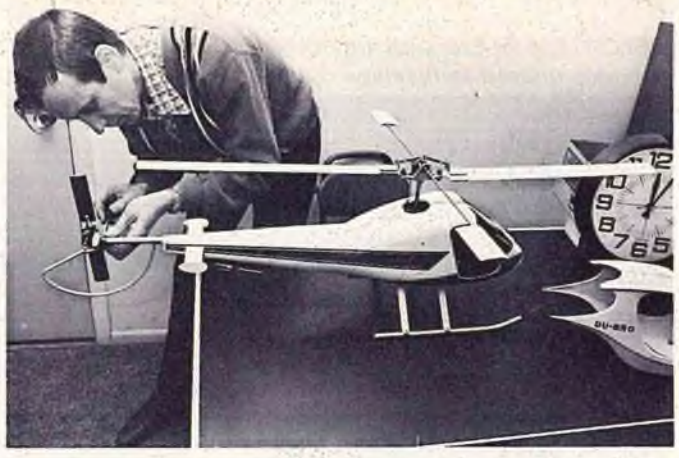
In the photos on this page, Dave Gray of Du-Bro Products changes the Du-Bro Tri-Star from the stock Scorpion fuselage, supplied with the kit, to the optional Enstrom Shark Fuselage. As you can see from these photos the total elapsed time is 5 minutes. The lower right hand photo shows the highly popular Enstrom Tri-Star ready-to-fly.

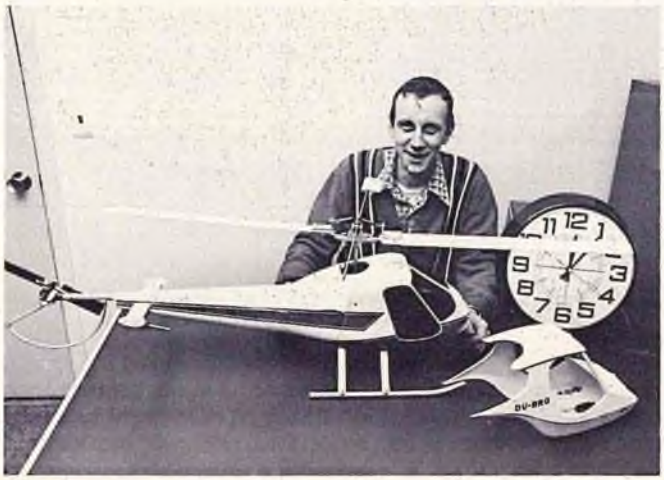


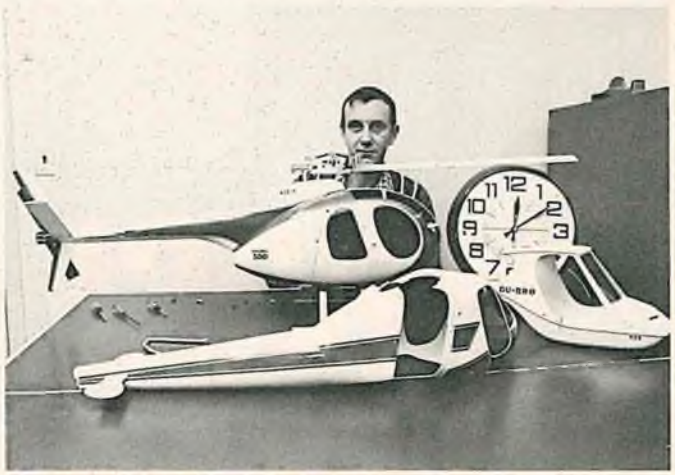


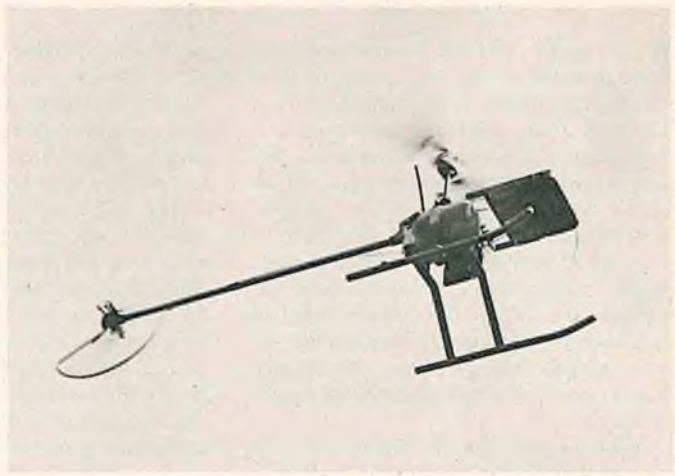












In the series of photos above we have Dave changing from the Enstrom fuselage to the very popular Hughes 500 body. As you will notice from the clock, the elapsed time is only eight minutes, and this includes a landing gear change. The photo above, and to the right, shows the .40 powered Tri-Star flying without a fuselage in the trainer mode.

Hughes 500 fuselage is projected to be $30.00 and the Enstrom at $25.00.

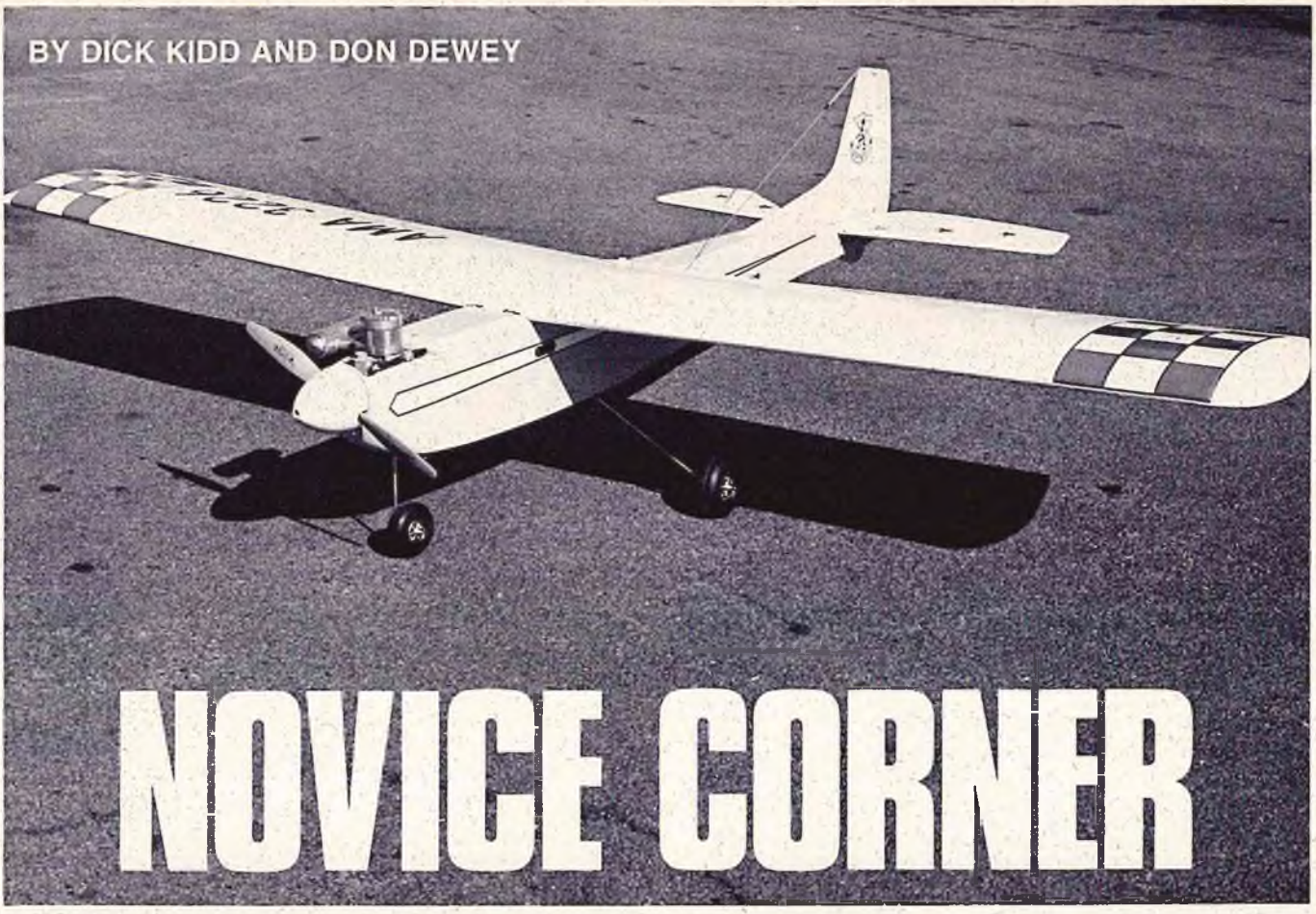
While at the Du-Bro factory I also had the privilege to see and fly Du-Bro's prototype collective pitch head. This rotor head is very efficient and has the unique feature of being able to be replaced by the fixed pitch head with no changes in the radio installation or cyclic linkages. This rotor head can be used on any helicopter because the swashplate and its linkages do not have to move. It can even be hooked up to the throttle servo on 4 channel radios without using any extra servos. I'll leave you with this on the collective pitch head and let you know more at a later date as to its availability and cost.

Look for a complete construction article with step-by-step photos on the Tri-Star in a future issue. At that time there will also be a complete review on the flying and handling of each of the three versions of the Tri-Star.

Now for the specifications:

Rotor span, 45 inches; weight without fuselage, 6 pounds; weight with fuselage, 7½ pounds (Hughes 500); height to top of rotor, 13 inches; length, 39 inches; width at skids, 10½ inches. □

BY DICK KIDD AND DON DEWEY



NOVICE CORNER

RCM's prototype of Sterling Model's Gazariator – an excellent trainer you won't want to retire.

● Last month, Novice Corner took you through the basic framing stages of your Sterling Gazariator. This month, we'll tie it up with final sanding, covering and equipment installation. Obviously, we cannot cover the subjects in detail in an article, or even a series of articles, and for this reason recommend that you obtain a copy of RCM's Anthology Library book, Flight Training Course Volume I. All of the subjects are covered in complete detail in this reference manual and you will see in photographs, text, and drawings exactly how to install your equipment in the proper fashion.

With the aluminum engine mounts provided with the Gazariator installed, mount your engine in place with the spinner attached. Be sure to cover your engine with Saran Wrap, or the equivalent, before beginning to sand. The fuselage can now be shaped and sanded using a razor plane and sanding blocks. Fair the front of the fuselage into the spinner. Securely cement the stabilizer into the slot on the fuselage and add the fin. Be sure, when gluing the stabilizer and fin in place, you align them with the wing.

After the vertical and horizontal fin are installed and the fuselage sanded, the balance of the fuselage can be finished which includes installing the main gear, drilling the holes in the wing for the mounting bolts, and adding the metal plates across the top of the bulkhead to hold in the wing dowels. After this is completed, remove the engine and sand the Gazariator with progressively finer sanding paper until you have progressed down to 400 or 600 wet-or-dry, used dry.

The RCM prototype of the Gazariator, shown in the photos, was covered with Flite-Kote and trimmed with DJ's Striping Tape and Trim Sheets. If you haven't used the latter, you should try them — it makes a very easy way to have a nice looking finish. Just cut out your pattern, stick it down, then peel off the clear top protective layer. While the Gazariator is large enough and has enough wing area to take any type of finish you so desire, we would recommend keeping the aircraft as light as possible, since it is going to be used for training purposes. Thus, we would recommend MonoKote, Solarfilm, or Flite-Kote — these iron-on coverings give you the maximum strength-to-weight ratio and require the least amount of time in the finishing stages.

The radio used in our prototype was a Model Rectifier Corporation Mark V with the servo tray mounted on two hardwood crossbars. There was ample room in this aircraft for just about any type and size of radio equipment that one wishes to use — another reason it is ideal as your first 4-channel trainer. It is much easier to learn to install a radio properly when there is plenty of room to install it. Once the installation of your radio equipment becomes second nature to you, then you can begin working on smaller aircraft with their more restrictive interiors if you so desire.

Read the manufacturers instructions carefully and make sure that the aircraft is balanced exactly where shown on the plans. Read your copy of the Flight Training Course thoroughly and make sure that you have balanced the wing; located the Center of Gravity in the right location; that the horizontal stabilizer is parallel to the wing and the vertical stabilizer is perpendicular to it, and exactly at right angle to the horizontal stabilizer; that your control surfaces are hinged properly; that your radio is installed according to recommendations in the Flight Training Course; that you have installed your pushrods and control horns in the proper fashion; and that your engine is securely bolted in place. Be certain, also, that your wheels track straight, that your fuel tank is located so that the centerline of the tank is as close as possible to the centerline of your engine's needle valve, and that all control surfaces move in a proper direction and with a proper amount of travel. Read and re-read each chapter in the Flight Training Course over and over again until you are completely familiar with every aspect of installing your radio equipment and checking your aircraft out

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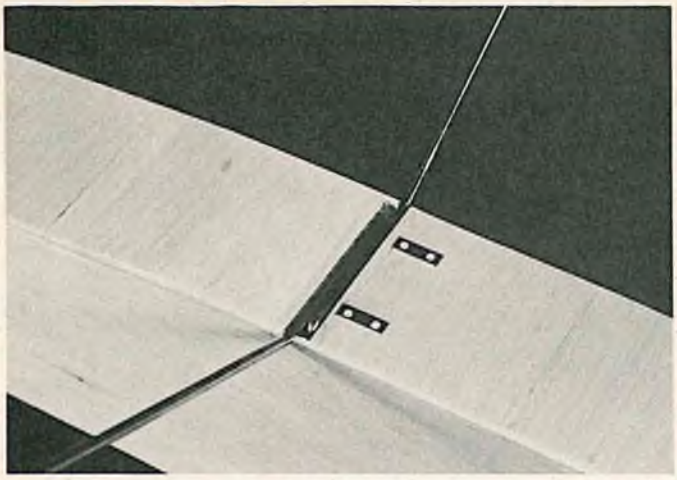
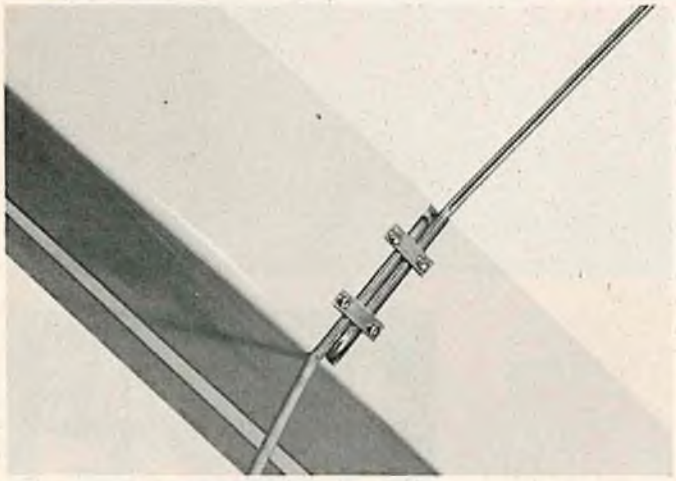
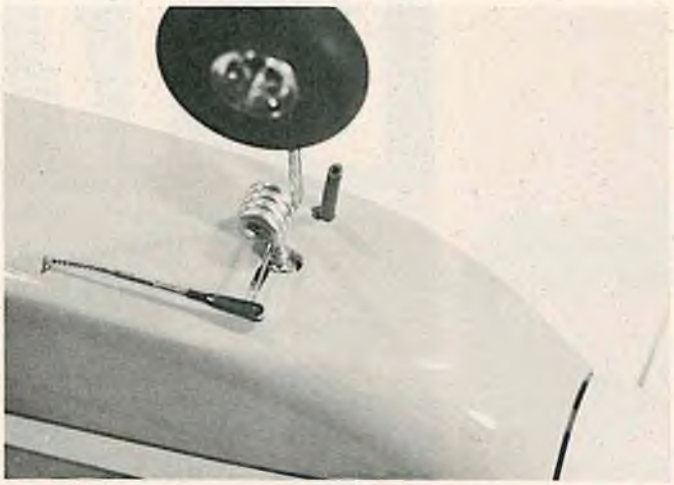
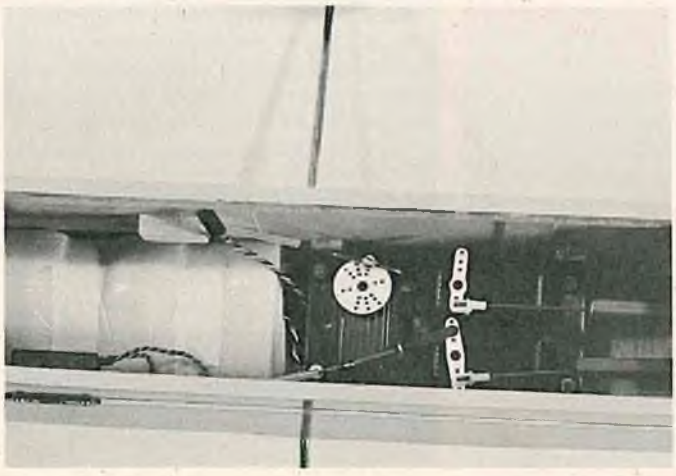
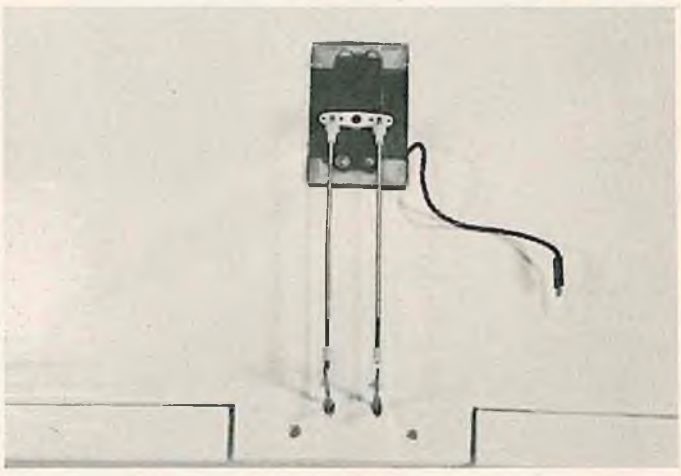






TOP ROW, LEFT: Before covering, install the landing gear and check for a proper fit.
RIGHT: The Gazariator, completely sanded and ready for covering.
SECOND ROW, LEFT: The main gear is now installed in the finished aircraft.
RIGHT: View of engine, muffler, and spinner installation. Note fuel and battery compartment hatch. Note front wing dowel hold-down brackets.
LEFT: View of steerable nose gear installation. Note fuel overflow tubing exiting bottom nose block.
BELOW, LEFT: MRC Mark V radio installation in Gazariator.
BELOW: Mark V aileron servo installation in wing.

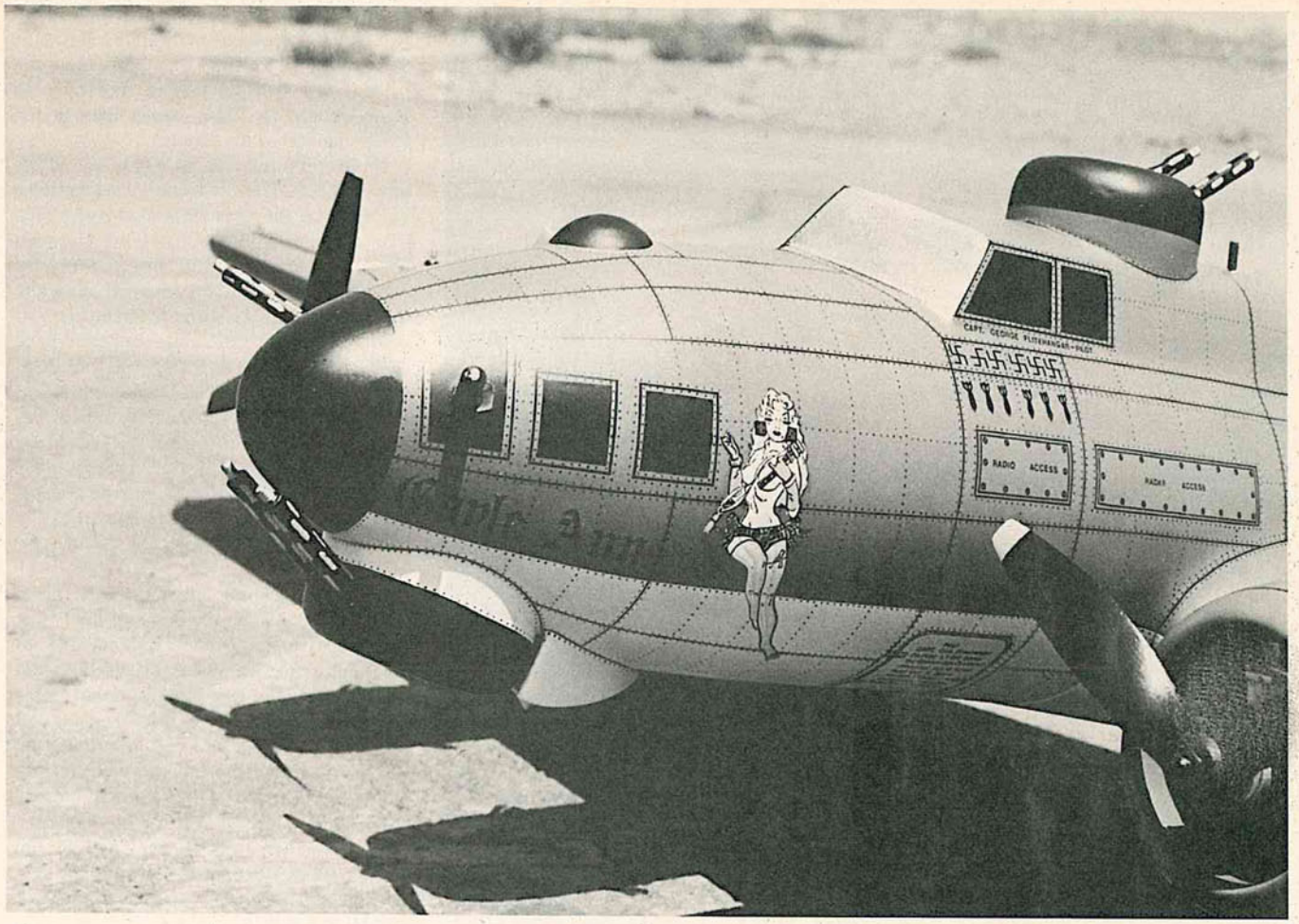


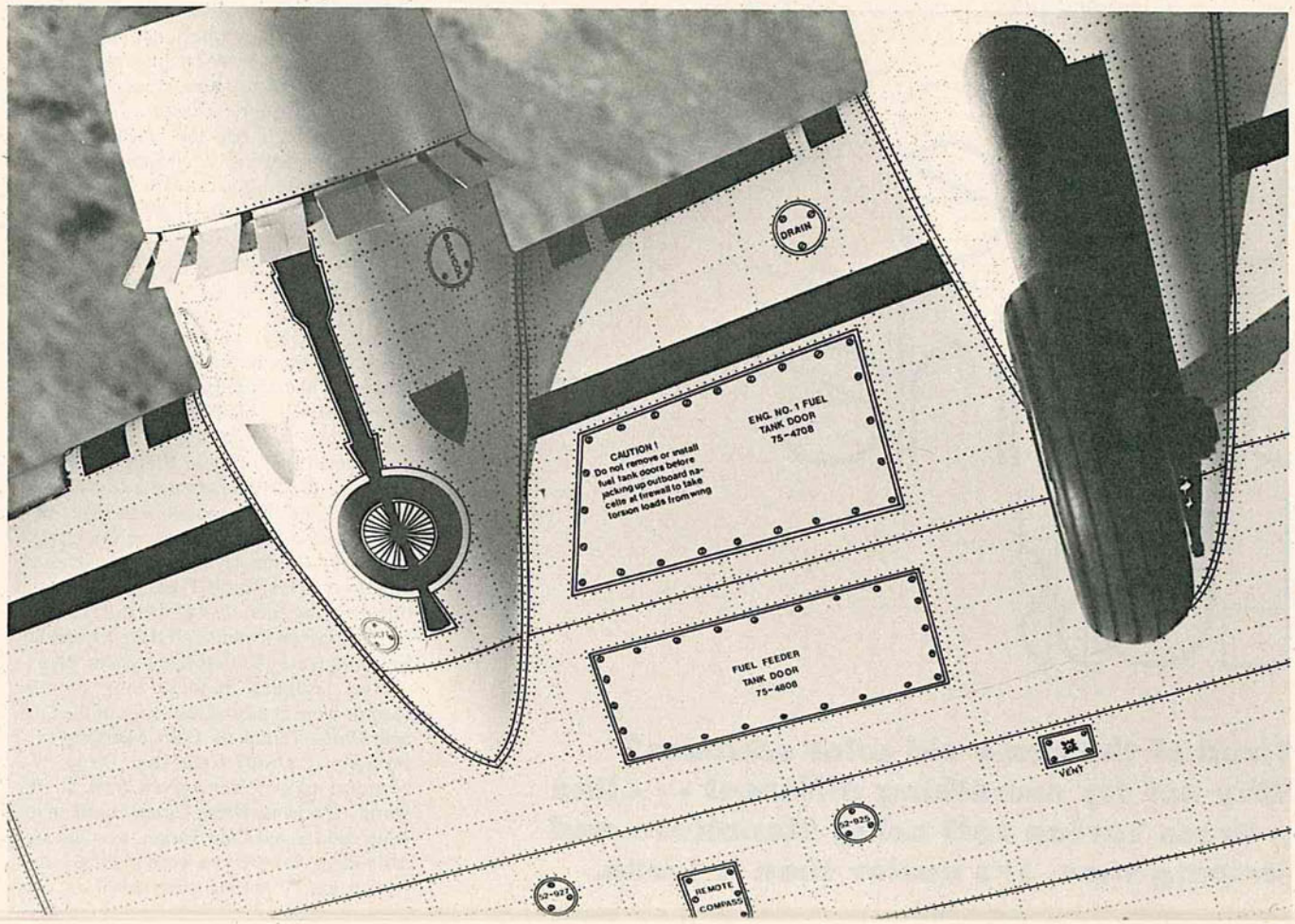


BILL SOVIA'S B-17

RCM PHOTOS BY DICK SONHEIM

Bill Sovia of Reseda, California, a member of the Valley Flyers R/C Club constructed the magnificent B-17 Flying Fortress shown on these two pages. Scratch-built from Cleveland plans, Bill's scale model of the famous World War II Bomber is of all balsa covered with K & B Surfacing Resin and painted with Aero Gloss flat dope. The all-up weight is fifteen pounds, hauled aloft by four K & B Veco .19's. The ship has operating flaps and working navigation lights. For you scale enthusiasts, the wing, alone, has twenty-five thousand simulated rivets. Gayle Ann, by the way, is also Mrs. Bill Sovia. This B-17 Flying Fortress is one of the most magnificent scale efforts we have seen and we are pleased to share these photographs of Bill's efforts with you.


CAPT. GEORGE PUTNAM/GAR • PILOT
RADIO ACCESS
RADAR ACCESS


DRAIN
CAUTION !
Do not remove or install fuel tank doors before jacking up outboard nacelle at firewall to take torsion loads from wing
ENG. NO. 1 FUEL TANK DOOR 75-4708
FUEL FEEDER TANK DOOR 75-4806
VENT
REMOTE COMPASS

Miss Pam Barnes and author's modified RCM Kwik Stik.

Wee Bonnie Lass

BY PAUL DENSON

Tired of the same old color schemes? Why not try something different - - - like a Dress Tartan sett using MonoKote and striping tape. It's easier than it looks.

● Robert the Bruce was crowned King Robert I of Scotland in March 1306 and, after many hardships, he cemented his power by his decisive victory at Bannockburn in 1314, which lead to the independence of Scotland.

It was rumored that, in 1313, one of his army officers, Gordon Dennis, had earned a warm spot in the heart of the king by helping him to escape from the Tower of Rosneath Castle where he had been secretly restrained. How Robert escaped from the tower has since been shrouded in mystery. It would have been impossible for him to have used a rope to scale down the 400 foot sheer cliffs to the Firth of Clyde. Gordon was given his own lands and the rank of Earl was bestowed upon him soon afterwards. Gordon Dennis's eldest son Duncan was the first Chief of Clan MacDennis, while his father was still alive he was known as the son of Dennis (in Gaelic would be MacDennis).

After the Jacobite defeat at the Battle of Culloden in 1746, the Government was determined to purge the Highlands of all unlawful elements and destroyed the Clan system. Even the wearing of a tartan was a punishable offense. The MacDennis tartan and the name went into hiding at this time and the people of the clan were henceforth known at Dennison. In 1782 the ban on tartans was removed but, by this time, the Highlander had been accustomed to the dress worn in other parts of the country and showed no great enthusiasm to rush back into tartan clothes.

When members of the family moved to this country, they shortened the family name to Denson by being a member of the Clan, I, of course, had access to family records. Through curiosity, more than anything else, I had the Gaelic text and notes, surrounding a curious triangular shaped drawing of cloth and poles, translated. The notes dated 1313 and, apparently, in the hand of old Gordon himself, finally gave a clue, perhaps, how the two men escaped from the tower.

Even though the drawing is crude and almost illegible, he indicated that they, using their brecan-feile, or belted plaids (a long over the shoulder cloak which could also be used as a blanket at night) and some poles they had managed to acquire, constructed one of these triangular shaped mechanisms. At this point the text became so faded as to be impossible to read. But, from the drawing and text there is a marked similarity to the flying devices that are appearing at the Torrey Pines gliderport and other soaring sites all over the U.S. Could it be that Gordon Dennis and King Robert I of Scotland were the first hang-glider pilots?

Also included in these long obscure records were copies of the settes of the Clan and Dress Tartan of Clan MacDennis. I thought it about time that these two beautiful tartans were given back to the world. The white Dress Tartan I used on the wing and the red Clan Tartan is on the stab and rudder. In case you would like to honor your name by putting your tartan on your

plane, I found it to be extremely simple. If you are Scottish, perhaps you belong to a Clan. Most libraries carry reference books on clans and Tartans. Look up your tartan, if you are not a Scot, but like the idea anyway, pick out an attractive one for your own use.

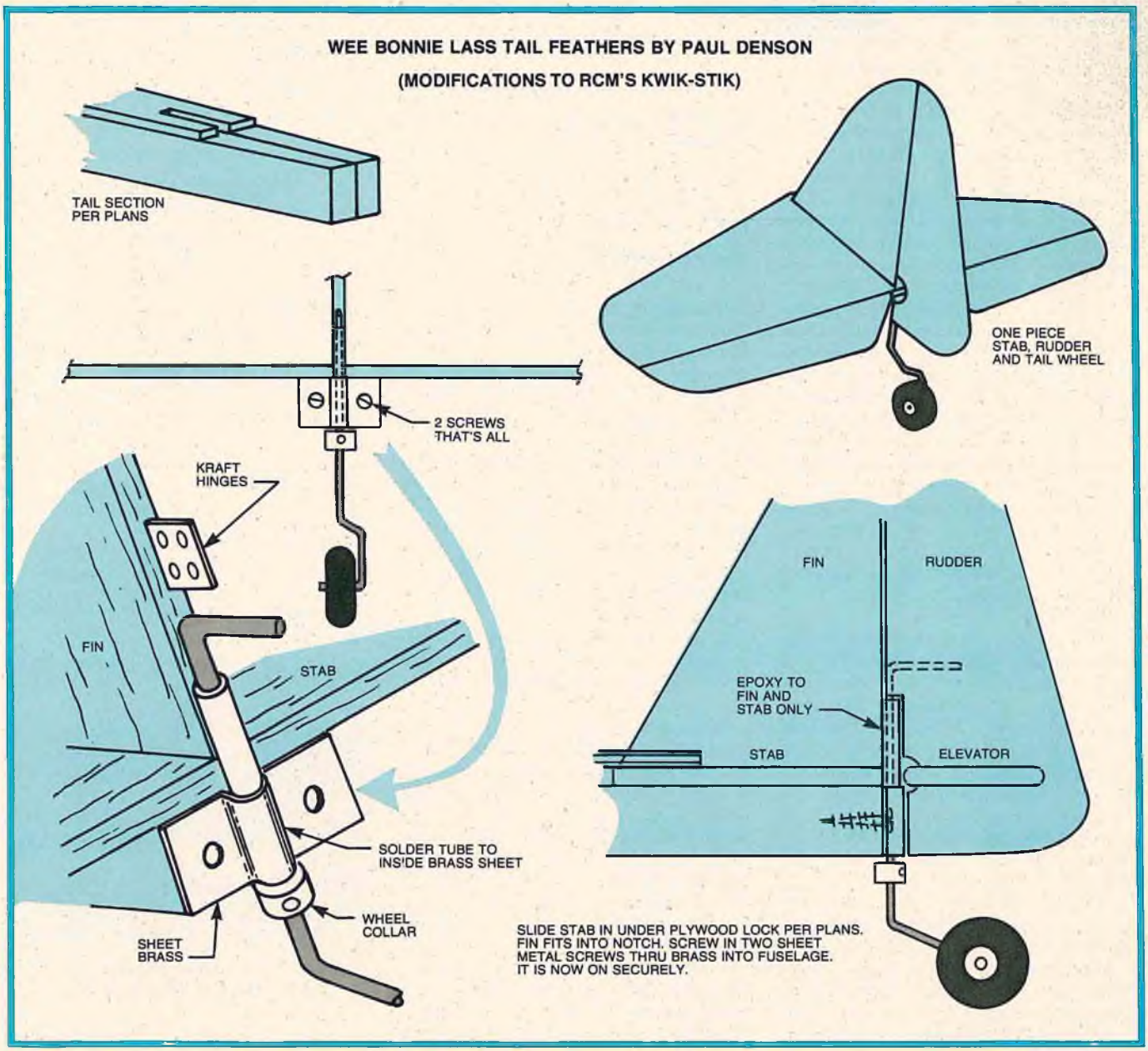
Tartan patterns are called 'setts' and by this is meant, the complete pattern, a length of tartan is made by repeating the pattern or sett over and over again.

When you have made your decision, determine the sett then, on a paper pattern of the outline of your wing, divide the whole into as many setts as you think will be attractive without becoming jumbled. It helps to make the drawing with colored pencils to better see the final results. When you have made your full size tartan, cover the wing in the background color. I decided I wanted the black lines under every other color, so I drew in the black part of the sett with a metal yardstick and a chisel shaped grease pencil, dotted line of course. I used DJ Striping Tape for the black lines. Next, I cut 5/8'' strips from green Trim MonoKote which were very carefully laid exactly half way between the 1'' spaced black strips. Next, I split the 5/8'' green stripe with 1/8'' yellow striping tape. I kept the red until last because I wanted to overlap the other colors with the red since it would be the only change when I used red as the background color. Both the red and white are made of 3 stripes — the 1/8'' strip was Bridi's Quik-Stripe and the 1/16'' stripes were some that I purchased at an automobile parts outlet. The nice thing about a plaid is there are no turns or curves, thus eliminating that problem that used to plague us before D.J. and Bridi striping tapes were available.

It is not necessary to use striping tape. If you are very careful, using a metal yardstick, you can cut strips as narrow as 1/32'' from Trim MonoKote. The remainder of the plane was painted with a can of 79¢ spray enamel obtainable at most paint stores. As of this time I have not had any of the stripes run or come loose due to the alcohol and nitro in the model fuel. Time will tell, it is the ''stripedest'' test-bed you ever saw.

It is quite easy to apply the stripes. Press down one end of the tape at an end of your rules line, unroll the tape to the other end of the line, holding it just barely taut, and press down again. All the tape between the two ends will settle down and stick. Push it down with a cloth along the full length and it is there for good. If you have to move one, do it immediately, the longer it is down, the better it sticks. Apply light heat with quick short passes of a MonoKote heat gun (hair dryer type), rub down again, and it is there for good. Be careful not to use too much heat — a little goes a long way.

The fuselage and tail surfaces are from RCM plans of the Kwik Stick II which was presented in the November 1973 RCM and the wing also from the October 1973 RCM was part of the 15-500 sport and pylon trainer. The sketches show a few handy mod's to the aircraft. □



QUIET REVOLUTION

BY ROLAND BOUCHER

●This year marks the fourth anniversary of the birth of practical R/C electric flight. Prior to this time, electrics had been constructed with the power level of rubber models using one shot batteries, whose cost made R/C electric prohibitive. 1971 witnessed the birth of the Quiet Revolution. In April, 1971, I completed my first successful electric power unit. By mid summer Astro Flight had demonstrated aerobatic electric flight at dozens of R/C meets from California to Royston, England. In September, Fred Miltkey demonstrated his R/C Twin Pusher electric sailplane at the Internats in Doysletown, Pennsylvania. Then Mattel introduced the Super Star electric free flight for the Christmas season. Now as the Quiet Revolution enters its fifth year, we witness the first U.S. all electric contest. I am proud to have been able to contribute in the development of this challenging form of modeling. Electric flight will continue to grow in popularity because it is fun, challenging and, most of all, because it will open up thousands of flying sites throughout the world.

★ ★ ★

On January 12, 1975, the Flight Masters of Inglewood, California hosted the first all electric contest in the U.S.A. Altogether five events were scheduled: Three free flight and two R/C. While the Mattel and Scale Class were familiar to the Flight Masters, the Duration Class was new and un-tested. Free Flight Contest Director, Bill Warner, chose a 30 second motor run limit which seemed to work well. The flight times were short because of adverse weather.

The two R/C events were: Stand-Off Scale and Sport Pattern. Contest R/C Director, Bob Boucher, used AMA Class "A" Pattern as the basis for flight scoring. Ten flight maneuvers were selected, eliminating straight flight out and traffic pattern approach. Each maneuver was given

NAME _____ NUMBER _____
FREQUENCY _____ NO. OF CHANNELS _____
SCALE _____ SPORT _____

1. TAKE OFF
2. PROCEDURE TURN
3. STRAIGHT FLIGHT BACK
4. FIGURE EIGHT
5. THREE ROLLS
6. IMMELMAN
7. THREE LOOPS
8. STALL TURN
9. LANDING PERFECTION
10. SPOT

TOTAL

JUDGES INITIAL

HANDICAP RULES

SINGLE CHANNEL — PICK ANY FIVE
SCALE OR NO AILERONS — ANY EIGHT
NO AILERONS — ONLY ONE ROLL

CONTESTANT SIGNATURE

CONTESTANT SIGNATURE

CONTESTANT SIGNATURE

a maximum of 10 points for a total of 100. Since most electrics have only two or three channel radios, a handicap system was used to enable these less sophisticated ships to compete. Two and three channel ships were required to complete only eight of these maneuvers with their score being automatically raised 25%. Single channel planes were required to complete only five maneuvers with their score being doubled. Because of the high wind, no single channel planes were entered. Scale entries were required to complete only eight maneuvers, regardless of the number of control functions available.

In the interest of our readers, a sample score sheet is shown. If your club tries these rules, let us know your comments so that we may pass them on.

Now for the contest results. The contest began with Phil Bernhardt and Dave Hallauer flying test hops with the Astro 020 powered "Little Buzzer", followed by an official flight by the author with his Curtis Robin built from the new "Fliteline" kit, also powered by an Astro 020. Soon the air was full of Mattels, duration ships and scale models. Free flight CD, Bill Warner, came out from behind the official's stand and showed us all how to fly free flight. Scale turnings in a winning flight with his Desoutter, powered by the new Hi Torque power plant. Next, Dave Hallauer put up his Little Buzzer for a winning 2:11, closely followed by the designer, Phil Bernhardt, with a second place flight of 1:19. Tony Nacaratto showed that you don't need to design a brand new ship for electric. He won third place with a flight of 1:12, using his Starduster 450 powered by an Astro 050.

The R/C competition began at 10 AM. Bob Boucher put in a winning pattern flight with an Electra Twin powered by a pair of Astro 25's. Roland Boucher had his usual run of luck, when a gust of wind flipped his Electra Twin on its back during take-off. Ed Sweeneyput his Astro 15 powered Quickie 500, constructed from a Glen Spikler kit, for a second place win. "Sonny" Meyers of A & L Mfg. braved the wind with his Astro 25 powered Bushmaster to take third place. Scale was a battle between Astro Flight's Boucher brothers. Bob flew first with a scratch-built Panaviea P-68 Twin powered by a pair of Astro 05's. Then Roland met the challenge with his Astro 15 powered Fournier RF 4. The RF 4's smooth flying characteristics gave Roland the edge in flight score but the scale judges threw the balance to Bob's P-68 Twin.

The contest was enjoyed by the participants and the handicap scoring was found fair and quitable. If your club is interested in seeing a home movie of this contest drop me a line.

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FLIGHT MASTERS ALL ELECTRIC MEET
Sunday, January 12, 1975
Sepulveda Basin Flying Site, Van Nuys, Ca.

FREE FLIGHT (35 Entries)
MATTEL
Junior

1. Joe Soltra	1:09
2. Tony Whitney	0:42
3. Matthew Lavender	0:38
4. Paul Lavender	0:11

Senior

1. Daryl Casper

DURATION (30 seconds)
Motor Run

1. Dave Hallauer	2:11	Little Buzzer	Astro 020
2. Phil Bernhardt	1:19	Little Buzzer	Astro 020
3. Tony Nacaratto	1:12	Starduster 450	Astro 05

SCALE

1. Bill Warner	Desoutter	Hi Torque
2. Roland Boucher	Curtis Robin	Astro 020
3. Bill Stroman	Donnier C-3	Mattel

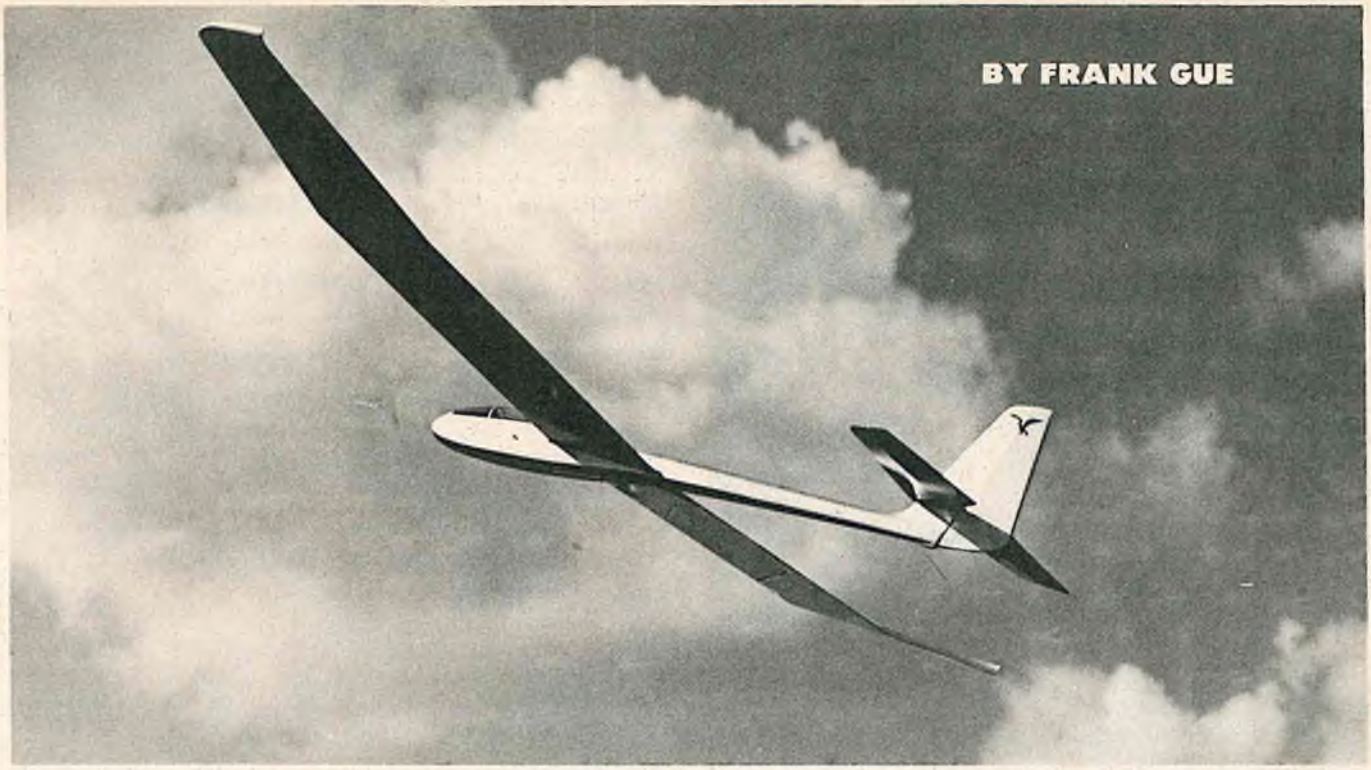
R/C (10 Entries)
SPORT PATTERN

1. Bob Boucher	Electra Twin	2 Astro 25's
2. Ed Sweeney	Quickie 500	Astro 15
3. "Sonny" Meyers	Bushmaster	Astro 25

STAND-OFF SCALE

1. Bob Boucher	Panaviea P-68	2 Astro 05's
2. Roland Boucher	Fournier RF 4	Astro 15

Bob Boucher with semi-scale Panaviea P-68 twin electric. Two Astro 05's.



BY FRANK GUE

UNDERSTANDING THERMAL SOARING WITHOUT MATHEMATICS

The flight of a fixed wing airplane is best understood by continual reference to the "relative wind," which is simply the angle at which the airplane is meeting the air. Read Wolfgang Langwiesch *"Stick and Rudder"* for a fascinating description of this concept. Every glider enthusiast should also read Frank Zaic's *"A Model Glider Design"* — one of the all-time classics.

A stable, trimmed glider flying in calm conditions continually self-adjusts its attitude to that which will generate enough forward speed to develop lift equal to its weight. If a horizontal wind arises, it will continue to fly exactly the same (if it is at reasonable height) through the air, but not across the ground. Across ground, its speed downwind will be flying speed + wind speed, upwind will be flying speed − wind speed, cross wind will be simply wind speed. To fly a model successfully in wind, one must have an aircraft which will continue to make a reasonable speed across the ground when facing the wind.

The higher the wind expected, the higher the airspeed required. The only thing which will cause a stable, trimmed glider to fly faster in non-thermal conditions, is higher wing loading, i.e., a heavier airplane. Note: this has nothing whatever to do with drag. Drag wastes energy; the only source of energy for a glider in non-thermal conditions is gravity (i.e., height); therefore, drag increases vertical speed (sink) but not horizontal speed. Repeat: drag does not affect the forward speed at which a stable, trimmed glider flies. Forward speed is governed only by the lift which the aircraft must generate to support its weight. Understanding this is helped by thinking of an aircraft being lowered by parachute (extremely high drag) and, therefore, adopting an attitude at which it is trying to increase its speed as much as it can (straight down!)

Now assume a thermal starts. Up to now, the airplane had faced a relative wind which was mostly horizontal but a little bit up — the result of its forward speed, angle of attack, and rate of descent. The thermal, however, is a straight-up wind which adds a great deal to the angle at which the model is meeting the air; that is, the relative wind, which previously was coming from mostly ahead and a little below, is now coming a lot from below. Our stable, trimmed model doesn't "like" this angle — it wants to self-adjust to its original condition. The only way it can do this is to nose-down to meet the new relative wind. Note that this happens automatically without any down elevator.

Now we have an airplane in a nose-down attitude. Two things will happen: it will speed up because its "gravity hill" is now steeper, and it will respond more to rudder, i.e., it will tighten its natural turn. This is why and how a free-flight soarer "winds into" a thermal. You can watch it happen.

Flying faster, the aircraft now lifts more. Since it was previously lifting just its weight, the increased lift has to find an outlet in added height. That is, the aircraft, whose only way of doing its job is to trade height for distance and time, now has an opportunity to gain, rather than lose, height. In engineering terms, it's converting some of the kinetic energy of the rising air (the thermal) into additional potential energy of height.

From the above, we can conclude that:

(1) Weight cannot possibly help, but only hinder, any aircraft in "getting up and staying up" in calm conditions.

(2) Weight may be a necessary evil when we want to fly in non-calm conditions and keep the airplane near the field. More accurately, it's **high wing loading** we may need to force the airplane to fly fast enough to enable us to remain in control of the overall situation.

(3) Drag has very little to do with any of the above, but merely governs the time you can expect the aircraft to remain in the air.

From the above, we can also draw an inference, which is that a much more productive way to get high wing loadings (rather than ballasting) is simply to reduce wing area, which keeps the airplane light, reduces airframe stresses and launching and landing shocks, and is generally a more elegant solution. Its drawback, of course, is that it is much more difficult to change wing loadings to suit conditions than it is to change ballast weights. □

RCM PRODUCT TEST

AIRTRONICS ACRO-STAR

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood		●				Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Acro-Star, designed by Don Dewey and Lee Renaud and kitted by Airtronics, is a sport and competition biplane which is an excellent choice for the multi-wing aerobatic events. With a wing span of 50.6" and a total wing area of 820", the all-up wing loading is 18 oz. per square foot at a 92 oz. ready-to-fly weight.

The kit is of conventional construction with the exception of full length light weight Italian poplar plywood fuselage sides. All parts are carefully machine cut and actually appear to be sanded, with each group of components packaged in its own polyethylene bag. This kit contains an extensive hardware package consisting of control horns, bellcranks, snap links, hinges, pushrods, retainers, tailwheel bracket, wheel axles, windshield, wing hold-downs, pre-formed dural gear, Gold 'N-Rod for throttle and assorted nuts and bolts. In addition, Airtronics has a set of ABS wheel pants available for for an additional $3.95.

Designed for a .40 to .60 engine, our prototype utilized an OS Max .60 with full-flow Semco muffler and Kraft KP-5 radio.

This is an excellent well engineered kit from a manufacturer renowned for high quality. The flying characteristics of the Acro-Star are excellent and it is capable of performing all of the standard maneuvers plus a great many free-style maneuvers. Its low speed characteristics are excellent and it can easily be handled by the sport flier. The aircraft has no inherent bad characteristics and it is truly a pleasure to fly. An excellent and most complete kit priced at $79.95. □

SPECIFICATIONS

Name ..... Acro-Star
Aircraft Type ..... Biplane
Manufactured by ..... Airtronics
45 E. St. Joseph Street
Arcadia, California 91006
Mfg. Suggested Retail Price $79.95
Available From ..... Manufacturer and Retail Outlets
Mfg. Recommended Usage ..... Competition, Multi-Wing Aerobatic Events, General Sport
Wingspan ..... 50.6 inches
Wing Chord ..... 8.5 inches
Total Wing Area ..... 820 sq. in.
Fuselage Length ..... 45.8 inches
Radio Compartment Dimensions ..... (L) 9.5" x (W) 3.25" x (H) 4.5"
Wing Location ..... Biplane
Dihedral (each tip) ..... 3/4 inches
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Constant Chord
Stabilizer Span ..... 24 inches
Stabilizer Chord (incl. elev.) ..... 7.5"
Total Stab Area ..... 165 square inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 10 inches
Vertical Fin Width (incl. rudder) ..... 8"
Mfg. Rec. Engine Range ..... .40 - .60
Recommended Fuel Tank Size ..... 8-12 ounce
Landing Gear ..... Conventional, Pre-Formed Dural
Recommended No. of Channels ..... Four
Recommended Control Functions . Rudder, Elevator, Throttle, Ailerons
Basic Materials Used In Construction:
Fuselage ..... Plywood sides, balsa
Wing ..... Balsa pine spars
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... Complete hardware package — everything needed
Plan Size ..... 53" x 43" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (6 pages)
Construction Photos ..... No
Kit Includes ..... Shaped parts
Mfg. rec. flying weight ..... 5.25-7 lbs.
Wing loading based on rec. flying weight ..... 18.25 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly: ..... 92 oz.
Wing Loading ..... 18 oz/sq. ft.
Covering and finishing materials used ... Solarfilm, DJ's Multi Stripe, and Trim Sheets
Engine Make and Disp. ..... OS Max .60
Muffler Used ..... Full Flow Semco
Radio Used ..... Kraft KP-5
Tank Size Used ..... 13 ounce

HOVER

BY DON DEWEY (N1A)

This month, as the National Radio Control Helicopter Association passes the one thousand membership mark, we are presenting a listing of those members who have made Grade Level I or higher in the NRCHA Proficiency Program. This listing will include the name and home town of the individual, the helicopter(s), radio(s), and engine(s) used. A careful study of the listings below will give you a good idea of the helicopters and equipment used by those NRCHA members who have achieved Grade Level I or higher. Next month, we will resume the normal Hover Column format - - - Don Dewey

NAME	NRCHA #	HELICOPTER(S) USED	ENGINE(S) USED	RADIO(S) USED
		GRADE LEVEL III		
D.L. Chapman, Tallmadge OH	N107E	Du-Bro Shark	O & R 1.34	Kraft
R.J. Dalusio, Woodbridge CT	N90F	Du-Bro Hughes 300	O & R 1.34	MRC
D.R. Dow, Ont. Canada	N5H	Hegi Huey Cobra	Webra .61	Can-Air (E.K.)
J.A. Gorham, Thousand Oaks CA	N10A	Kavan Jet Ranger	ST .60	Kraft
D. Gray, Mundelein IL	N1E	Du-Bro Shark	O & R 1.34	World Engines
G. Howard, Salisbury NC	N1C	Du-Bro Shark	O & R 1.34	World Engines
F. Peoples Jr., Warminster PA	N136F	Orig. Design	ST .56	Kraft
J. Simone Jr., Mission Viejo CA	N32A	Kavan Jet Ranger	ST .60	Kraft
R.E. Wiensch, Dayton OH	N118E	Du-Bro Shark	O & R 1.34	Proline
		GRADE LEVEL II		
B. Atkinson, Blue Spg. MO	N29E	Hegi Bell Huey Cobra	Enya .60	EK
W.D. Back, Sanford, FL	N60C	Du-Bro Hughes/Kavan Jet Ranger	Webra .61/O & R 1.34	World Engines/Kraft
R. Bentley, Wauconda IL	N92E	Du-Bro Shark	O & R 1.34	RS
R. Burch, Denton TX	N14B	Du-Bro	O & R 1.34	EK
R. Clayton, NYC NY	N22F	Kavan Jet Ranger/Kalt Cobra	ST .61	Kraft
L. Cubillos, Oakdale NY	N9F	Lenco 100	HB .61	Micro Avionics
S.W. Darlington, Anderson IN	N110E	Kavan J.R./Hegi Cobra	HP .61	Proline/Kraft
H.L. Griffith, Severn MD	N36F	Du-Bro Hughes 300	O & R 1.34	Kraft
H. Hagen, Red Bank NJ	N157F	Kavan Jet Ranger	Webra .61	Royal
T. Herr, Paxinos PA	N7F	Kavan Jet Ranger	ST .60	Heath
D.G. Keats, Troy MI	N66E	Polecat/RCH Jet Ranger	Fox .19/Veco .19/ST .60	Keats Blue Max
J. Levenstam, Spanga Sweden	N1S	Kavan Jet Ranger	Webra .61	Mac Gregor
J. Minasian, Ventura CA	N74A	Kavan Jet Ranger	HB .61	Kraft
B. Murphy, Linthicum MD	N1F	Du-Bro Shark	O & R 1.34	Kraft
L.A. Ohler, Casper WY	N10D	Hegi Huey Cobra	OS .80	MRC
A. Piercy, Castle Rock WA	N20D	Hegi Cobra	Fox .61	Royal
W.R. Schoonard, Winter Pk. FL	N23C	Hegi Enstrom	Veco .61	Kraft
T. Schwyn, Ft. Wayne IN	N34E	Du-Bro Hughes 300	O & R 1.34	Proline
A.H. Stein, Southfield MI	N94E	Kalt Huey Cobra	Enya .60	Min-X
E.J. Walther, Winter Pk. FL	N38C	Schulter Hegi Bell Cobra	Veco .61	Kraft
J.A. Werne, Tallmadge OH	N25E	Du-Bro Hughes 300	O & R 1.34	Kraft
J.C. West, Ypsilanti MI	N30E	Hegi Huey Cobra/Kavan	Max .60/ST .60	Kraft
S.L. Willoughby, Kansas City MO	N164E	Kavan Jet Ranger	Webra .61	Heath
		GRADE LEVEL I		
R.A. Atkinson, Peoria IL	N172E	Kavan Jet Ranger	OS .60	Kraft
R.C. Barker, Weston MA	N133F	Kavan Jet Ranger/Graupner Bell 212	Webra .61/HB .61	Kraft
M.D. Belshe, Long Beach CA	N63A	Du-Bro Hughes 300/Shark	O & R 1.34	Micro Avionics/Orbit
D.D. Bertrand, New Orleans LA	N64C	Kavan Jet Ranger	ST .60	EK Logictrol
B. Blaisdell, Stratford CT	N182F	Hegi Huey Cobra	HB .61	R/C Mfg. 800
B.R. Carey, Castroville CA	N66A	Du-Bro Hughes 300	O & R 1.34	Heathkit
O. Colon, Hato Rey PR	N3R	Hegi Cobra	OS Max .60	Kraft
W.H. Curtis, Greenville PA	N51F	Du-Bro Shark	O & R 1.34	Proline
J. Dalton, Greeley CO	N13B	Original	McCullough 24	Proline
R. Dalusio, Daytona Bch. FL	N49C	Hegi Cobra	K & B .61	MRC
R.G. Depew, Detroit MI	N71E	Hegi Huey Cobra	OS Max .60	Proline
R.A. DeShong, Marion IN	N140E	Du-Bro Hughes 300	O & R 1.34	MRC/World Engines
E. Dizenbach, Ont. Canada	N10H	Kavan Jet Ranger	Webra .61	Kraft
J. Doggett, Henrietta NC	N56C	Kavan Jet Ranger	Webra .61	Heathkit
J. Duckworth, Warner GA	N79C	Du-Bro Hughes 300	O & R 1.34	Heath
W.R. Ellis, Euless TX	N21B	Kavan Jet Ranger	ST .60	Kraft
B.E. Engel, Waco TX	N56B	Graupner 212	HB .61	Proline
P. Fasano, Wyckoff NJ	N123F	Huey Cobra	Enya .60	MRC
W.J. Fraser Jr., Asbury Pk. NJ	N164F	Huey Cobra	OS .60	Kraft
O. Guerra Jr., McAllen TX	N34B	Kavan Jet Ranger	Webra .61	Proline
D. Hale, Wilmington OH	N179E	Du-Bro Hughes 300	O & R 1.34	Proline
D.W. Hamlin, W. Lawn PA	N78F	Kavan Jet Ranger	Veco .61	Kraft
J.K. Harris, Pretoria S.A.	N6P	Kavan Jet Ranger	Webra .61	Futaba
J.L. Holcomb, Vancouver WA	N18D	H. Cobra/Kavan JR/Orig.	Webra .61/ST .60/Veco .61	Kraft
M.D. Holton, Charleston SC	N20C	D.B. Hughes 300/D.B. Whirlybird	O & R 1.34	Proline
E.A. Ice, Terre Haute IN	N98E	Du-Bro Hughes 300	O & R 1.34	Proline
G. Ingraham, Roanoke VA	N223F	Du-Bro Shark	O & R 1.34	PCS
D.M. Jackson, Wooster OH	N137E	Hegi Bell Huey Cobra	OS Max .60	Blue Max
E. Koelle Jr., Bedford TX	N12B	Kavan Jet Ranger	ST .60	Kraft
R. Kubly Jr., Monroe WI	N170E	Graupner 212	.60	Kraft
C.E. Legg, Council Bluffs IA	N50E	Original	HP .40	Royal
A. Lobaito, Staten Isl. NY	N239F	Sc. Scorpion Too/D.B. Shark/H.C.	Twin Ross/O & R 1.34/OS .80	Kraft

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FOAM

BY JOHN D. WOODS

This is the completed ready-to-fly foam Bizzy Bee.

TODAY'S BEST WAY TO BUILD A MODEL AIRCRAFT

PART II

Article #1 of this series dealt, primarily, with the background of building materials and, hopefully, increased your curiosity for more knowledge on how you can use styrofoam to improve your model aircraft. This article will show you how to incorporate foam into an airframe in such a way as to gain the strength the foam provides and still retain the familiar materials such as balsa and plywood on the outside so you can finish your model with any of the materials you normally use — such as silk or silkspan and dope or the polymer films, Solarfilm, MonoKote, etc. The model I chose to convert to foam construction is the Bizzy Bee, a small .049 powered 2 channel model published in RCM several months ago (RCM plan #574). The model is a small, simple model that will show what is required to convert standard construction without getting into a more complex model. The basic technique is adaptable, however, to any basically slab sided fuselage of any size.

Okay, let's get into the construction. First take a block of foam large enough to extend fore and aft from the firewall to the balsa tail post, and wide enough to be cut with a hot wire or sawed to the correct width with at least 1/4" left over on each side. The foam is easily obtained from insulation companies, building supply houses or model shops and suppliers. Buy small bead, white foam with about 1 pound density per cubic foot or less. The smaller the bead the easier it will be to sand and finish.

Next cut two 3/32" balsa cutting templates the shape of the top view of the Bizzy Bee that extend about 1" beyond the front and rear of the length of foam. These templates will also be used for top and bottom sheeting so the balsa will not be wasted. Sand the edges smooth and pin these templates on the top and bottom of the foam block that was previously cut to a size that was long enough for the fuselage and slightly wider. Make sure they are perfectly aligned because a mistake in alignment here will result in a **permanent** twist in the fuselage. A few extra seconds with a triangle at this point will mean a perfectly straight fuselage that can never warp or twist. Cut off the excess foam from both sides with a hot wire, if you have one, and if you do not have one a little careful sawing with a coping saw and some final sanding will produce the same result. Cut the fuselage sides from — get this — 1/32" balsa. Apply either contact cement to both the foam and balsa or epoxy glue to the balsa only and glue the balsa sides to the foam core previously cut. Again, be careful to see that the sides exactly oppose one another. Next cut the excess foam from the top and bottom using either your hot wire cutter or saw and sand smooth. Insert an appropriate piece of 1" trailing edge stock at the end of the foam block between the balsa sides gluing in place with epoxy or Titebond, Elmers etc. and pin in place until dry. Your fuselage should already look like an airplane and be rigid and strong. Cut the firewall from 1/8" plywood and epoxy it in

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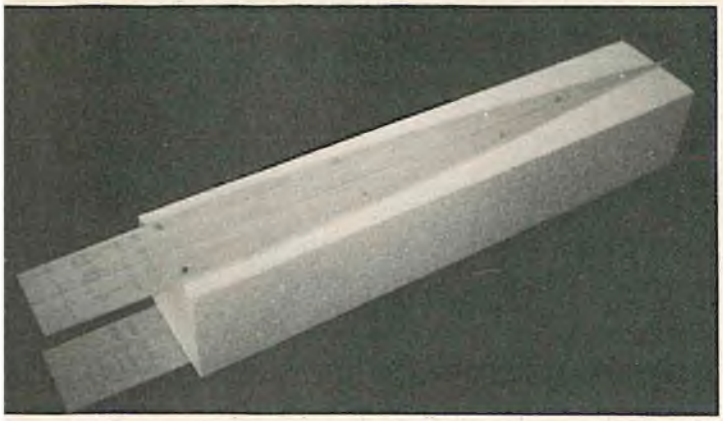
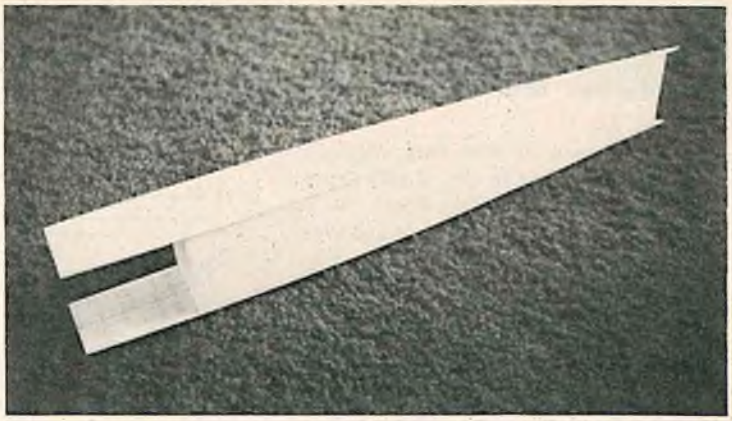
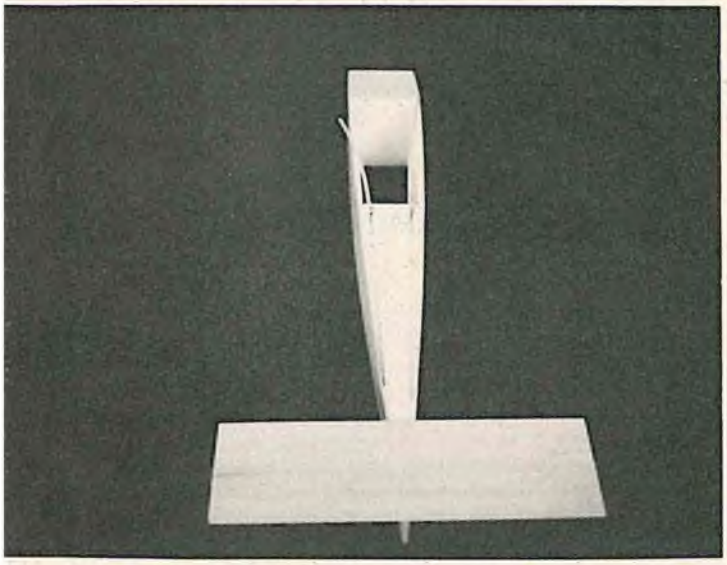
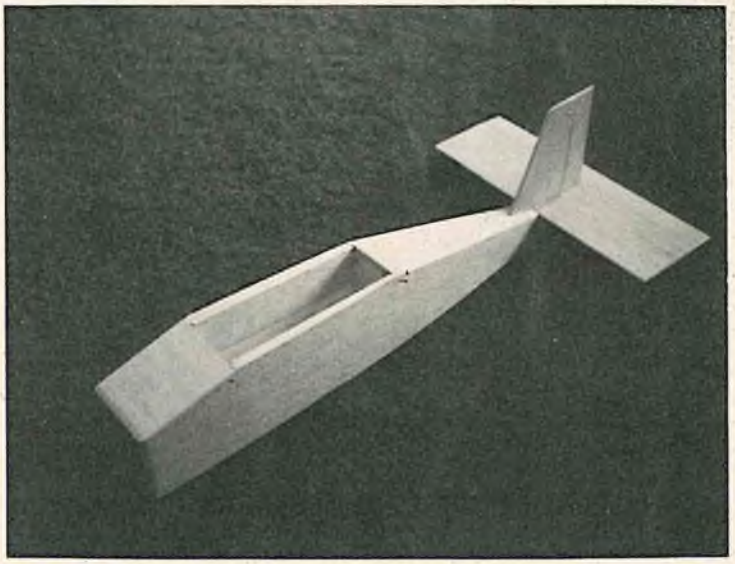
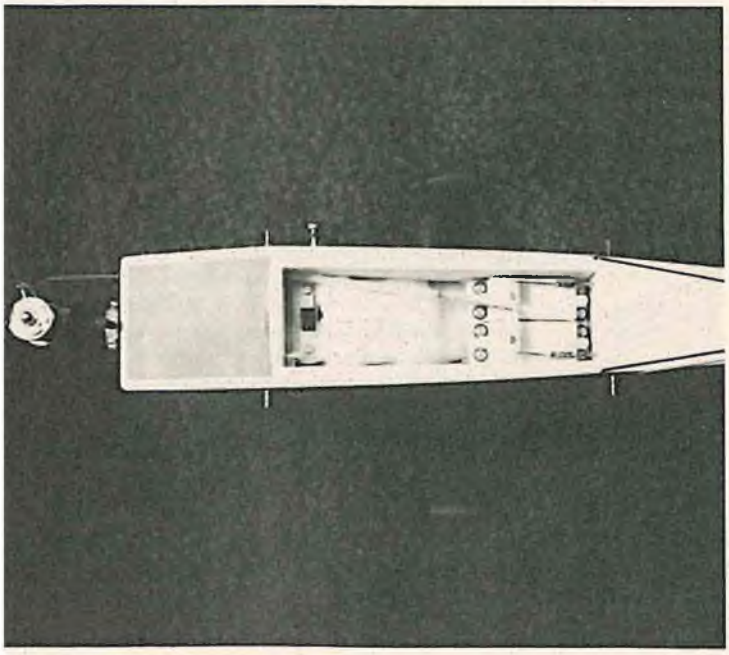










TOP ROW, LEFT: Balsa cutting templates pinned to correct length rectangular block of foam.

RIGHT: Excess foam is cut from sides of the foam block leaving top profile of the fuselage.

SECOND ROW, LEFT: Fuselage sides are shown glued to cut foam block.

RIGHT: Excess foam is cut from top and bottom of the foam block leaving fuselage shape complete.

THIRD ROW, LEFT: Equipment compartment cavity is shown cut out, nylon tubes are installed and horizontal stab is glued on.

RIGHT: Top and bottom sheeting, landing gear plywood, vertical stab, fuselage doublers and wing saddle strips are added completing fuselage.

LEFT: This picture shows engine, landing gear and equipment installed on completed fuselage.

FOR WHAT IT'S WORTH

Bob Mayhew of Allen Park, Michigan, writing in the Indian City Radio Control Club newsletter, the 'Tom-Tom', got the following idea out of desperation and fright. The last time he bench tested his Super Tigre .60 and tried to adjust the carburetor with the engine running, he decided there had to be a safer way! It was difficult to insert the screwdriver into the slot of the idle screw and keep it there. He shuddered to think of what could happen if the screwdriver got into the prop. Here's the solution: Use a long 1/8'' screwdriver such as a Craftsman 1/8'' x 4, about 6½'' long. File the tip, if necessary, to fit the carburetor screws. Cut a piece of neoprene fuel tubing 5/8'' long and slide it up the tip 1⅛'' as shown in Figure 1. It should be a snug fit. Select a brass tube about 1/4'' O.D. that will fit snugly over the neoprene. Cut a 1¼'' long piece of the tubing. Square off the ends and remove the burrs. Slide it over the neoprene until one end extends beyond the screwdriver tip 1/8'' as shown in Figure 2. In use, the tube will slide over the screw head and hold the screwdriver in place while you find the slot and make the adjustment.

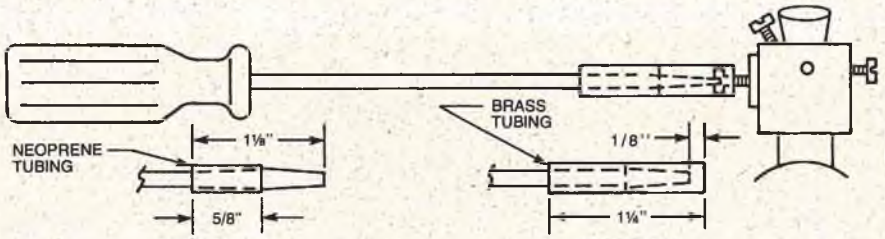
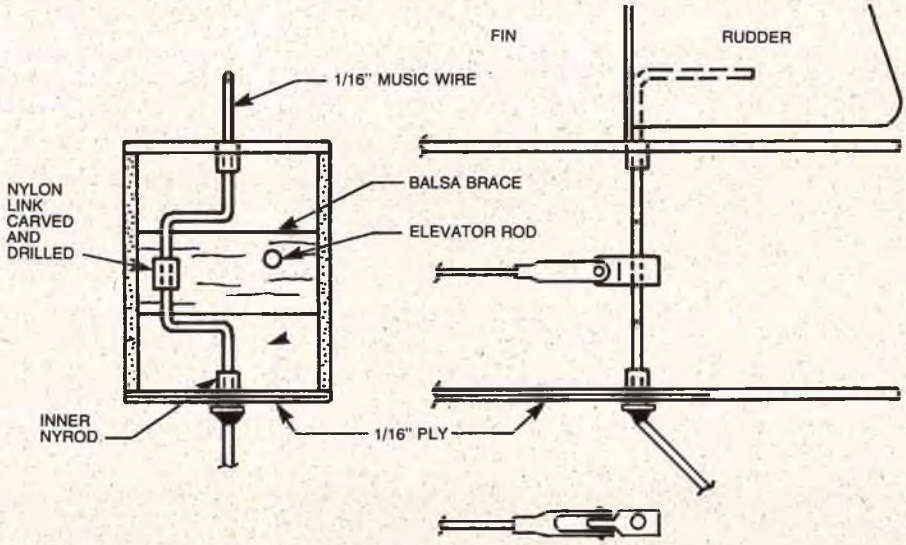
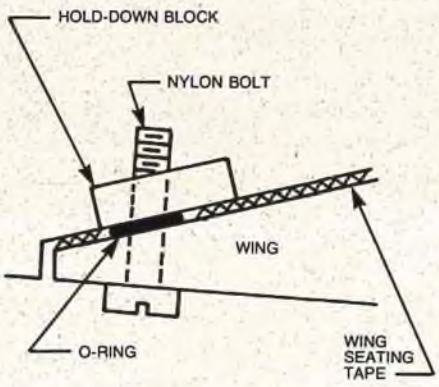


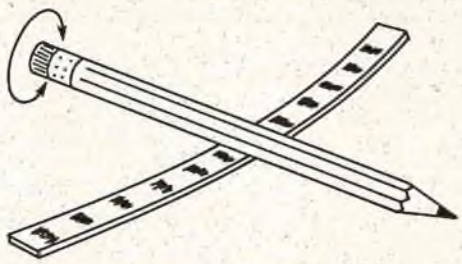
FIGURE 1 FIGURE 2





The use of nylon bolts for wing attachments certainly has many advantages over the use of rubber bands, but there is one major problem and that is the bolts tend to fall out of the wing during transit to or from the field. This really becomes a major problem if they fall out, and are lost, and you don't have any spares with you. Even at the flying field, you may not be able to borrow the right size from a fellow flier. One solution was submitted by Duie Matenkosky of Pittsburgh, Pennsylvania. Duie's solution was to simply visit a local bearing supply house and buy a small assortment of O-Rings, of a size to fit tightly on the outside diameter of each size nylon bolts you use. You should be able to buy two or three dozen for $1.00 or so. The O-Ring is slipped over the bolt after the bolt is inserted through the wing. It will then hold the bolt in place when the wing is in transit and will not interfere with the normal functioning of the bolt in holding the wing in place.

Don McGregor of Ontario, Canada writes that he doesn't like pushrods protruding from the fuselage. The sketch shows how he did away with them by leaving the fuselage open at the tail end. Bend the tail wheel link carefully to make sure it is straight. Install the nylon block before bending. Carving or cutting and drilling of this link is straightforward. Remember to build the rods into the plane as you go and put lots of thread in the NyRod and nylon link because it is very inaccessible when the fuselage is finished. Don used this method on an RCM Trainer .40 and, to say the least, rudder control is definitely positive.



Capstrips, under tension, can cause a warped wing that can never be straightened. A simple and sure-fire method of solving this irksome problem without resorting to the messy water-soaked technique is with a pencil! Just place the cut-to-length capstrip on a flat surface and lightly roll a pencil back and forth over the strip. A little practice will show just how much pressure is needed to produce an arc in the capstrip that will closely match the curvature of the wing rib. All that is necessary is to glue the capstrip in place. An X-Acto knife handle will also work as well. This idea was submitted by Bob Petro of Athol, Idaho.

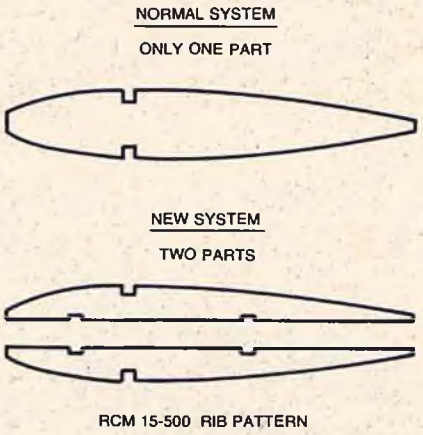
Next time, instead of using thinner, or heating your epoxy and shortening its drying time, try heating the wood in your engine compartment with a heat gun, then spread the epoxy with a stiff brush. Finally, use the heat gun again to thin the epoxy after it is applied and spread. According to Charles V. Fox, Jr. of North Bend, Oregon, this method makes a fine finish, gets into all the corners and cracks, as well as having the added advantage of stretching the epoxy almost twice as far.

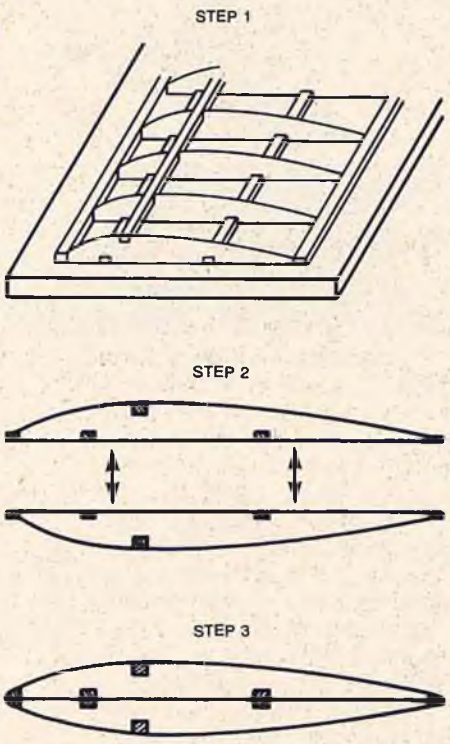
If you've every built an aircraft with no access hatch, you probably dreaded the day when you'd have to put the tank in through the wing. Lance Harmon of APO, N.Y., hit upon the simple solution to getting the fuel line through the firewall. After locating and drilling the holes through the firewall, put one length of Gold'N Rod inner tubing through each hole and then slip the end into the tubing on the tank. Pull the Gold'N Rod back through the hole and gently push the tank up towards the firewall. This eliminates the tedious task of trying to find the holes in the firewall from the inside.

If you prepare the ribs of your next

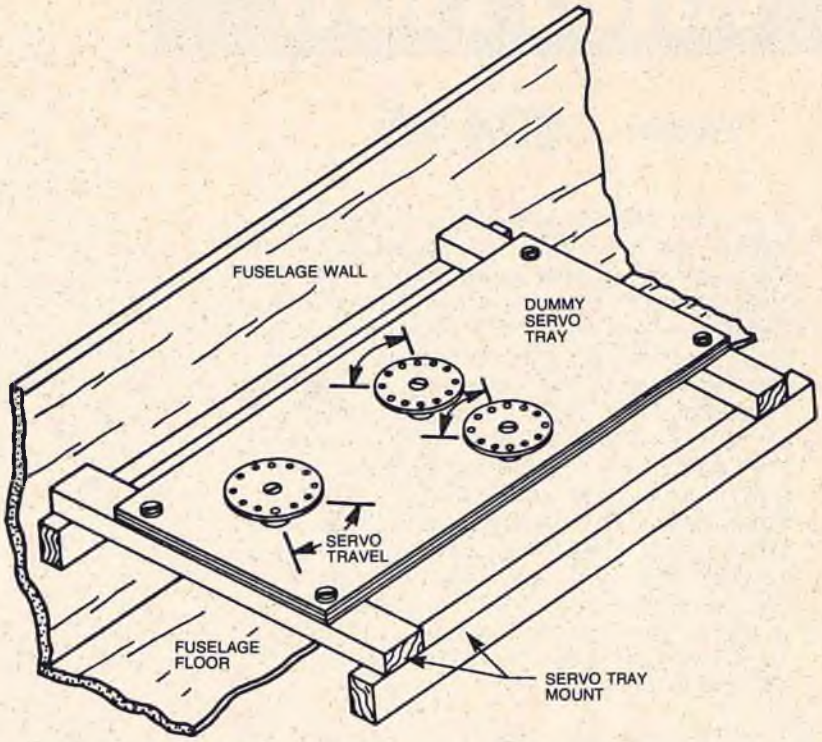
FOR WHAT IT'S WORTH

aircraft, dividing them into two parts as shown in the sketch from Juan Carlos Pesce of Argentina, you will obtain the following benefits. First, you will have an economy of balsa wood, because the two part system permits the best use of balsa sheets cutting more ribs per sheet and, secondly, easy construction since it is only necessary to use a flat board for building the wing. The wing is actually built in four parts which are joined together after they are completed in order to obtain a finished wing. In addition, there will be no warps since the wing spars, leading and trailing edges are built by the two balsa sticks as shown in step two and three of the sketch.

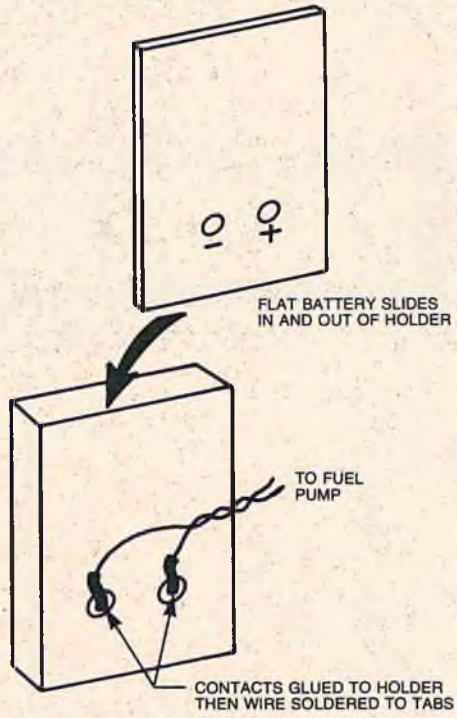




Due to only having one radio, Bart Draper of Waco, Texas built a dummy servo tray to use for fitting his radio in a new airplane while still flying his radio in an existing aircraft. The dummy servo tray was made from plywood scrap with three plastic servo arms mounted in the correct servo locations and with the servo throws marked on the plywood scrap plate. The dummy servo tray is also useful in locating servo tray mounts in the fuselage.



One of the many unique features of the SX-70 camera by Polaroid is that each film pack contains its own 6 volt flat battery. This battery, when used to take the ten pictures in each pack, contains enough power to operate an electric fuel pump for 3 to 4 twelve ounce tanks of fuel. Ron Kummer of Pickerington, Ohio uses the pack that the film and battery comes in and glues two brass contacts (fingers) into the existing openings. In this manner the expired battery can be removed and a new one inserted and you are ready to fuel up again.



After fighting for years to cut foam rubber with scissors or a pocket knife, J. Elliot Brown of San Mateo, California recently discovered an easier way — borrow your wife's French butcher knife. This is the one with the large, triangular blade. Place the foam on a cutting board, and with a sharp blade and, using a slight sawing cut, slice beautiful slabs of 1/4", 3/8", or thicker sections useful for packaging receivers, batteries, etc. Brown buys blocks 3" thick, 7" wide, and 1 or 2 feet long. 1/2" slab cuts on a 3" x 7" end results in a perfect size to wrap the receiver.

Here's a suggestion you may be interested in from David Richards of Bettsville, Ohio. Place a piece of paper over the end of a magnet and then pass the paper and magnet over your work area and presto, you have all those loose pins, tacks, nuts, bolts, etc. collected. Turn the magnet and paper over and remove the paper which now contains the articles picked up. These pieces can be easily saved or discarded without the frustration of picking them off individually from the ends of a magnet.

HOVER (continued from page 69)

NAME	NRCHA #	HELICOPTER(S) USED	ENGINE(S) USED	RADIO(S) USED
M. Malherbe, Pretoria S.A.	N1P	Kavan Jet Ranger	Webra .61	Skyleader
J.L. Marsh, Salem VA	N224F	Du-Bro Hughes 300	O & R 1.34	Heath
R.C. Mearns, Las Vegas NV	N80A	Kavan Jet Ranger	Webra .60	EK Locictrol
T.A. Melz, Tucson, AZ	N27F	Du-Bro Hughes 300	O & R 1.34	Orbit
D. Moulton, Ontario Canada	N9H	Schluter Gazelle	Webra .61	Simprop
J.L. Nelson, Bronson MI	N141E	Whirlybird 505/Hughes 300	O.S. .40/O & R 1.34	PCS/Kraft
D.L. Nuss, Williamsport PA	N73F	Du-Bro Hughes 300	O & R 1.34	Heath/Futaba
K.K. Oakley, Mentor OH	N13E	Du-Bro Hughes 300	O & R 1.34	Kraft
D.E. Perry, N. Dartmouth MA	N203F	Kalt Bell Huey Cobra	Enya .60	Kraft
D. duPlessis, Pretoria S.A.	N7P	Kavan Jet Ranger	Webra .61	Skyleader
J.J. Raats, Pretoria S.A.	N8P	Kavan Jet Ranger	Webra .61	Kraft
M.R. Raisch, Arvada CO	N26B	Hegi Huey Cobra	O.S. Max .80	Royal
A. Richardson, Burlingame CA	N92A	Du-Bro Hughes 300	O & R 1.34	Kraft
L.T. Roberts, Newport News VA	N6F	Kavan Bell J.R./Du-Bro Shark	ST .61/ O & R 1.34	Proline
G. Rodriguez, Rio Piedras P.R.	N1R	Schluter Cobra	HB .61	Heathkit
T.L. Rollins, Oklahoma City OK	N18B	Hegi Huey Cobra	Webra .60	Kraft
L. Sabato, Buchanan NY	N145F	Lenco 100	ST .60	Kraft
G. Sauter, Arlington Hts. IL	N43E	Schluter Hegi Cobra	ST .60	EK
A.H. Sharman, Leicester ENG.	N1U	Kavan Bell Jet Ranger	HB .61	Kraft
J. Simone, Mission Viejo CA	N56A	Kavan Bell Jet Ranger	ST .60	Kraft
J.K. Smith, Waco TX	N52B	Kavan Jet Ranger	Webra .61	Proline
P.V. Sproul, S. Plainfield NJ	N65F	Kalt Jet Ranger	Enya .45	Orbit
L.B. Stencel, Harrington Pk. NJ	N21F	Hegi Huey Cobra	ST .60	Kraft
D.P. Stephens, Cuyahoga Fls. OH	N167F	Du-Bro Shark	O & R 1.34	Kraft
R. Stewart, Huntsville AL	N7C	Du-Bro Whirlybird/Hughes 300	K & B .40/O & R 1.34	Hobby Lobby
T. Steyn, Pretoria S.A.	N9P	Kavan Jet Ranger	Webra .61	Skyleader
T.H. Strom, Williamsburg VA	N194F	Kavan J.R./Du-Bro Shark	HP .61/O & R 1.34	Proline
F.S. Talarczyk, New Haven CT	N63F	Bell Huey Cobra/Kavan J.R.	Enya .60/Webra .61	Kraft/RC Mfg.
C. Thompson, Zanesville OH	N65E	Graupner Bell 212	HB .61	Kraft
W.J. Thompson, Castroville CA	N65A	Du-Bro Hughes 300	O & R 1.34	Heathkit
C.D. Tobin Jr., Hollister CA	N77A	Du-Bro Hughes 300	O & R 1.34	Kraft
R.J. Tristao, Visalia CA	N47A	Schluter Hegi Cobra	HB .61	Cannon
L. Urban, FPO NY	N3C	Du-Bro Shark	O & R 1.34	Kraft
A.M. Ward, Akron CO	N1B	Kavan Jet Ranger	Webra .61	Kraft
E.L. Wayman, Portland OR	N11D	Hegi Cobra/Du-Bro Hughes	OS Max .60/O & R 1.34	Kraft
E. Von Websky, Santa Barbara CA	N89A	Kavan Bell Jet Ranger	Webra .61	Kraft
L.O. Webster, Holly Hill FL	N25C	Kavan Bell Jet Ranger	Veco .61	Kraft
L.A. Wheeler, Elgin IL	N6E	Graupner/Hegi Bell Huey Cobra	HB .61/Webra .61	Kraft
P.M. Wik, Bodo Norway	N3N	Graupner Bell 212	HB .61	Graupner
G.A. Wohn, Hillsdale NJ	N26F	Hegi Huey Cobra	ST .60	Royal
A.G. Zoph, Bourbonnais IL	N86E	Du-Bro Hughes 300	O & R 1.34	Proline

QUIET REVOLUTION

from page 66

In my first column I discussed the theory and operation of the Astro Flight 15 minute charger. This month I will answer some of the questions concerning charging that arise when even the most proficient glow engine flier tries his hand at electric flight. Before getting into the details, I want to tell you something that you probably won't believe until you experience it yourself. **Nicad batteries have a definite "break-in" cycle.** Sometimes you can feel them "come-in" right in the middle of a flight. The difference between a "hot" battery and one that has been sitting on the shelf too long can be as much as 500-1000 rpm and 1 minute of flight time. This is a real effect and is related to the "memory" effect. If you use a 500 mah cell at half capacity for a long enough period it begins to act as though its capacity has been reduced to 250 mah. A couple of full charges and deep discharges will bring it back to full capacity. Electric flight requires high battery current and it appears that the battery has to "learn" how to do this. Some batteries learn on the first flight, others take up to 5 or 6 flights to come-in. If you haven't used your batteries in a couple of months, be careful on the first flight. Your flight duration might be a little shorter than you have been accustomed to until the battery is broken in again. Now let's get into some of the more frequently asked questions.

Can I charge my Astro 05 while driving to the field?

Definitely not! The Astro Flight Rapid Charge Unit (automobile) is designed to operate from a 12v negative ground cigarette lighter receptacle. When driving, your car's regulator will soon bring the receptacle voltage up to 14.5 volts, and within minutes this over-voltage will completely destroy your battery pack and smoke you right out of you car. Charge your plane with the auto engine turned **off.** That's the way the Rapid Charger was designed to operate.

I use my Rapid Charger with a motorcycle battery and get only 2 amp charge current – What's wrong?

The Rapid Charger has a 5 foot cord designed to plug into you cigarette lighter receptacle. When charging from a motorcycle battery, the cord length should be cut to achieve the desired current level (4 amp for Astro 5, 10, 15, and 8 amp for Astro 25). A cord length of 18 inches is about right when charging from a 9 ah battery. For smaller capacity batteries, a somewhat shorter cord length should be used.

Astro Flight calls out the use of a 9 ah battery in its field box instructions. Can I use a smaller less expensive battery?

It's not recommended. The field box was designed to use a 9 ah battery. If you use a smaller battery, you will not get a full charge in 15 minutes. One of the local pattern fliers, here in Los Angeles, recently took up electric flying. He started with an 05 powered Electra Fli then moved up to a 10 powered version. He complained of getting only 3 minutes of solid power from both ships and brought the 05 plane in for a check up. It worked fine. A few days later we met at a field where I was flying my RF 4, and he mentioned he was still getting short flights. I went over to his ship and watched him charge it. The amp meter was only reading 2 amps after 30 seconds of charging. I pointed out that the normal charge current, 30 seconds into the charge, is 4 amperes. We plugged his ship into my field box and got a good solid 4 amp reading. 15 minutes later he was ready to fly. His loop and rolls were better and he now could finish "A" pattern (single rolls) and have 2 minutes of flying time left over.

The ampmeter was telling him something was wrong for months but since he had thrown the instructions away he had no way of knowing!

I have a field box with the radio rapid charger cable. How do I know when my radio batteries need charging?

I know of no product on the market capable of accurately determining the state of charge of your battery. Play it safe and give your radio a 15 minute charge before each flying session. Be confident that you can get in half a dozen flights without experiencing radio failure because of a dead battery. When you get home **don't charge your battery —** leave it alone. Charge it at the field before flying — then you'll know it's okay. Using some sort of battery tester to determine the state of charge of your battery is a very risky business. We recently witnessed the crash of a plane because the owner relied on such a device. Don't be afraid that you might over charge your battery. The flight box radio cord has more resistance than the normal charge cord and requires 25-30 minutes to achieve a full charge. Besides, the modified constant potential charge used in the field box will not harm a fully charged battery.

Can I charge my Astro 10 from my car with the rapid charger?

No! The auto battery delivers 12 volts while the Astro 10 battery requires 18 volts to obtain a proper charge. You would be surprised how many modelers try to charge the Astro 10 from their car battery and complain of 30 second motor runs! If they had measured the rpm, they would also have found it to be running at less than 1/2 speed. □

NOVICE CORNER

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with respect to control surfaces movement, etc.

As we mentioned earlier, it would be impossible to detail each and every one of these items in an article such as this — the purpose of Novice Corner is to take a given subject and to expand upon it beyond the treatment we would normally give such a subject. For example, the Gazariator would normally be presented as a standard RCM review. However, we have tried to elaborate upon the construction of this aircraft in text and photographs in order to help you over some potential rough spots in the construction of your first 4 channel trainer. There is no substitute, however, for thoroughly understanding the material contained in the Flight Training Course and for enlisting the aid of an experienced and proficient flier in helping you through your first few flights with the Gazariator. Watch carefully as your instructor trims the ship out and, following this, you will find that he will be able to go through all the basic aerobatic maneuvers such as loops, rolls, horizontal and vertical eights, stall turns, spins — all of which will prove that the capability of the aircraft will suit your needs for many months to come during your learning stage. At first you'll be practicing take-offs and landings and find that the Gazariator can land very slowly without any tendency to stall or to drop a wing. While, with the Fox Eagle .60 used on our prototype, along with a Perry Carburetor and Rosies Perry Carburetor adaptor, the Gazariator is capable of flying at quite a fast clip, it is equally at home at low speeds. You will also find that the Gazariator can be flown quite easily using rudder and elevator without touching the ailerons — another factor which makes it a good trainer. The ailerons are not overly sensitive even when set at maximum throw. All in all, the Sterling Gazariator is a very docile model that is ideal for a 4 channel trainer or a general sport flying aircraft. For you, the novice, it will give you invaluable experience in building a very conventional aircraft, insofar as construction is concerned yet one that is durable and rugged and can give you hours and hours of flying experience before moving on to a more advanced model.

So that you can check your version of the Gazariator against RCM's prototype, the weight of our model, ready to fly, was 98 ounces with a wing loading of 17 ounces per square foot. As previously mentioned, we used the Fox Eagle .60 with an adaptor from Rosies R/C, Box 10306, Lubbock, Texas 79408, in order that a Perry Carburetor could be used on the Fox. A standard Fox muffler was used and a Sullivan Products Prop-Loc and Hi-Tork nylon spinner faired out the front end of the engine compartment. An 11 ounce Kraft-Hayes tank fit easily in the fuel compartment.

You will find that the items needed to complete your Gazariator is a 2½'' nosewheel, two 3'' main wheels and wheel collars, engine, fuel tank, spinner, propeller, and covering material.

We hope that this two-part series on the Gazariator, as part of the Novice Corner column has been of benefit to you if you have chosen the Sterling Gazariator as your 4 channel training ship. It is an excellent aircraft for the novice as well as for the sport flier and an excellent buy at $51.95. If you follow the manufacturers plans and instructions, read and become thoroughly familiar with the Flight Training Course, and listen to the advice of your instructor, your Gazariator will pay for itself many times over by getting you through the learning curve on your first .60 powered full-house aircraft. Eddie Manulkin and Sterling Models have utilized their years of experience and expertise as one of the nation's oldest kit manufacturers in producing an aircraft that will take you through the basic and intermediate stages of flight training.

And, even when you go on to a more advanced ''super-ship'', we'll bet you won't give your Gazariator away. It's just too good a ship to retire permanently. □

FOAM

from page 70

place. Next, cut a 2'' wide piece of 3/32'' plywood for a main landing gear mount and lay aside. This part should extend all the way to the outside of the fuselage. Cut four 1/4'' x 1/8'' strips of balsa 3'' long and four 1/4'' x 1/8'' strips 7'' long and pin them to the top and bottom of the fuselage in such a manner that they enclose the equipment compartment on four sides on both the top and bottom of the fuselage. These are merely cutting templates that will enable you to remove the foam from the center of the fuselage and give you room in which to put your equipment.

The procedure for doing this is to punch a hole down through the foam in the center of this area to be removed, large enough to allow you to pass the disconnected nichrome wire from your hot wire cutter through and re-connect it on the other side. Now, turn on the cutter and cut around the 4 sides of the plug and turn off the cutter. When the wire cools, disconnect it again and remove it and the foam rectangular block from the fuselage. Also remove the 1/4'' balsa strips from top and bottom. Cut out the small compartment of this opening as per the plans with a knife. Make it large enough to accept your battery pack. Install NyRod, or tubing and cable, down the back of the fuselage by routing out the foam with a small screwdriver after cutting the channel edges with an X-Acto knife. Use a vertical sawing motion with the X-Acto to prevent pulling beads. Next, use the 3/32'' balsa cutting templates you used to make the first fuselage cut to sheet the top and bottom of the fuselage. You will notice that the hot wire undercut the foam just enough so that the 3/32'' balsa sheet will just come to the edge of the 1/32'' side sheeting. Install the main landing gear mount next by cutting out a 2'' section of the 3/32'' balsa sheeting on the bottom of the model. Epoxy in place. If you want to you can sheet the inside of the equipment compartment as this will add some additional strength.

Cap the 1/4'' exposed foam edges in the wing saddle with 3/32'' balsa. Sand the fuselage smooth and slightly round the edges of the balsa. Cut the vertical and horizontal stabilizers from 1/8'' balsa and glue in place with epoxy.

You will notice that I used a Cox .049 with an attached tank — if you use a Tee Dee it will be necessary for you to rout out a cylindrical hole in the forward upper cabin area for the 102 tank indicated on the plan. Next, cut the wing using a template 1/32'' oversized from that indicated by the rib on the plan. Sheet the wing using 1/16'' sheet balsa adhered with contact cement and Titebond or epoxy for the sheet butt joints. Sheet the top of each wing panel first with the flat bottom on a perfectly flat surface. Turn the panels over and cut and sand off the excess balsa front and rear in line with the flat under surface and apply 1/16'' sheet to the underside. Sand the center joint of both

panels to the correct dihedral angle and epoxy them together. A 1" strip of nylon tape epoxied around the joint will greatly increase the strength of the center section. Notice that the upper sheeting was intentionally left too long and extends about 5/8" beyond the end of the foam. If you take a sanding block and sand on a 45 degree angle using the bottom sheeting as a guide you have an instant curved and beveled tip.

All that is left to do now is cover the model with Solarfilm or MonoKote and install the engine, landing gear, and wing dowels. You now have a complete model ready for equipment installation. How's that for quick and easy? Keep in mind that this is a very tiny model but the basic techniques used in its construction can be extended to build even the largest models. In fact, except for the cost of materials, the larger model is easier to construct because you have more working room and you don't need fingers like knitting needles to work on, or in, it. The larger, more aesthetic model will probably require a balsa block or a fiberglass cowl to make it look more finished.

The all up, ready-to-fly Bizzy Bee with the World Engines Las Vegas Radio and two servos installed weighed in at exactly 18 ounces. This weight is within the 16 to 19 ounce range indicated in the original article as the correct flying weight. The big bonus comes when you find that the parts count for the model, not including hardware, has been reduced from 77 in the original to 25 in the foam version. This really simplifies your building once you master the foam techniques. The total building time from scratch was 7 hours and 55 minutes. I suppose a quick builder could beat that, but my building is slow and meticulous — I eat slowly, too. The funny thing about this technique is that the building time of a large model is not considerably longer than a small one and the parts count is reduced even more.

The next article in this series will detail the method for applying fiberglass cloth to a commercially produced foam fuselage to produce a thing of real beauty. Interested? Then come on back next month and I'll walk you through the easiest and quickest way you have used to date to produce a strong, light and **beautiful** fuselage. □

FOCKE-WULF

from page 53/48

is such that the model, once given a heading, will fly stably without control inputs.

To stay in trim a model needs to be "tight." Control surfaces should feel rigid to the touch; no slack movement around center. Use plenty of hinges on the surfaces. No slop anywhere in the control rods, bellcranks, etc. Above all, the radio needs to be accurate, especially servo centering. If a surface comes back to a different neutral each time, you can't expect to trim the model out properly. Open gimbals help, which is why a lot of experts won't use anything else.

However, even this isn't the entire story. Sometimes the pilot himself can be at fault. We have observed scale models flying erratically when they could have flown smoothly if the pilot had left them alone more.

Compared to RC models, real airplanes make very wide turns, It helps, in practice flying, to imitate real ship characteristics — wide turns, long landing approaches, flat take-offs and so on.. Attention to these matters will improve your skills and put you among the trophy winners. □

AQUILA

from page 47/40

16) Cut the lower edge of the 1/8" x 1/4" x 3" spruce leading edge tie to match the bottom edge of W-11 and glue to the aft side of the leading edge, using clamps to hold in position. Cut rib W-3 apart and trim to fit, then glue in position using a 1/16" shim under the forward section to position the rib properly. Slant the rib inboard slightly so that it is centered on the spar joint.

17) Apply Hobbypoxy Formula I epoxy to the beveled portion of the center trailing edge and glue to the top edge of the spar supports and rib surface. Position top trailing edge sheet and pin the forward edges in place. Lay a strip of 1/4" x 3/8" or 1/4" x 1/2" balsa over the aft portion of the trailing edge and pin every 2 or 3 inches through this strip and the trailing edge sheet into the work surface. This clamping strip will ensure a straight trailing edge. Don't use aliphatic glues for the trailing edge seam as it will warp or curl the thin section.

18) Trim the aft edge of the leading edge sheet with a straight-edge then trim the end so that it is centered on rib W-3. We recommend contact cement to install the leading edge sheet as it eliminates tedious pinning and drying time. Use a small brush to apply cement to the spar, leading edge and rib surfaces, then coat the inside of the sheet where it contacts these points. Let contact dry and press 2 or 3 pins vertically into the spar to act as alignment guides. Align sheet against pins and drop onto spar, supporting the sheet so that it does not contact the ribs or leading edge. Rub down firmly against the spar then lower the sheet slightly and rub with your palm so that the sheet contacts the ribs. Work forward from the center toward each end finally rubbing down the leading edge joint. The panel can be removed from the board as soon as the sheet has been completely rubbed down. If you prefer to glue the sheet in position be sure that the joints are completely dry before unpinning the panel.

19) Cut and install the top center sheet, starting with the 1-7/16" x 12½" piece butting against the leading edge sheet. Note that the outboard end of this sheet is flush with the outer face of the rib. Install the sheet on the outboard end of the spoiler blade. It's easier to trim the contour of these pieces after installation. Fit and install the 1/16" x 1/4" fillers that outline the forward and aft edges of the spoiler bay. Fit and install all center panel capstrips. We suggest cutting the caps slightly oversize and then bowing them in place to eliminate pinning. This completes assembly of the center panel. Remove from work surface when dry.

20) Prop up the center panel so that the bottom tip spar is flat against the work surface. Install the trailing edge sheet, leading edge sheet and capstrips following the methods outlined in steps 17, 18, and 19. Let dry completely and remove from work surface.

21) Trim the L.E., spars, and sheet flush with the outboard edge of W-9 and epoxy tip block in place. Set block 1/16" forward of the wing trailing edge. Form the soft wire reinforcement to the shape shown on the plans (match the second wire to the first now so that both wing tips will be identical). Notch the trailing edge to receive the wire and epoxy wire to trailing edge and tip block. The wire serves as a guide when carving the tips and prevents the tip from breaking during handling or when bent by curious hands. Rough shape inner surface tip using a scoop gouge and coarse sandpaper wrapped over a 1" diameter form (a section of MonoKote tube core is ideal). Carve and sand outer surface using a block, following the wire and tapering toward the leading edge. Wrapping a strip of masking tape around the wing inboard of the tip block joint is helpful to prevent sanding the top sheet or capstrips. Finally carve the forward top portion to match the contour of the leading edge sheet. Check the photos and cross-sections shown on the plans and work carefully.

22) Trim sheet, spars and leading edge, plus nylon tubing, flush with W-1 taking care to avoid changing the angle of W-1. Stack the ply root ribs and fuselage fillet ribs together using the brass tubes to align and shape the leading edge contour to match the plan. Unstack and glue the ply rib to the face of W-1. Add bottom capstrip at W-3. This completes the wing panel assembly except for final sanding and spoiler installation.

23) Use rubber cement or contact to secure a piece of #120 or #180 sandpaper to a sanding block at least 3" x 10". Be sure that the paper is tight against the surface of the block to avoid sanding undercamber into the wing. Block sand the entire lower surface being sure that the block contacts the leading and trailing edge at all times. Then sand upper surface taking care to follow the rib contour on the capstrips. Check that all seams and joints are smooth and flush by running your fingertips over the wing.

24) Use a small block or razor plane to shape the leading edge. **Important Note:** The tip panel leading edge must be shaped so that it becomes progessively blunter toward the tip. Check plan for the correct shape at the polyhedral joint and tip rib. Work carefully when shaping the leading edge and be sure both wing panels are identical. Block sand to final contour then change to #220 or #240 sandpaper and final sand entire wing panel including tips.

NOTE: The brass tubes for the wing alignment pin are not installed until the fuselage has been assembled. The fuselage is used as a jig to accurately locate the holes in the wing.

SPOILER INSTALLATION

1) Cut 1/4" x 1/4" balsa supports and pre-drill holes for screw-eyes. Epoxy supports to bottom surface of the sub-spar and rib. Install screw-eyes making sure that the joint of the eye faces aft, and the bottom of the eye is flush with the support.

2) Trim the three ribs marked "X" on the plans to provide clearance for the spoiler blade. Cut the 1/4" x 1" T.E. stock blade to fit the opening, allowing a 1/32" gap all around the blade. Sand blade smooth all over.

3) Locate the aluminum control horn as shown on the plans and epoxy or Hot-Stuff to the lower surface of the blade. Note that the horn projects 1/4" forward of the blade leading edge and that a right and left hand blade is required. Temporarily hinge the blade in place with masking tape and fit the 1/8" x 1/8" balsa blade supports at both ends of the spoiler bay. Use your fingertips to check that the blade is flush with the surrounding structure.

4) Cut two lengths of dial cord and insert into tubing from the root end. Hold panel tip down to help feed cord smoothly through tube. Pass end through screw-eye then back forward to the inboard side of the control horn. Pass cord through the hole in the horn so that one inch projects past the horn. Cut a 3/8" long piece from the end of a round toothpick and use this as a wedge to secure the dial cord by pushing into the horn from the outboard edge. Pull dial cord from root to check blade action and be sure the horn and retainer clear the shear web.

FUSELAGE SUB-ASSEMBLY

SIDES

Align right side over plan and draw vertical lines indicating the position of the aft edge of the nose block, F-1 and F-2. Transfer these lines to the left side aligning sides carefully. Cut 1/8" x 1/4" spruce doublers to fit

between nose block and forward face of F-2 then glue to sides. Allow a 1/8" gap for F-2 and cut the 1/4" triangular stock top longeron to length and glue flush with the top edge of the side. Glue bottom longeron in place starting at the tail end cutting kerfs with a razor saw if necessary to follow the side contour. Use pins as required to hold side and longerons in position and flat on the board. Repeat for the other side making sure that you make a right and left side. Cut the aft spacer from 1/4" x 1/4" balsa and glue to either side positioning carefully. Let the side sub-assemblies dry thoroughly before removing from the work surface.

TAILPOST

Cut two pieces of 1/8" x 1/4" spruce 3¾" long. Lay out the hinge locations and file a 1/64" deep slot in each piece to receive the tang for the rudder hinges.

Epoxy the two pieces together forming a 1/4" square post with two 1/32" wide slots in the center. Epoxy hinges into slots and cut off excess flush with the tailpost. Use 3/32" diameter hinge pin to check hinge alignment.

FIN

Tack glue the 1/16" ply fin sides together aligning edges carefully. Cut-out the template from the plan and use rubber cement to glue the template to the ply. Drill a 1/8" diameter hole for the horn pivot tube and a hole at each end of the rear alignment pin slot. Use a coping or jig-saw to cut the slot and file smooth. Be sure the slot is wide enough (3/16") to clear the boss on the control horn. Separate the two ply pieces and remove paper template.

Epoxy the tailpost to the aft edge of the right fin side aligning carefully. Cut the 1/8" x 1/4" and 1/4" x 1/4" frame and epoxy in place. Insert a 4" length of brass tubing into the hole in the plywood and install the stabilator control horn. Check horn action to ensure that full travel is available. Trim frame pieces if required.

Coat frame faces with epoxy and push left fin side down the tubing until it contacts frame. Use a small square or triangle to check that the tube is vertical in all planes and use weights or tape to hold together until the epoxy cures. Don't epoxy the brass tube to the sides — it is used only as an alignment fixture, and is removed when the epoxy has cured.

FUSELAGE ASSEMBLY

1) Insert the 1/4" O.D. x 3" long and 1/8" O.D. x 4" long aft brass tubes through the holes in the fuselage sides with the inner edges of the sides facing each other. Insert F-2 between the sides and push sides tight against F-2. Bring rear edge of sides together, trimming the 1/4" triangular stock so that the 1/4" square spacer is firmly contacting both sides. Apply glue to spacer and clamp sides together tightly checking alignment of the aft edges.

2) Apply glue to the edges of F-2 and install between sides. Use tape or clamps to squeeze sides tightly against the former. Invert over top view and check alignment. Be sure F-2 is tight against the 1/4" tube, and flush with the top edge of the sides. Do **not** pull nose together yet!

3) Pin 1/4" sheet top block to work surface over the top view of plan then apply glue along each side and across the forward edge where the sides and F-2 contact top block. Drop sides into place using pins to hold in position. Use straight-edge to check that sides are straight between F-2 and tailpost, pinning as required. Let assembly dry completely before continuing.

4) Use your hand to squeeze the front of the sides together against the noseblock, pushing block back against lower longerons and spruce doublers. Wrap the rubber bands and check alignment over the top view by lining up a square or triangle against the side. Be sure the nose is centered over the plan. Correct any misalignment by trimming the doubler and longerons. When satisfied with alignment apply glue to both sides of the noseblock, squeeze sides together, then use a length of strip rubber or several large rubber bands tightly wrapped around the sides to clamp the nose together.

5) Install F-1 between the sides slightly aft of its final position. Apply a bead of glue to the sides at the former location and slide F-1 into final position. F-1 will be a tight fit between the sides and pressure will hold it in place.

6) Cut the anti-crush crosspiece from 1/4" x 1/2" stock to fit across the sides aft of the 1/8" tube for the wing alignment pin. Glue crosspiece to sides, but not to brass tube. Cut the former reinforcements from 1/4" triangular stock and fit around F-1, F-2 and bottom edge of noseblock. Remove brass tubes.

7) Pre-form the forward ply floor by drawing it across the edge of your bench pressing down with your hand in the manner you curl or straighten paper. A few passes with controlled pressure will form the floor to match the side contour. Epoxy the 1/8" ply hook mounts in position on the inside of the floor. Note that the aft mount projects 1/4" behind the edge of the floor. Position the towhook extruded bar in the slot and use a 1/8" diameter drill to transfer the mounting holes to the ply plates. Enlarge these holes with a 5/32" diameter drill and press-in #4-40 blind nuts from inside of floor. Epoxy around nuts to secure.

8) Remove the rubber wrapping from the nose and block sand entire bottom edge of sides to ensure good contact with bottom sheet and floor. Mark aft edge of floor and apply glue to sides, former edges and noseblock. Install floor starting at aft edge using masking tape to draw tightly against sides. Wrap nose section with rubber strip or bands to secure. Let this assembly dry thoroughly and remove from work surface. Remove all tape, pins, etc.

9) Trial fit the fin sub-assembly into the aft end of the fuselage. Check that the tailpost fits snugly against the 1/4" square aft spacer and that the forward bottom is seated against the top surface of the longerons. Correct any problems now and remove fin.

10) Cut a piece of 1/8" O.D. brass tube 13/16" long and insert through the holes in the fin sides and control horn. Be sure the tube projects equally on each side of the fin and epoxy the tube to the fin sides. Work the horn back and forth to check for smooth action. Prepare the aft end of the inner elevator pushrod as shown on plan and snap the clevis over the outer hole on the horn.

11) Check your servo action to determine the best routing for the rudder and elevator pushrods and the location for the rudder horn. Cut the rear exit in the appropriate side. You may have to cross the pushrods to obtain correct throw at the surface. Mark servo position on the plans to eliminate confusion when you are installing the radio.

12) Scuff the outer pushrod tubing with coarse sandpaper and install the outer elevator tube. Position tube so that the aft end is 3/4" forward of the fin slot and epoxy the forward end to F-2 and the trailing edge crosspiece. Insert inner pushrod into the aft end of the outer tube, pushing forward until fin is positioned in slot. Check horn throw and epoxy fin into slot and tailpost between sides. **Note: This is a permanent assembly** — the elevator pushrod cannot be removed after the fin has been installed. Be sure that everything fits and works correctly! Epoxy the aft end of the outer pushrod to the top sheet and against the sides for extra rigidity.

13) Install the outer rudder pushrod tube, epoxying in place as described above. When dry, trim flush with the outer face of the fuselage side. Install the optional tube for an internal antenna installation at this time.

14) Place the fuselage on your work surface, propping up the aft end so the the top surface is parallel to the bench. Measure carefully! Insert the forward joiner through the brass pivot tube in the fin and the rear joiner into the horn boss, then slip the stabilator panels over the joiners against the sides of the fin. Use pins or tape to temporarily position stabilator. Check fuselage position again and adjust stabilator position until the leading and trailing edge are the same distance above the work surface. This ensures that the stabilator is parallel to the top of the fuselage and provides proper longitudinal decalage. When satisfied with alignment glue the root fairings to the sides of the fin. When completely dry, cut the stabilator panels free from the root fairings, but do not remove from joiners yet.

15) Insert rudder hinge pin from the bottom of the fuselage, holding rudder in proper position. Be sure that the pin is inside the brass tube in rudder root rib. Check that the rudder is square with the stabilator using a triangle or square. Correct any misalignment by enlarging the rudder hinge slot and shifting rudder sideways. When satisfied with alignment epoxy the rudder hinge into the rudder.

16) Remove brass wing tubes from the fuselage and slip joiners through holes in the sides. Plug the wing panels onto the joiner and rest the trailing edge on top of the alignment pin. Sight from nose to check that the empennage is properly aligned with wing. If misalignment exists it can be corrected by twisting the aft fuselage when installing the aft bottom sheet, to counter any twist between wing and empennage. Remove the wing panels from the joiners.

17) Cut aft bottom sheet from 1/8" balsa and install, starting at the end of the ply floor. Use 5-minute epoxy and pin sheet in place. Work toward tail butting sheet tightly but don't install last 10-12 inches of sheet until re-checking wing and empennage alignment. Twist the fuselage if necessary and install the remainder of the sheet, locking fuselage alignment. Cut a slot in the last section of sheet for the antenna tube and tailpost and install. Remove stabilator panels and rudder.

18) Glue tapered aft fairing block to top sheet and block sand top sheet to match the face of the block. Cut the 3/8" sheet fin fairing block 1/16" outside final shape and fit between stabilator root fairings. Glue to fin and fuselage top.

19) Build the canopy floor frame from 3/32" x 1/4" spruce, fitting between fuselage sides. Use the crosspieces to hold side pieces against sides, and epoxy frame together. Remove frame from fuselage and assemble canopy floor from 1/8" sheet and glue to frame. Bevel forward edge to match front fairing block then insert frame back into fuselage and trim floor flush with top edge of sides. Draw a line 1/32" inset from edge and trim floor to this line to ensure finished canopy will be flush with sides. Cut canopy formers from 1/8" sheet and glue aft former to floor against aft fairings. Cut triangular stock to match angle and glue in place to reinforce joint.

20) Glue forward canopy fairing block to top surface of nose block, using the canopy frame as a spacer. Bevel lower edge of C-1 and glue to canopy floor. If you plan to install the optional instrument housing and panel, do so at this point. Remove the canopy frame from fuselage and spray forward section of frame and housing flat black. Cover floor and aft former with flat black contact paper. If you prefer use a color which compliments the color scheme you select.

21) Cut both ends off the canopy and place over the frame. Mark trim lines with tape, or felt-tip pen, and cut the canopy 1/8" oversize. If you perfer a colored canopy it can be easily accomplished by dying with household dye and hot water. Use a whole package of dye in a gallon of hot water in a cake pan or similar utensil. Place on the stove and heat until the water is just below boiling. Stirthoroughlyand insert the canopy in the dye for 15 to 20 minutes. Check the color often and remove when you are satisfied with the color depth. Wash the canopy clean and dry with a lint-free cloth. Use a tack rag to remove dust from the canopy frame and canopy.

22) Position the canopy over the frame and spot glue to the frame at the high point of C-1 and C-2. Be careful not to distort frame by applying excessive pressure. We have had very good results using Hot Stuff to install canopies, but you can use epoxy or other adhesive that you feel appropriate. Cut two strips of 1/4" square balsa or equivalent and place against sides of canopy at the floor to act as clamping strips. Wrap both ends with rubber bands to clamp sides against floor. Glue canopy to both end formers, using your fingers and/or tape to hold canopy against formers. Finally, glue the side seams against the floor and let dry thoroughly before trimming the canopy flush with frame. Check canopy fit and apply 1/4" wide DJ or B & E striping tape to cover frame edges. Fold tape over the edge of the canopy and press tightly against floor and formers to help secure canopy. Add the simulated bow from 1/8" wide tape. Position completed canopy on fuselage and draw outline on fairing blocks to provide a guide when carving fuselage.

23) The fuselage is now ready for final shaping and sanding. Use a small plane and sharp knife to slab off the fuselage corners down to the triangular stock. Temporarily position the fillet ribs on the sides and draw a line 1/8" outside the rib outline. Do not carve fuselage inside this line. Be careful when carving the cross-grain bottom sheet not to gouge out chunks of sheet. Contour the nose area following the detailed photos. Use very coarse (#50 or #80) garnet paper, and/or a wood rasp to further shape and contour the fuselage, using the photos and plans as a guide. Be sure to round the aft portion of the fuselage as shown on the plans to avoid a tail heavy fuselage. Wrap ends of canopy with 2 or 3 layers of masking tape to protect canopy and install in the fuselage. Use a block to shape the forward and aft blocks to fair smoothly with the canopy contours. Shape the aft canopy fairing to blend smoothly into the fuselage top contours. Final shape the fin fairing, blending contours into the stabilator fairings and fuselage top. Finish all shaping with coarse sandpaper and avoid using finer paper until all contours are final shaped. Then smooth all over with progressively finer paper. Add spruce nose and tail skids and fair into fuselage.

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YOU ARE INVITED TO BECOME A MEMBER OF

NRCHA

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Sponsored by R/C Modeler Magazine, the National R/C Helicopter Association has been established to promote and encourage active participation in sport and competition R/C helicopter flying. It is a vehicle whereby the R/C helicopter builder and flier will have a forum from which to discuss various ideas, helicopter competition rules, and provide a communications media with which to assist the Academy of Model Aeronautics in future programs in conjunction with helicopter contests. The organizational structure is very similar to other established organizations within the R/C framework such as the NSRCA for pattern fliers, the NMPRA for pylon racers and the LSF for sailplane pilots and will be structured in such a fashion as to promote helicopter activities within the existing governing body for all phases of model aviation, the Academy of Model Aeronautics.

As mentioned, the primary purpose of the NRCHA is to encourage the dissemination of information between R/C helicopter pilots as well as to establish and create a self-improvement and achievement program similar to that utilized by the League of of Silent Flight. A five step Grade Level Proficiency Program has been established with gold proficiency pins awarded for each grade level you complete successfully.

The Association is a non-profit organization whose administrative and clerical details are handled by the R/C Modeler Magazine staff on a gratis contributory basis. Membership dues have been deposited in a separate account in the name of the organization and those dues are used for actual expenses of membership cards, and physical materials necessary for the initial operation of the organization. A full accounting of all funds will be made on a periodic basis and will be certified by a public accountant. Additional funding has been donated by R/C Modeler Corporation.

As a member, you will receive a membership card in the NRCHA and will be assigned a registration number which you can use on your helicopter which will consist of the letter N followed by a number issued on a first come, first serve basis followed by a letter designating the district in which you reside. These registration numbers will not only serve as an indication of your membership in the organization, but will enable the model magazines to be able to identify the owner of a helicopter in contest photographs by simply checking the organizational file for the individual membership card bearing that number. As a member you will also have the opportunity to associate with individuals across the continent whose interest in the hobby parallels that of your own. It is our hope that each and every one of you will participate in any degree possible within the organizational structure, contributing ideas, building information, flying tips, and/or working and serving on the various committees that will be established in the future. Any assistance that you can render will be appreciated by each and every R/C helicopter pilot in the country. The annual dues have been established at $4.00 per year to cover postage, printing, etc. All additional costs will be absorbed by R/C Modeler Magazine.

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AQUILA

from page 81/40

Important: The completed fuselage without empennage and wire joiners or canopy should balance level approximately 3½" behind the wing joiner when supported between your fingers. If the balance point is further aft, excessive nose ballast will be required. Further shaping and sanding is recommended to move the balance point forward.

24) Insert the main wing tube through the sides and epoxy to the sides and former F-2, checking that the tube is centered in the fuselage. Insert the rear tube but do not epoxy. Slip root fairings onto tubes and tack glue to fuselage sides, using the tubes to hold fairings in proper alignment. Trim the 1/4" O.D. tube flush with the fairings and remove the rear tube. Insert joiner and install one wing panel, aligning the root rib and fairing. Use a long 1/8" diameter drill (sharpen the tubing and use as a drill if you don't have a long drill bit) inserted from the opposite side of the fuselage to pick up the 1/8" diameter hole in the root rib and drill 3/4" into the wing filler block. Work slowly and carefully. Repeat this process for the other panel. Insert the brass tube in the fuselage as a temporary joiner and plug both wing panels in place. Check the fit of the wing root against the fairings and overall aircraft alignment. Add shims between sides and fairings if necessary, then epoxy fairings to sides. Remove wing panels. Cut the rear tube into three sections and epoxy in place in fuselage and wing roots. Be careful not to get epoxy inside tubes. Trim flush and chamfer ends.

25) Build up fillets around wing and stabilator fairings with 5-minute epoxy and cornstarch or Sig Epoxylite. By chamfering the end of the main wing joiner you will have a good tool to smooth the fillets. When fillets are dry, sand smooth and cut slot in stabilator fairings matching slot in fin sides. Insert rear joiner and check control action.

26) Cut the 1/4" x 3/8" plywood servo rails to suit your radio installation and install in fuselage. Add the 1/4" triangular stock reinforcements. Cut the 1/4" x 1/2" crosspiece located under the aft canopy block and fit to fuselage. Insert screw-eyes 3/8" in from ends and glue in positionusinga 3/32" joiner to align the eyes with the holes in the fairings for the spoiler cables.

This completes the construction of your Aquila. It is now ready for the covering and finishing and installation of the radio and final assembly.

COVERING AND FINISHING

We suggest that you use Super MonoKote to cover the wing panels and empennage. The other plastic film materials that we have tried are more flexible and contribute no skin stiffness to the airframe, causing flutter problems at high air speeds. For contest work, including speed and distance tasks, you want all the stiffness possible. For beauty, toughness and light weight this is the only way to fly.

Because of the compound curves the fuselage is best painted. We find the following process works well and provides a lightweight repairable finish:

1) Check contours and final sand. Fill any cracks or dents with Hobbypoxy Stuff or Dap.

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WAREHOUSE hobbies

AQUILA

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2) Use a foam brush to flow on one coat of Hobbypoxy Clear Epoxy. Hang the fuselage nose down and let dry overnight. Most of this coat will soak into the wood. Lightly sand with #120 No-Load sandpaper.

3) Spray on one coat of Ditzler Primer well thinned. Allow 3-4 hours drying time and sand with #180 or #240 No-Load paper. Inspect carefully and rework any problem areas. Most of the primer should be sanded off.

4) Spray a second coat of primer and let dry. This should have completely filled the grain and resulted in a uniform color. Sand lightly with #280 No-Load and you are ready for color.

5) We prefer Ditzler Acrylic Lacquer plasticized with Southern R/C Products Flex-All for final coats. There are hundreds of colors available and custom mixing is very easy. The finish is durable as well as beautiful and can be repaired very easily. Spray on two coats and let dry overnight. Rub out with DuPont white compound then with Wright's Silver Cream and you will have a beautiful gleaming fuselage.

SPOILER FINAL INSTALLATION AND RIGGING

1) Slit covering in the spoiler bay and fold down and iron all around to the frame edges. Trim off surplus material and seal edges. Check blade fit and cover both sides and all edges of the blade. Be sure that you cover top and bottom and shrink covering carefully to avoid warping the blades.

2) Cut a strip of Slictac or similar material 1/2" wide by 12" long. Drop blade into opening and center so that the gap is even all around. Press on hinge and then iron firmly to the wing and spoiler blade. No internal pieces are required. Trim ends and check blade action.

3) Feed cable through tubing starting at the root end. Use tweezers to feed through screw-eye and back through horn. Wedge in place and pull cord to open spoilers. Apply 1/4 ounce stick-on weight on the bottom of the blade and check spoiler action. The blade must retract freely and be flush with the wing. Correct any binding before flying.

We have found that the return weights work better than spring or band returns and present less load to the servo. We have flown the ship inverted without any evidence that the spoilers extended.

4) The final step is terminating the servo end of the cables, which is done after the spoiler servo is installed in the fuselage. Plug wing panels in place on the joiner fishing the cord through the holes in the fuselage sides and through the screw-eyes. Insert a #2 x 5/16" sheet metal screw and eyelet onto the outer hole of a long servo arm, forming a post. Wrap cord 1/2 turn around the post, pulling the slack out of the cord and attach the free end with tape. Check spoiler action to be sure blade opens 90° and retracts fully. When satisfied, place a drop of epoxy or Hot Stuff on the cord, forming a small loop. Cut off excess cord after the epoxy sets. Repeat this process for the other panel, making sure that the blades extend equally. Any further adjustments can be made with the toothpick peg in the spoiler horn.

Slip loops off the post and remove wing panels. Hook-up, when assembling the model, is quick and easy by threading the loops through the sides and onto the post.

FINAL ASSEMBLY

1) Install rudder hinge pin and rudder, and check that rudder swings freely. Insert stabilator joiners through horn and plug on stabilator panels. Install rudder and elevator servos on rail and mount switch. Be careful to leave room for the battery lead through former F-1. Position the battery pack and receiver.

2) Mount the rudder horn with two #2-56 x 9/16" long screws. Make up inner pushrod termination and insert in fuselage and attach to rudder horn. Cut pushrods to length and connect to rudder and elevator servos. Check control action and throws and adjust to provide servo throws shown on the plan.

3) Temporarily install the canopy and insert the main wing joiner in the fuselage and check balance by holding the rod in your hands. Add ballast as required to the nose block cavity until the fuselage hangs level when supported by the rod. Remove 1/2 ounce of balance weight and affix the rest firmly in the nose block. The 1/2

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Introducing PermaGloss Coverite*

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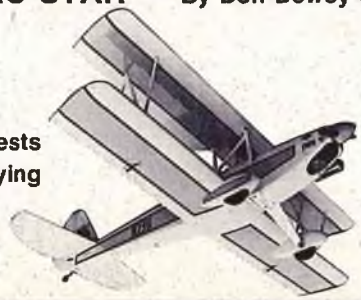

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AQUILA

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ounce weight will be used for the first test flights then reduced as the airplane is trimmed out. Wrap the battery pack and receiver in foam and install in final position. If using an internal antenna insert through the fuselage tubing, otherwise run through a hole and down the side of the fuselage.

4) Install the towhook in the extruded bar and mount the bar in the fuselage. Position hook approximately 1/2" forward of the main joiner for the first test flights. Be certain that the lock nut on the hook is firmly tightened as movement of the hook may have disasterous consequences.

5) Assemble the complete model and hold in one hand and jiggle it up and down. Check all surfaces for movement. If necessary kink the stabilator joiners slightly to tighten their fit in the panels. The wing panels are retained by friction only as we have found hooks and bands across the fuselage unnecessary. When everything is shiny and new, however, the wings may tend to slip outboard. If this happens, push the joiner wire ends into an orange or potato and let it sit overnight until it rusts slightly. Normal handling and weather will keep the rods rusty.

PRE-FLIGHT CHECKS

Before you go out to the flying field we suggest that you run through the following pre-flight check list. It is a good idea to develop the habit of regularly checking the model and radio system between flying sessions. Many times you will find a problem in the shop which, if not corrected, might cause a crash.

☐ 1) Inspect the model carefully. Check the radio operation by trying all control functions and make certain that the surfaces move in the proper direction. Be sure that the rudder and stabilator surfaces are neutral when the transmitter trims are set at neutral. Check that the spoiler blades close tightly and extend equally. Adjust clevises and/or spoiler cables, if required.

☐ 2) Check that the servos are firmly mounted and that the receiver and battery pack are secure. Make sure that the nose trim ballast is firmly mounted and cannot shift forward or backward. A strong launch can shift things toward the tail.

☐ 3) Check all flying surfaces carefully for warps. Remove any warps present by re-heating the film covering. Be sure that the tip panels are not washed-in (leading edge higher than trailing edge at the tip). A small amount of wash-out is okay as long as both tips are the same.

☐ 4) Check the span-wise balance by making a string sling and supporting the ship by the main wing joiner. If it rotates span-wise, add weight to the lighter wing tip. A slight tilt can be tolerated but excessively out of balance wings will cause erratic turns. Remove the wing panels and recheck that the fuselage hangs level when supported by the main joiner. This will provide slightly nose heavy trim which we find is safer for the first few flights.

☐ 5) Check your batteries, both in the transmitter and airplane. If you are using dry batteries be sure they are fresh; if Ni-Cads, that they are fully charged. Remember that more radio failures occur from defective or improperly charged batteries than any other cause. Don't be a statistic!

FLYING THE AQUILA

The Aquila is a very clean and responsive aircraft. It is capable of very tight turns and will really move out if you feed in down elevator. Be careful not to over-control on your first flights and make all commands smoothly until you have become accustomed to the control response.

We suggest using a Hi-Start with 3/16" x 1/16" surgical tubing for your first flights.

If you have a fish scale available check for 8-10 pounds of line tension for winds up to 10 mph. Note your position on the field and adjust accordingly on succeeding flights. Face directly into the wind and hold the nose up slightly. Release the airplane smoothly with the wings level. If the ship starts to weave back and forth during the launch, apply a little down elevator. Control rate of climb by feeding in slight up or down elevator. Check glide trim and turn response using transmitter trims, if necessary. All of the test ships have flown well on their initial flight, so you should experience the thrill

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AQUILA

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of the majestic glide and beauty of this ship on your first launch. We suggest that you don't use the spoilers on early flights. When landing don't set up the approach too high as the glide is very flat and the tendency is to overshoot. Just get it on the ground smoothly, and don't worry about hitting a spot. Don't try diving during the landing approach as the speed builds up, the L/D improves, and the ship just keeps going!

Adjust clevises and throws, if necessary, and you are ready for another flight. Try a few tight turns by applying rudder and holding a little up elevator. Point the nose into the wind and pull up stick to check the stall characteristics. Because of the sharp leading edge radius, the stall will be sharp, but the ship should not drop a wing. Concentrate on flying smoothly and plan your flight path so that you are ahead of the sailplane. If you find some lift, circle a few times and watch the climb. Now you're ready to try the spoilers. Point the nose into the wind and apply half the stick travel, feeding in up elevator to counteract the nose down tendency. Watch your altitude carefully and retract the spoilers while you are still high enough to set up the landing approach. Perhaps you would like to try the spoilers on this landing. Pop them up halfway and leave them out during the final approach, controlling the rate of descent with elevator control. Experiment on later flights with more spoiler throw, starting at altitude as with full throw they are very effective and will bring the airplane down in a hurry. Leaving the spoilers up during landings will help to stabilize the ship in gusty weather and we suggest that you use them routinely.

SPECIAL FLYING NOTES FOR COMPETITION

1) Recent C.D. rule interpretations have been quite strict about loss of landing points if any part of the model is shifted or detached. This can be a problem, particularly if landing on concrete or asphalt runways. Use 3M plastic tape or masking tape to secure the canopy to the sides. Wrap wing roots to fuselage with tape. If the runway is rough apply masking tape skids to the bottom wing surface at the dihedral breaks and tip ribs.

2) For spot landing events on asphalt or concrete, tape a pad of Pylon Golden Foam or G-Pad to the forward fuselage bottoms. This will prevent skating across the spot on a hot landing.

3) For two minute precision tasks don't worry about maximum height on launch. The spoilers are very helpful in dumping excess altitude and in setting up the landing approach. Try to set up a straight upwind approach so that you don't have to turn when nearing the spot. Concentrate on hitting the center of the spot as our experience is that more points are lost here than in missing the target time. The ideal landing would be to stall the airplane out directly over the spot from 6 inch altitude, but this approach is dangerous in windy, gusty

to page 96

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ENGINE CLINIC

from page 10

to 98 dB range. The louder ones over 100 dB and the more quiet 92 dB to 95 dB. The only engine muffler combination I have ever tested to be below 90 dB is the O.S. Wankel with the O.S. Muffler supplied. Some of our presently available mufflers could be made more quiet with the addition of a tail pipe extension, but this, in turn, leads to a loss of power, and the old enemy heat, varnish, etc.

Actually an 80 dB figure would be nice but simply is not realistic. Many of your law enforcement agencies concerned with noise control use higher figures than this. As an example, the California Highway Patrol places a limit of 88 dB at 50 feet for heavy trucks and buses. To provide for variations in test sites, temperature gradients, and test equipment, an additional 2 dB is allowed. In other words 90 dB at 50 feet. Decibel measurement is not a straight line progression but a logarithmic function. Those familiar with amplifiers and sound equipment will know that it requires double the power for a 3 dB rise. The difference in sound intensity between 80 dB and 90 dB is considerable. To impose an 80 dB limit when nothing is presently available to achieve this level is a bit puzzling — unless something is available in Europe that we do not know about.

So the purpose of this whole bit has been to bring to your attention a new ruling that is not in the best interest of model muffler design. As Wally says at the end of his letter to the FAI, let your voices be heard. We wouldn't want something of this nature to become a rule within our own AMA who often follows an FAI lead.

While on the subject of mufflers and their resulting noise there is another related topic I would like to kick around a bit. Hardly a month goes by in which I do not receive a letter, or letters, from individuals concerned with the noise situation and resulting loss of flying sites. The first persons blamed are the engine and accessory manufacturers who

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ENGINE CLINIC

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are supposedly doing nothing, and the AMA. Every time I get one of these types of letters I do a bit of a burn because although the individuals writing are well meaning, they haven't really investigated the facts. The following letter received some time back is typical of many received. To avoid any embarrassment the writers name has been deleted. The letter is from a member of one of the larger RC clubs in the country.

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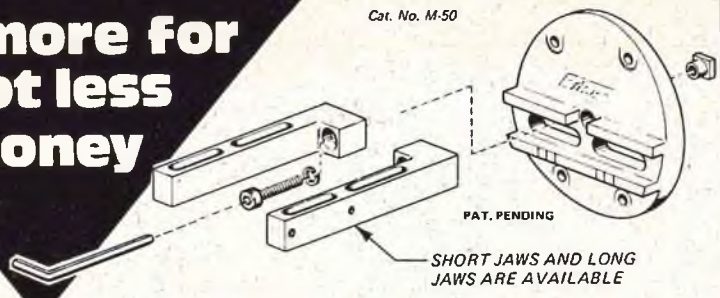

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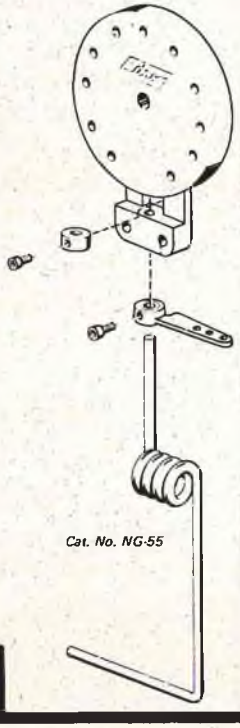

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AQUILA

from page 90/40

conditions, when it is better to grease it in with plenty of flying speed during the approach.

4) Be careful when winch launching in high wind. This is a strong airplane and winches very well, but use a little common sense and discretion. Pulse the winch to control the speed during climb. With proper technique you can use the ship to pull line off the winch drum, gaining more altitude.

If the winch line breaks while you are on tow apply full down elevator immediately, no matter what the altitude. Get the nose down and level the ship out quickly. You are entitled to a new launch if this happens so don't try to stretch a poor launch into an official flight, even if you are in a thermal. Your mental concentration has been broken, so take the attempt and re-launch for your official.

5) For Duration events try to gain maximum height on tow and concentrate on a smooth release with level wings directly into the wind. During the contest watch the other ships to see where lift is present, and head for those areas. Concentrate on flying smoothly and avoid abrupt control movements, particularly when searching for lift. In weak lift conditions conserve altitude carefully and make large slow turns. This ship rides low ground lift very well and will eke out seconds under 50 feet when other ships are landing. Don't give up any lift or even zero sink air and work the air for all it's worth. It's amazing how you can pick up an extra minute of time by fighting for every foot of air.

In windy conditions try dynamic soaring against the wind by flying a slope pattern across the wind. This can be very effective when thermals are scattered or overdeveloped and will gain more time than circling. In calm conditions, in weak thermals, try pulsing beeps of slight up elevator every 2-3 seconds. This seems to work better than up elevator trim and will lower the sink rate very effectively, if you pulse evenly.

Of course you may get lucky and find a real boomer! If you do keep the circle constant and feed in up elevator to climb. Don't worry if the ship stalls occasionally as you are going up all the time. The stall is from excess lift and this trim will really gain altitude. Just don't let the stall build up excessively. Gain all the altitude you can — this is a big airplane and easy to see up high. Remember those spoilers — you can dump altitude faster than a thousand feet per minute.

6) Speed tasks are a very demanding test, both of the airplane and pilot. The only way to learn is by flying in contests or practicing this type of flying. The following hints seem to help and we suggest that you try them.

For events timed from the tow release don't use full altitude. Turn the ship downwind while still on the line and release downwind. Keep the nose down and head for the first pylon. Turn sharply and fly to the downwind pylon conserving altitude still keeping the nose down. Make a pylon turn at the far end, kick down elevator and head back, still keeping altitude, and then pylon turn and start the second lap. The ship should be in a shallow dive during this lap, depending on the altitude remaining. The

to page 98

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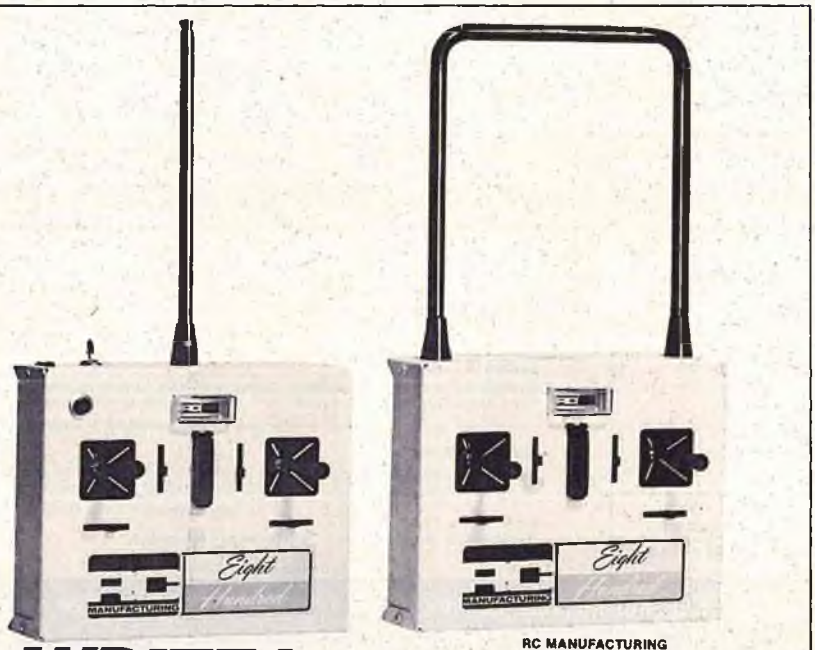

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AQUILA

from page 96/40

last pylon turn should be at 100 to 150 foot altitude. The last lap is a real dive with the ship really on the step. Aim for the ground right at the finish line — ideally you should pass the line 6" off the ground. Once past the finish line, release the down stick and let the ship zoom to gain altitude from the excess airspeed.

If the event is timed from entry into the traps, launch to full height and enter the traps as high as possible. Dive through the whole first lap and finish as above.

The most important thing is to keep the nose down through the course. Momentary removal of down stick will result in a zoom and lose a great deal of time. It requires real concentration and a lot of courage to fly this course well, and practice is the only way to succeed.

We have not flown the ship with ballast for the speed task, and suggest you gain experience before trying this approach. This design is very fast and contest results to date have proven that the pilot is the limiting factor. Remember that control response will be faster due to the high speed so be careful not to over-control. You may wish to desensitize the controls by using the outer holes in the horns or decreasing servo throw for speed task.

7) A final caution about the spoilers. Be sure that you always fully retract them after use. Check before each launch, and while you are flying. If possible rig your transmitter so that the spoiler control is spring loaded to the closed position, which will save grief. Several of the test crew, both sport flying and in contests, have flown with the spoilers partially extended during the flight. Just develop a mental check list and keep them closed when not in use. □

PLAYBOY SR.

from page 31/24

could be removed and wheels installed, ready for flight in just under 4 minutes. It takes a shade longer to go the opposite direction. Only 2 modifications in the wheel version were made for floats and they hardly show.

Now that you are ready to fly, did you plan ahead? Is the lee shore available to you? If you have to land dead stick out there, the plane will always float downwind, but can you get there? Carry a fishing pole with you — a lead weight may be cast over your plane then it may be reeled in. A gang hook or grapnel could be used but would be hard on the MonoKote! To get a fishook out of a wing tip, do you cut the eye off the shank and force the barb on through?

Maintain thy altitude lest a wave come up and smite thee. □

QUARTER MIDGET

from page 19/18

from the rear of the plastic housing to depress the spring latching finger that has been stamped into the clip. The clip will then slide out easily from the front end of the housing. After soldering the junctions simply push the clips back into the housing and they will lock themselves into place."

■ ■ ■

This months interview with Joe Zdankiewicz turned out to be more of a symposium on racing than a regular

to page 100

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QUARTER MIDGET

from page 98/18

interview. Joe is a perfectionist builder and takes great care in preparing for a race. Unfortunately Joe had a series of radio problems which virtually kept him out of competition last year. His ability became apparent when he turned the fastest time at the RCM sponsored Tucson Winternats, while another of his airplanes turned the fastest time at the '74 Nats in the hands of Tom Christopher.

Joe is 28 years old and a police officer with the Los Angeles Police Department. Dale, his wife, also works for the LAPD. Joe has been building models most of his life starting in grammar school with U-Control and hand launch gliders. He has always been a sport modeler and, except for U-Control had not entered competition until Quarter Midgets came along.

We asked Joe how he builds, finishes, etc., to produce these fast airplanes. His basic premise is to keep everything as light as possible and to reduce as much drag as possible as well as demanding the maximum from his engine and propellers.

Joe builds light by hollowing out all non-stressed wood and blocks. Epoxy is used only for the firewall and landing gear mounts. Hot Stuff is used for non-stressed areas for quicker assembly and Titebond is used for the remainder of construction. In addition, Joe meticulously recesses all hinges to eliminate gaps between the control surfaces. A 1/8" brass tube and sandpaper is used to inset the movable portion of the surface. In order to reduce external drag, Joe likes to use hidden linkages as much as possible. He also does not like sharp wing leading edges, keeping them to 1/4" diameter or 1/8" radius. Hatches are usually non-stressed so are just a simple frame covered with MonoKote. Joe also makes his own fuel tanks from 3 ounce plastic bottles from the drug store in order to avoid carrying an extra ounce of fuel that isn't used. Tatone Stick-A-Tubes are used for plumbing the tank.

to page 102

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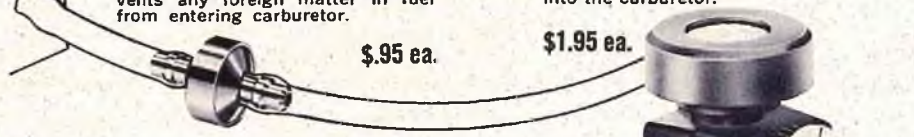

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QUARTER MIDGET

from page 100/18

The finish is very important to Joe as several ounces can be saved. The wings, tail surfaces and hatches are all covered with MonoKote. The fuselage is given two coats of K & B Primer, sanding the first coat almost all off, then one spray coat of K & B epoxy color. All trim colors applied to wing and tail are parallel to the fuselage to reduce turbulence and drag.

The most important part of engine care is to be sure there are no leaks on mated surfaces such as glow plug to head, head to sleeve, sleeve to case, rear cover to case, carb to case, etc., or even holes in the case itself.

The engine is only as good as the prop and Joe recommends the Prather Pitch gauge and to follow Terry's procedure to check the props. Variations in pitch from side to side will cause reduction of rpm and loss of efficiency. The areas on the prop where the finish has been removed during balancing should be coated with paste wax to prevent oil soaking which, in turn, will change the balance.

In conclusion, Joe prefers to fly the course as tightly as possible ignoring the other racers and thinks it is best to stay with the same caller.

■ ■ ■

Perry Aeromotive has just released a carburetor for the Taipan 15. They are available at your local dealer or direct from Perry Aeromotive, 581 N. Twin Oaks Valley Road, San Marcos, California 92069. Catalog number 314, price $9.95.

■ ■ ■

RACING SCHEDULE

1/2A — First Sunday of the month at Boeing Field, Seattle, Washington. Contact Bill Bone, 13 165th Ave., N.E., Bellevue, Washington 98004. (206) 746-0769.

1/2A — monthly MARCS field, Mentor, Ohio. Contact Bob Penko, Kirtland Hardware, Kirtland, Ohio.

QM & FI — Chicago Pylon Club monthly. Contact Jim Marinangel, Route 3, Box 46, Barrington, Illinois 60010.

APRIL

6th — Quickie 500. Chula Vista, California. Ramzi Thomas, (714) 427-0354.

6th — 1/2A & Sport Pylon. Centreville, Virginia. Wayne Northcutt, (703) 751-5731.

12th-13th — Model EXPO for American Cancer Society sponsored by local clubs at Mile Square, Fountain Valley, California. Demonstration flying and QM demonstration races.

20th — Quickie 500, BIRDS, Torrance, California. Betty Stream (213) 429-1281.

20th — 1/2A pylon, Sport Pylon, Centreville, Virginia. Wayne Northcutt (703) 751-5731.

27th — QM, Whittier Narrows, California. San Gabriel Flyers.

MAY

3rd-4th — MACS Trade Show, Anaheim Convention Center, California.

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QUARTER MIDGET

from page 102/18

4th — 1/2A and Sport Pylon. Centreville, Virginia. Wayne Northcutt (703) 751-5731.
11th — QM, Mile Square, Fountain Valley, California. Du-Bro Mini Muffler required.
18th — QM, Tamiami Regional Park, Miami, Florida.
17th-18th — Formula One, Bakersfield, California. BARKS.
18th — 1/2A, Sport Pylon, Fun Fli. Centreville, Virginia. Wayne Northcutt (703) 751-5731.
18th — 1/2A Pylon. Sunnyvale, California. Pioneers.
25th — Speed Trials. Sepulveda Basin, California. Valley Flyers.
25th — Quickie 500, Sport Pylon. Mather, California. Cordova Model Masters.

JUNE

1st — Quickie 500. Whittier Narrows, California. Tailspinners.
21st-22nd — Formula One. Sepulveda Basin, California. Valley Flyers.
22nd — 1/2A Pylon. Mather, California. Cordova Model Masters.
29th — QM. Chula Vista, California. Ramzi Thomas (714) 427-0354. □

SUNDAY FLIER

from page 16

solved it, and the units I now have amaze me. I've flown one of my sailplanes up on a thermal until it was a speck in the sky, then collapsed the antenna and flown the glider without a hitch. To top it off I grabbed the antenna with my hand, cutting the power way down, and still had control. Fantastic range!

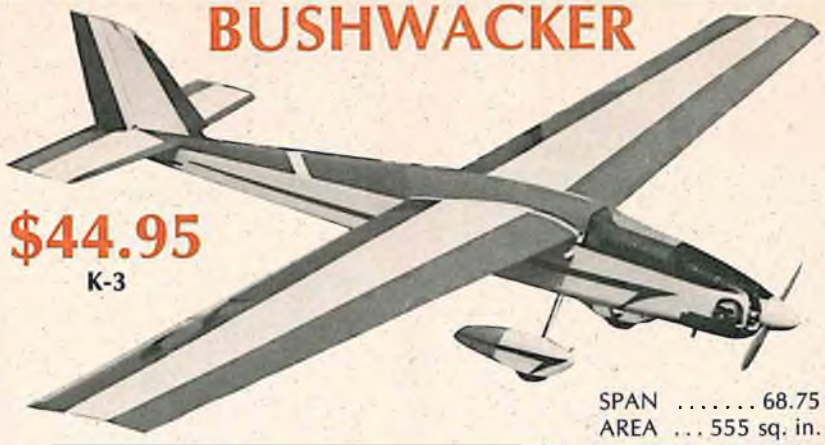
Then, with one of the new Proline three channel jobs, I put it in my electric powered Astro Rover, and did the same thing. The range was unbelievable — except that it was there! Incidentally, I liked the action of the open gimbal — good solid centering and smooth response.

So, if you asked me what radio system should you buy, I'd have to answer this way: I've had excellent results with Kraft for over four years, both in performance and in service; I like Cannon, because Bill responded to my continuous call for a lightweight unit, and in doing he did have some problems, which he has solved, and my current units are working great. The Proline three channel unit has done everything claimed for it, and the reliability is good.

That does not mean the other units aren't good. I just haven't used them.

So what am I saying? Just this. It boils down to the degree of reliability which you can expect. They all have to have good circuitry — or they wouldn't be on the market. But that circuitry is only as good as the reliability of the components — and secondly, when the components fail, it

BUSHWACKER



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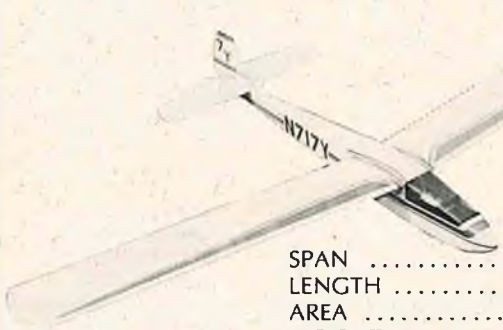

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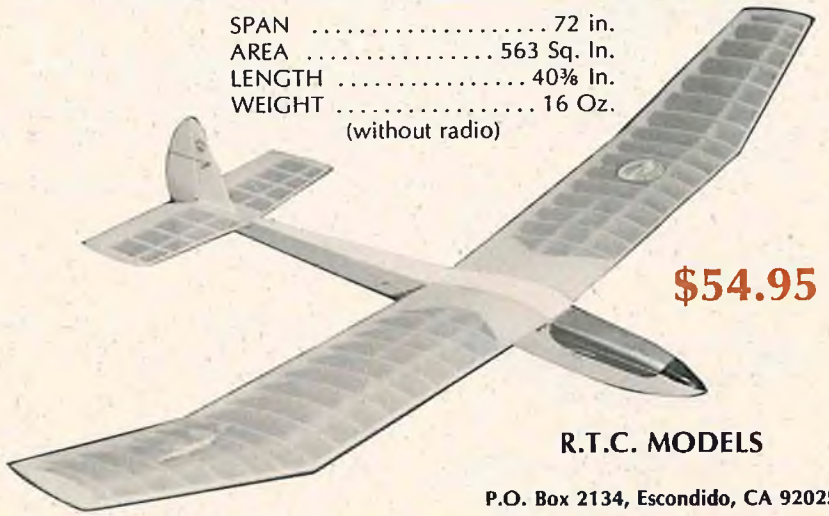

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becomes a matter of how long will your unit be in the repair shop before it is returned to you. Even that factor is sometimes beyond the control of the manufacturer because of the mail situation. Kraft overcame that by setting up authorized service representatives in strategic areas, which was a good move. Here in the Bay Area we are very fortunate indeed to have Ivor Winby of Wintronix, within easy driving distance. If you're in a real bind, Ivor says, "When do you need it?" and you've got it.

Good service and good reliability. That's what makes the difference. Find out what other modelers in your area use. Ask them why. Their report will be just as valid as mine.

Next month maybe you'll understand better, as I relate some of the results of my "flight tests." □

CUNNINGHAM ON R/C

from page 12

For the aircraft, a modified Lanier Slo-Comet seemed like the perfect choice, so Len Purdy of Lanier Models was contacted and, after being briefed on the scope of the project, sent (Wayne) a Slo-Comet kit.

As construction of the plane and equipment got under way, Sherrif Bailey was invited to present a demonstration during a filming session of the Mike Douglas TV show in Miami. This upset Wayne's schedule so the plane was not modified but, rather, put together stock (except for a 50% increase in elevator, width) and flown three channel. With a S.T. Bluehead the plane was capable of lifting unbelievable loads (5 lbs.) and performed flawlessly except in a cross wind, where the exaggerated wing trihedral, caused slight handling problems.

The bomb release mechanism was operated by servo and the retract channel. Since time was short and the mechanism was not refined, smoke bombs rather than live explosive grenades were used in the tests, and demonstration. These could either be dropped on target (being activated upon release) or activated in flight while remaining attached to the plane. With the latter procedure a large area can be enveloped in smoke (or tear gas) by flying circles around the area. Insulation and a deflector plate keep the heat off the plane's belly.

The demonstration on the Mike Douglas Show apparently was successful. Sheriff Bailey narrated while Wayne flew a "Super Kaos 40" to show what an RC model is capable of doing. Then while flying the test aircraft he dropped one "bomb" on target and laid down a smoke screen with a second. The show is scheduled to be aired January 23, 1975. Hope you can watch it, as we don't receive the show in the Birmingham area.

to page 108

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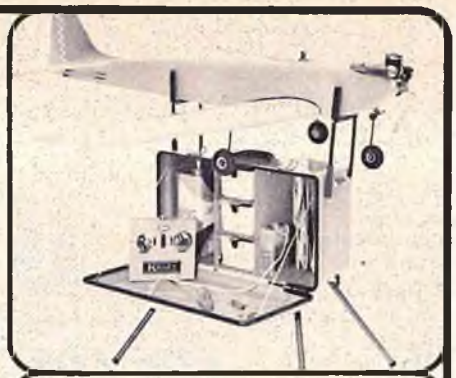

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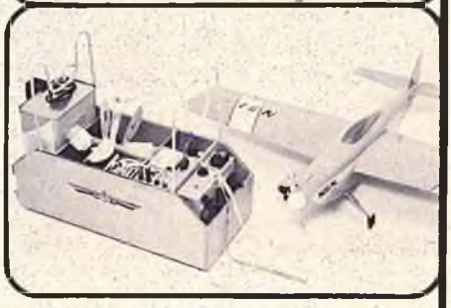

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CUNNINGHAM ON R/C

from page 106/12

As the project apparently has no appropriations, the expense of all materials and equipment involved except the kit, was borne by Wayne Chancey. He even closed his business for two days to make the trip to Miami. While I contributed nothing more than an idea or two, I enjoyed witnessing the project from an RC enthusiast's point of view.

Marling D. Culwell
Secretary, Bessemer RC Club
Bessemer, Alabama

Thanks to Marling's great letter, I was able to catch the Mike Douglas Show on the day that he exposed RC bombs to the world. It really was a great presentation and Mike's co-hosts, Robert Goulet and Carol Lawrence, were very much impressed with the abilities of the aircraft and Wayne at the controls. Wayne had to fly in just about the worst conditions that you could imagine. His take-off run was cross wind on a piece of canvas laid out over the beach sand. His take-off path was right towards a group of spectators. I'm sure that there were a few damp chairs among the spectators as he took off just over their heads. It would have been the greatest wipe-out of all times if he hadn't managed to yank the aircraft off of the canvas in time. The flight demo with the Kaos 40 drew lots of reaction from the crowd and the TV people and then, when Wayne put the Slo-Comet into the air and laid the smoke bomb on the target, and then followed up with a smoke screen demonstration, you could really see the potential of this program. It was a good show and will probably mark the first in the use of our type aircraft for police work. If any of you are engaged in similar work, drop me a line and tell me what you are doing, and I will pass it along to the rest.

•

Now to get into this month's thoughts and advice for the newcomer to R/C. One of the things that is often a problem to the man that wants to get into the sport is just what to do, where to go for help, and upmost, how much is it going to cost? When he asks this last question out at the local flying field he is very apt to get an answer that will turn off all thoughts of RC for a past time! We are all pretty much guilty of flashing out a pretty high dollar figure when asked by a casual spectator, "Say, how much does it cost to get an outfit like that?" Chances are the figures that we pass along might be low, and would be low if we valued our work hours at a reasonable figure. But, the point is, if you say, "Oh, four or five hundred bucks up there in the air," then you have pretty quickly dampened the interest of the newcomer — especially if his wife is in hearing range!

Most men who ask this question are really evaluating what it would set them back if they wanted to take up the sport, so do the

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CUNNINGHAM ON R/C

from page 108/12

"asker," and the "askee" a favor and temper your reply so that he doesn't get scared off all at once. A lot of people have asked me over the years how much does it cost to get into the hobby and I usually answer them by telling them that they can get in for as little as a hundred and fifty bucks, or as much as they think that they can afford to spend. My advice to the beginner on a limited budget is to get into the sport by buying a brick type radio, but one of the newer types that can be expanded to four channels by simply adding servos; purchasing a simple glider, such as Airtronic's Square Soar; and start the easy way. If they find out that they really don't enjoy this sport then they can sell the radio easily, and will not have invested very much money.

The first place to go for help is the hobby shop and then to the local club or flying field. The beginner cannot be bashful — he has to **ask** for help. He simply has to be **willing to take advice,** and to accept

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CUNNINGHAM ON R/C

from page 110/12

someone telling him that what he has done just might be all wrong. None of us likes to be told that we are wrong, but it can sure happen in a hobby as complex as ours.

The very best advice that I can give to the newcomer is to examine your own financial condition before getting into this sport, seek the best advice that you can find as to what radio to buy, what aircraft to build, what engines to purchase, what type of covering to use and so on. And, when you are ready to learn to fly, take the advice of the people whom you have asked for help. Don't fight them, work with them — you will be better off in the long run. This all may seem stupid to you, but I have seen it happen many times at the flying field. The person asking for help really doesn't **want** help, he wants someone to give him a big pat on the back and tell him what a great job he did building his bird. This is all well and good, but if the controls aren't right, or the balance point is not correct, or the engine is improperly mounted, then the man who was asked for help is not being a friend if he does not point out these faults. So, this month's advice is to seek out help, and then **accept** the help — you're going to need it.

•

Time to wind down for this month, but now that the good weather is with us again, and Daylight Savings Time is making the evenings long enough to get in some flying, it is time to get out to the flying field. One more thing — how about all of us mounting a letter writing campaign to our members of Congress to keep Daylight Savings Time on the 8 month/4 month basis as has been on for 1974-1975. It's really great to have two extra springtime months of longer evenings! □

ENGINE CLINIC

from page 94/10

Dear Mr. Lee:

Utilizing your recognized status as the pre-eminent American Senior Statesman for Engines I would like to offer comments on a critical problem demanding immediate attention by the R/C industry.

At the rate fields are being lost in metropolitan areas it is conceivable that in the foreseeable future the travel problem involved in remote fields could decimate the hobby. While the hobby is national in nature, I am under the impression that activity is centered in the metropolitan areas and that is where the field loss problem is occurring. Since this loss of fields is allegedly primarily due to the so called "noise problem" we may already be at the point where it is too late to solve the

to page 118

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ENGINE CLINIC

from page 114/10

problem. And let's face it – there is no effective muffler on the market today. All we have are devices hanging off the exhaust ports of engines. Within the hobby we can attempt to gratify ourselves that one muffler is more effective than another but all we are talking about is the difference between perhaps a 1% to 5% dB spread, and our neighbors' ears can't measure the difference. All they know is that they hurt.

It is obvious that the industry would like to develop a noise solution as effective as the auto industry's answer. It is equally obvious that the problem is a lack of financial capability. Development of a real solution to this problem requires a tremendous amount of basic technology work in the rigorous disciplines of vibrations, acoustics and metallurgy. To do this may take hundreds of thousands of dollars. Clearly, no single manufacturer has the financial capability to undertake such a development effort. The only solution, then, is a joint venture in which the top hundred manufacturers (yes, airplanes and accessories as well as the engine people) get together and underwrite a program to be carried out by an independent engineering firm aimed at developing the technology required for effective muffling.

Up until now the engine manufacturers have shown no apparent disposition to get together on anything. Example – they all insist on individual mounting hole patterns. I fully understand the need for competitive advantage in products and I understand the desirability to each engine manufacturer of trapping the individual modeler into using his engines interchangeably between airplanes in order to avoid the bothersome job of re-drilling engine mounts. In the case of the noise problem they no longer have the luxury of going their own ways.

The problem here is not one of how much it will cost to solve the problem, but what it will cost the manufacturers, distributors and retailers if they don't solve the problem. I wouldn't like to, but I can find other hobbies if I have to. To the industry it will mean going out of business.

The first point to which I have to take exception is the statement that there are no effective mufflers on the market today. By what standards?? There **are** many effective mufflers available today but the fellows are not using them. And herein lies the whole point of this part of the column.

When a club passes a muffler requirement there are always those who will satisfy that requirement by hanging anything on the exhaust stack of the engine that even remotely looks like a muffler. Whether it does anything in the way of quieting is secondary. More often than not one of the many commercial mufflers will

to page 120

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ENGINE CLINIC

from page 118/10

be gutted. And yet this individual, or individuals, are allowed to fly because they complied with the rule that a muffler must be used.

Then we have the guys who like to go out and put in a few flights as soon as the sun comes up before it gets windy, before they have to go to work, etc. This goes over real big with the neighbors a few miles away! An engine that, during the course of the day would not even be noted, comes on real clear to those who are still trying to get some sleep — especially on Sunday morning! However, when the complaints start coming in it is the fault of the lousy manufacturers for not producing silent mufflers and the AMA for not doing anything about it.

Frankly, just what is the AMA supposed to do? The AMA can rule that mufflers be used at AMA sanctioned contests and set a dB limit, but they can't do anything about the everyday flyer who does not enter competition — which is about 90% of R/C modelers. The enforcement of muffler rules

to page 122

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ENGINE CLINIC

from page 120/10

is up to the individual clubs. When a club decides a muffler rule is necessary then money should be taken from the treasury and a decibel meter purchased. These can be had for as low as a little under $50.00 to several thousand. For our use the sophisticated jobbies are not required. We are only interested in the "A" scale which is the closest to the human ear. Many of your electronic supply houses have decibel meters. The one I use was purchased from Radio Shack a few years back. Many clubs have a safety officer and if not, should appoint one who, in turn, would do the sound level checking. Most clubs are tight enough groups to know who the guys with loud engines are. Set a dB level and **enforce** it. Some areas can tolerate more noise than others so a level of 95 dB to 98 dB would be appropriate. In high density areas or when houses are present nearby, 90 dB to 95 dB would be better. The second step would be to set flying hours and enforce them. For example, no flying before 9:00 AM or

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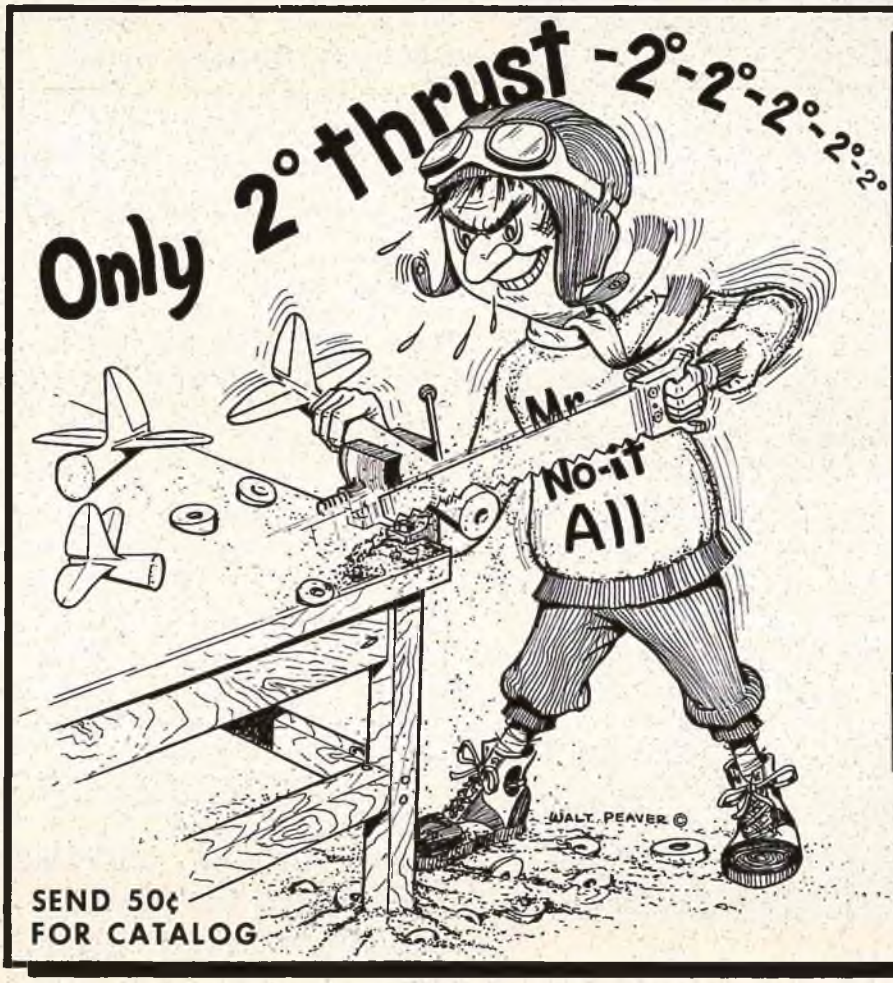

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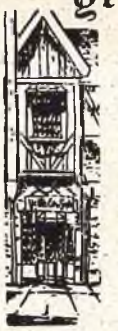

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ENGINE CLINIC

from page 122/10

whatever. When flying fields are lost, it is easy to look for someone else to blame (the manufacturers) but in 99% of the cases, it is the modelers themselves who are to blame.

Now as to quiet mufflers. There are many available but you don't see many of them in use. The Murphy muffler is very quiet in the 92 dB to 94 dB range and can be made even quieter by the use of a heavier silicone rubber sleeve. Many fellows do not use the Murphy because they do not like the sound it is noted for. However, it is a quiet muffler. Erich Jung in Europe manufactures the Silence-Aire Super Competition imported by Cliff Rausin of Exportations. The Silence-Aire is a closed chamber type in that it does not have the flow-through venturi. The nose cap is removable and contains a removable ring that blocks off small pressure outlets. With the outlets blocked off the Silence-Aire Super Competition is extremely quiet. I haven't seen one of these in use for a long time now. This is probably due to their cost being a few dollars higher than some of the competition. These are just two of the more quiet mufflers available. There are others that are almost as quiet. Your O.S. mufflers are very quiet so the first thing many fellows do

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ENGINE CLINIC

from page 126/10

to these is cut off the tail pipe! The muffler that comes on the Veco .61 is of the flow-through type and, although noisier than the Murphy or Silence-Aire, still could be considered a quiet muffler. In fact on the Custom Veco .61's I sell I install a larger diameter tail pipe to purposely increase the noise level slightly. Fellows complained that they could not hear the engine with other models in the air — especially during competition flying. So gang, there are solutions to the noise problem, but it is up to the modelers to take advantage of them.

With mufflers presently available in the low 90 dB range, can't something be done to get the level lower? Most certainly. The only things holding back quieter mufflers right now are size and weight limitations. Much of the noise you hear is coming right through the muffler body due to the thin wall necessary to keep down weight. It would be very easy to increase the wall thickness by a manufacturer but then the modelers would complain about the extra

to page 134

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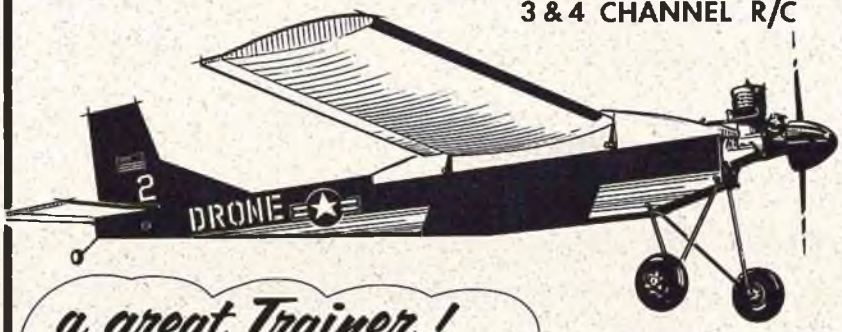

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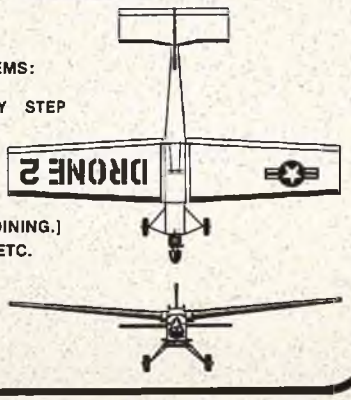

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ENGINE CLINIC

from page 130/10

ounce or two of weight. The fact that many already have five or six ounces of lead in the nose of the model to make it balance is beside the point.

The same thing pertains to size. Enlarging the muffler about a third to half again for more expansion area would help but, again, the modelers would complain about the size. In a way, modelers want to eat their cake and have it too. The muffler must be small, light, quiet, cause no power loss, and be **cheap.** (Cheap being the most important factor with many.) So with this criteria it is a little rough for a manufacturer to spend many thousands of dollars developing a muffler only to have it not sell due to it being slightly larger, heavier, etc., than acceptable standards. Then, too, rulings such as the one just passed by FAI banning flow-through type mufflers are a real encouragement to a muffler manufacturer to continue development work — Wally McAllister testifying to this.

•

That about wraps it up for this month. We'll get off our soap box and get back to answering some letters with engine related problems next month. □

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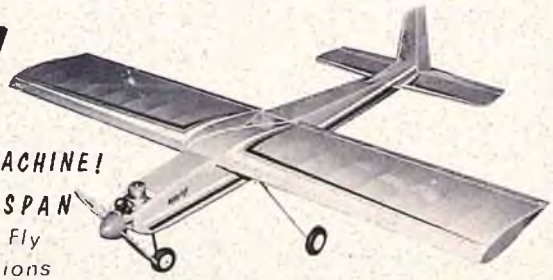

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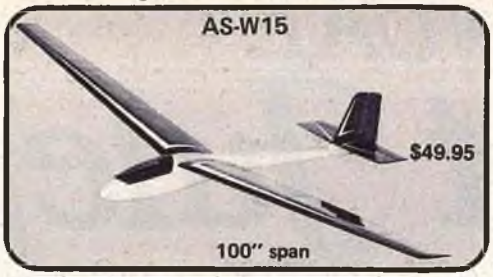

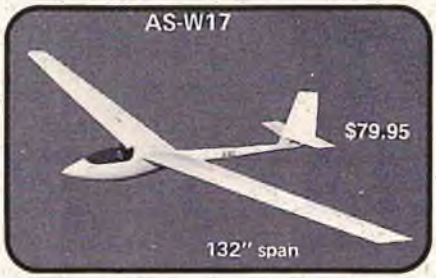

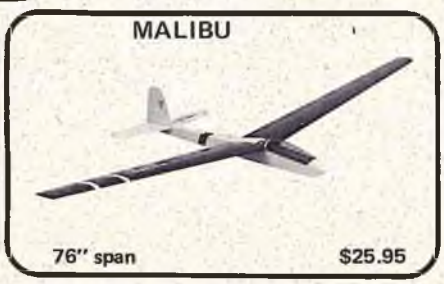

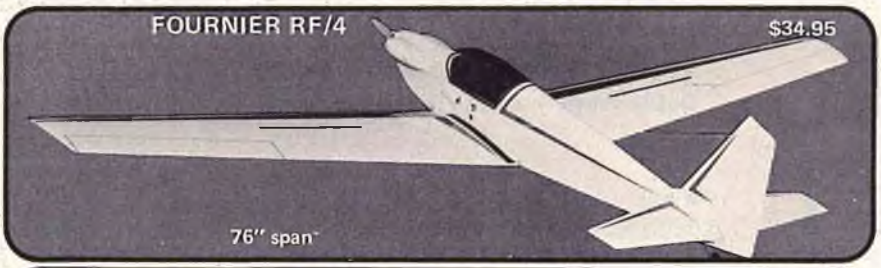

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from page 6

of four comparators and three transistors plus a mess of other components so if you're trying to think of a simple way of doing it, quit wasting your time and buy one of Jerry's servo controllers.

I didn't have time (or the guts) to put it in an airplane and fly until it did its thing. If you decide to test it in the air remember what we said in last month's issue: Voltage alone will not tell you how much time you have left. You've got to know the slope of **your** discharge curve, under the conditions **you** charge and discharge. Once again the safe way to test would be to fly some safe number of flights and then go home and simulate flying conditions until you get the fail safe action. Then keep going to see if you would have had enough time to land.

Even if you do all of this and find out everything is great don't be too sure you're out of the woods. The next step is to simulate a stalled or buzzing servo. You will find that the time between fail safe and everything quitting is much shorter and may not be long enough for your particular system. The only thing I know of to save you in this case would be to monitor the battery after each flight and determine if the voltage is falling faster than normal. That way you get a warning before you get down to 4.5 volts — long before your system quits working. My final opinion of the servo controller is that it is kind of like an H-bomb. It's kind of nice to have one on your side but you hope you never have to use it!

★ ★ ★

I received a call from Carl Maas of RS Systems the other day and he was a little worried about all of the accessories coming out that require modifications to the basic RC system. He told of an individual who tried to add something to his transmitter and loused it up. He was then quite irate when RS refused to fix it under warranty. My advice is this: When you pay for a radio it's yours and you can do anything you want to it, but if you change it, be prepared to pay the price if you want the manufacturer to service it. Most service departments don't make money in the first place and really couldn't stay in business if they had to spend much time figuring out modifications that customers put in.

★ ★ ★

Well, let's pull a few letters out of the mailbag and see if we can come up with some interesting subjects:

Jim:

I would be interested to have you discuss the merits of servo electronics in the servo versus in the receiver in some future column. From an electronic man's point of view, it seems illogical to throw away good electronics because of mechanical wearout or malfunction.

W.E. Moxin W2NE
Mossapaqua, New York

I'm sure this is a question that goes through the mind of everyone who is considering new equipment in 1975 with the

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emergence of many "new" configurations by the manufacturers. I put the new in quotes because the so-called "brick concept" was used on the Space Control system, one of the first proportional feedback systems, back about 1960. Space Control was known as the "Gold Brick" because its main package, which contained three servos and the receiver, was in a gold anodized can about the size of a brick. The original concept included locating the battery pack in the can also, but I never saw this done in practice. It doesn't allow flexibility in moving the Center of Gravity on the plane and it also represents a large mass that you would like to keep away from receiver and servo electronics.

So much for history, let's talk about the pros of putting the electronics in the receiver. The best reason is to cut the cost of spare servos. A person could equip two or more airplanes with relatively inexpensive servos and switch the electronics package from plane to plane. He could also afford more spares in case he needed them. Another good reason for this approach is the fact that most modelers float their receivers in foam, which provides vibration isolation, something you don't get as much of in the servo mechanics. It also permits use of smaller servo mechanics because you don't need the added volume. If someone put many servo amps on a single chip it could also cut costs but so far no one has done this.

to page 138

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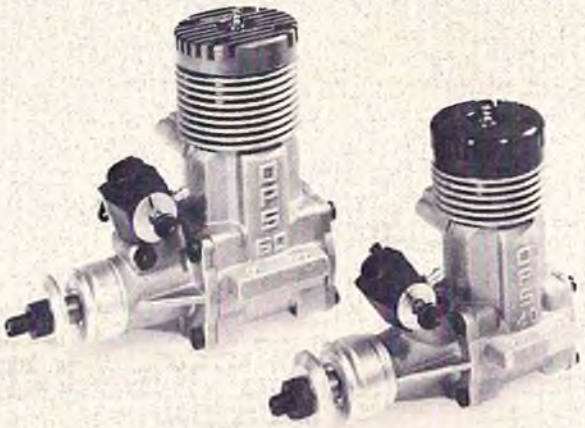

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On the negative side, we end up with a larger receiver package, both mass and volume, and we probably use the same servo mechanics so our net volume increases, and we're more likely to break something in a crash. The more mass, the more force is applied during decelleration, (that sudden stop when airplane meets earth). We also end up with more wires, more connector pins and sockets and longer wires between output transistors and motors. This means some reduction in reliability. The biggest argument against this concept, as well as the bricks, involves maintainability. The military spends millions on the modular approach which allows systems to be repaired by simply replacing a module. The TV manufacturers pushed this for a while also. What this means is if one servo amp quits you're not out of business if you have a spare servo. If the electronics were in the receiver you would have to send the receiver and all the servo amps back to the factory and cool your heels for awhile.

★ ★ ★

Ray Wellbaum of Canoga Park, California, wrote us an interesting long letter which discussed charging from a 12 volt source, such as an automobile or truck battery for overnight charging while camping. As he found out this can be tricky. He and many others asked about our fast field charger that works from a 12v source so we'll try to cover that next issue. However, he tacked on a question that I am asked over and over. "The thought came to mind that there are times when it would be desirable to reverse the response of the servo. Is it possible to do so by rewiring the servo?"

The answer is yes, and it is quite simple, but you must be very careful, because one bad solder joint can wreck your 1000 hour or $1000 project. Every servo I've seen can be reversed by interchanging the two wires to the motor, interchanging the two wires to the ends of the feedback pot and recentering the servo. This usually involves rotating the feedback pot relative to its mount. I recommend that RTV be used to secure the leads after they are resoldered.

If this sounds like its more complicated a task than you want to tackle, I've heard that someone is coming out with a little black box that you can plug in between the receiver and servo to reverse it. At least one manufacturer is designing a transmitter that will allow easy reversal of the servo direction. We'll keep you posted on these developments in future issues.

Jim:

I have a question I hope that you can answer. I would like to build a monitor for 27.145 MHz. I would like it to be crystal controlled and be able to work off my starting battery (12v DC). What I would like to know is, if there is anywhere I may be able to obtain a schematic?

George Kutcher
New Brunswick, Canada

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RADIO SPECTRUM

from page 138/6

My first reaction, George, is to tell you to forget it, because you have the best monitor in your own airplane. Most good modern day receivers will sit there and appear to be dead if they are turned on before you turn on your transmitter. If the servos are jittering around you're receiving interference (or you have a noisy or unstable receiver). However, passing this test doesn't mean you will be all right when you get up to altitude, but a monitor won't tell you what is up there either unless you can get an antenna up there somehow.

If I were going to build a monitor I would scout around for some used RC receiver and attach an audio amp and speaker to the output. You don't need a particularly good receiver for this task and, in fact, one with a wide passband might be desirable to tell you if anyone is on the edge of your receiver passband. If there is enough interest we could research this further and print a schematic, or maybe someone has got a circuit they would like to submit.

Jim:

Will the operation of two or more servos from one channel, i.e. engine/throttle, of a receiver overload or damage the receiver?

J.C. Griffin
Fort Walton Beach, Florida

Most modern day receiver decoders will drive two or more servos with no problem. The worst that could happen is that it wouldn't work, without some kind of isolation, but in no case should you do any damage. Ask the manufacturer or try it. If you still have trouble, let us know.

Dear Jim:

Re: Your January 1975 article in which you described the availability characteristic of effectiveness. Seems to me that in many cases, the hobby would be more enjoyable if a dry cell option were available for full house rigs. In my case, I flew two years using an MRC 713 3-channel; dry cell powered. Sure, I had to load test the cells but at least I could fly on a good weekend or evening – even if the cells were low – ten stores on the way to the field carry the cells I use. My MRC 713 is always available. Since most of us are "Sunday fliers," I'm sure I'm not alone in my frustration in dealing with nicads. It had to be faddism that made nicads as universally demanded as they are.

So – my question – can I safely adapt alkaline cells to my MRC Mark V?

Thanks,
John J. Drewski
Rochester, New York

to page 142

Cobra 17 HIGH PERFORMANCE MODEL SAILPLANE

WING SPAN ..... 121.5 in.
WING AREA ..... 717 sq. in.
WING LOADING 10 oz. per sq. ft. @50 oz.
OVERALL LENGTH ..... 47 in.
WEIGHT ..... min. 50 oz.
ASPECT RATIO 20.5:1
SCALE 1:6

QUALITY ENGINEERED —
- Beautifully finished white Gelcote fiberglass fuselage
- Custom-molded Canopy
- Complete fuselage hardware
- Resin filler for wing rod and hardware installation
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$84.50

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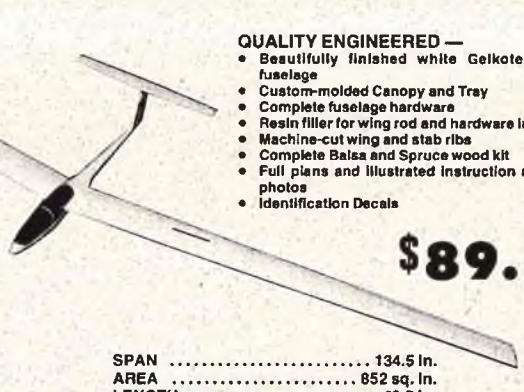

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$89.50

SPAN ..... 134.5 in.
AREA ..... 852 sq. in.
LENGTH ..... 49.5 in.
WEIGHT ..... 52 oz. min.
WING LOADING ..... 8.5 oz./sq. ft. to 10 oz./sq. ft.

WINDSPIEL MODELS ■ 835 Piner Road, Santa Rosa, Ca. 95401 ■ Shop Phone (707) 544-2334

RADIO SPECTRUM

from page 140/6

Well it's pretty hard to argue with success. If you are satisfied with dry cell operation and have a means of testing them, then go ahead. If you do very much flying it's going to cost you more money however, and if you are the conservative type, like most modelers, there is that tendency to try to squeeze one more flight out of the batteries before replacing them. Sooner or later that practice will cost you an airplane.

The other problem you may have is short life on the transmitter battery if you use 9 volt lantern type battery and have a high power transmitter. I know that some manufacturers reduce the output power and therefore the current drain on the dry cell transmitters. However, if you make up an eight cell pack with alkaline pen cells you should be okay.

Your best bet is to wait until next month and I will tell you how to fast charge your nickel cadmium cells after you get to the field. That way you can have your cake and eat it too.

You don't get many deals like that nowadays! □

¼ Scale Model of the Ka–6E Radio Controlled Sailplane

TECHNICAL DETAILS

Wingspan: 144 in.
Wing area: 1080 sq. in.
Weight (flying) 10.75 approx.
For 3-Channel Radio

Model is pre-fabricated of reinforced plastic sandwich of foam and fiberglass producing a lightweight extremely robust structure.

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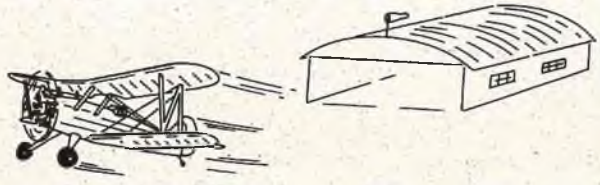

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FROM THE SHOP

from page 2

solvents can be readily absorbed through the skin and carry with it other chemicals previously dissolved. Combined with a cyanoacrylate, this could possibly cause some real problems if absorbed through the skin and into the body. As Jim points out, the 1974 list of Toxic Substances, published by HEW, lists the lowest known toxic level of human inhalation of DMF at 20 parts/million and the maximum safe level of DMF for skin contact at 10 parts/million on a time weighted basis.

In other words — don't use **either material.** Use 'Pro Tek' on your hands and you won't have to worry — it's available just about everywhere and is harmless.

Thanks, Jim, for this information.

While on the subject of this adhesive, I had the pleasure of building two additional aircraft this past month using this material throughout, fixed my kid's shoe, repaired a broken flower vase, and glued my thumb to the telephone.

How do you fly with a telephone on your thumb?

•

The Federal Communications Commission has announced that starting March 1, the fee for a license for an amateur or citizens radio station will be reduced to $4.00; compared with the previous fees of $20.00 for citizens and $9.00 for an amateur license.

•

For our R/C friends in Canada we would like to mention that Canada's largest radio control model aircraft exhibition and flying show is being sponsored this year by the Hamilton Flying Tigers on May 10-11, 1975, and will be held at the Nelson Recreation Complex, 4235 New Street, Burlington, Ontario, Canada. Prizes will be awarded to third place in Military Scale, Non-Military Scale, Stand-Off Scale, Finish, Sport Plane, Original Design, Sailplane, Best Model built by a Junior (16 or under), and R/C Boats. There will be distributor displays, a Swap Shop and two flying shows daily. For further information contact the Hamilton Radio Control Club, P.O. Box 3183, Station "C", Hamilton, Ontario, Canada.

•

The second event brought to our attention by Nino Campana, is the Upper Great Lakes Aeromeet, sponsored by the Soo Modelers Radio Control Club on Saturday, May 31 and Sunday, June 1st at Sinclair Park, Sault Sainte Marie, Ontario. Both Pattern and Scale will be flown. Entry fee is $5.00 for either event. The Contest Director is Jack

to page 147

Wing tip protection tape

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AMYA 36/600 CLASS
LENGTH 36 in
BEAM 9 1/4 in
SAIL AREA 600 sq in

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VALKYRIE
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LENGTH 50 in
BEAM 11½ in
SAIL AREA 800 sq in

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FROM THE SHOP

from page 144/2

Mertes, 44 Oregon Rd., Sault Sainte Marie, Ontario, Canada. Pre-registration would be appreciated, but not essential.

•

We'd like to extend our apologies to Bill Laskar who took the photographs for the BF-109E which appeared in the March issue of RCM. These photographs were inadvertently credited to another photographer. We apologize for this typographical error and thank Bill for his efforts on our behalf.

•

We're sorry that we are unable to present part III of the Helicopter Flight Training Seminar in this issue as originally scheduled. Unfortunately, inclement weather during the first two weeks of the month in which we were preparing the outdoor photography to accompany that article, prevented us from so doing. Part III will appear in the next issue of RCM.

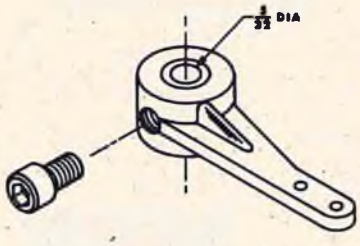
★

By the way . . . I have to say we were only kidding about Jim Martin not being able to fly. I have to say it because if we don't I have a feeling I'm going to pay ten bucks a piece for those 5½/4 props . . .

★

See you next month. □

STEERING ARM
NEW DESIGN



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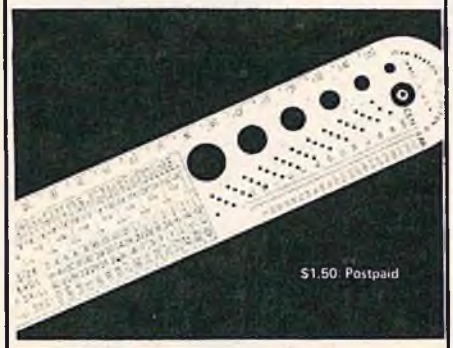

It's a compass for accurate circles to 6" in 1/8" increments.
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