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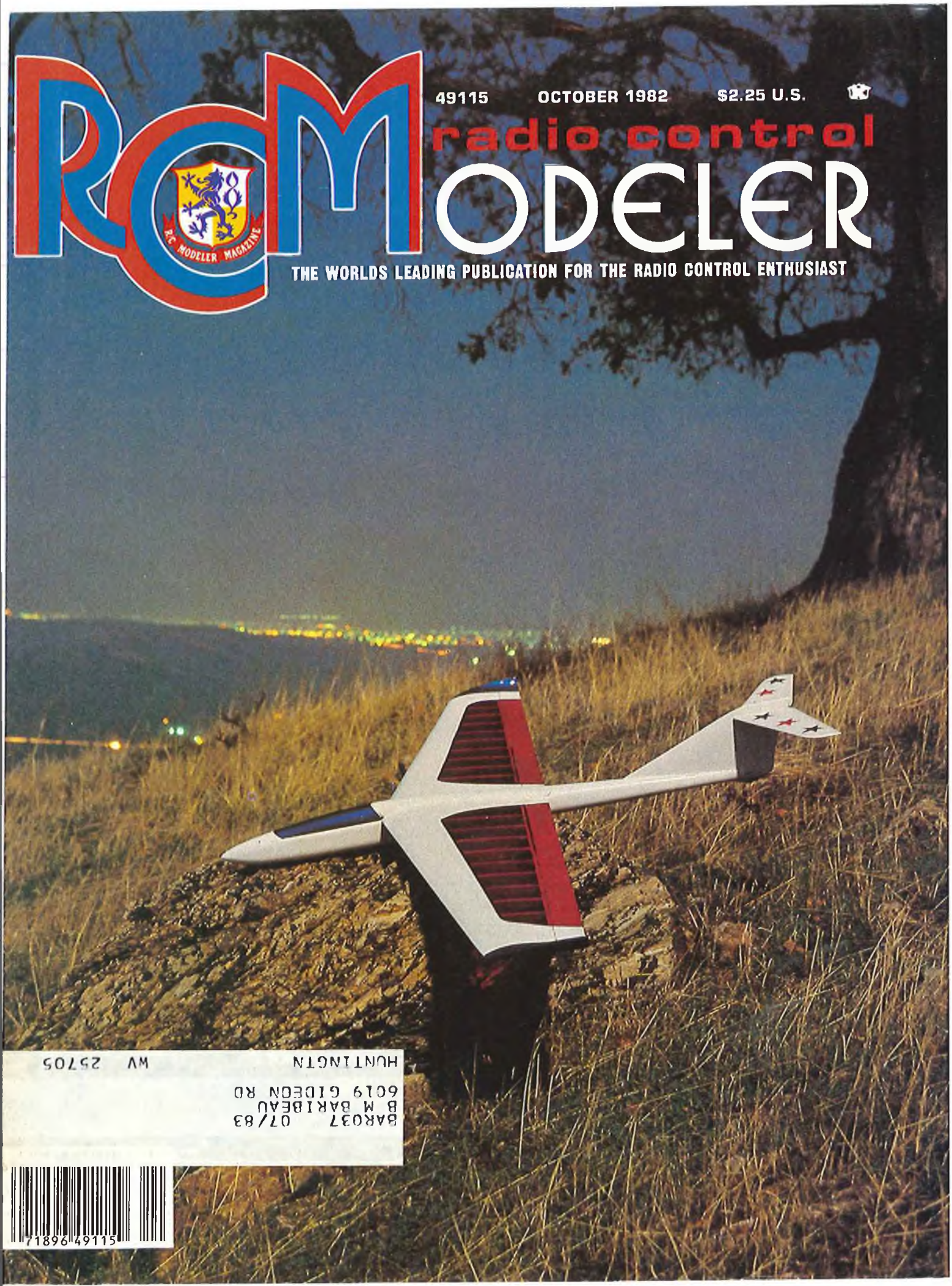
RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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VOLUME 19 NUMBER 10 ISSN 0033-6866 OCTOBER 1982

RCM MODELER

THIS MONTH'S COVER

Jack Caldwell's slope soarer, the AR-1 was photographed at night in the moonlight with the city lights of Livermore, California, in the background. Featuring a sharp entry on the leading edge, landing flaps, and a T-tail design, this beauty also flies inverted and is featured as a full size construction article this month on page 28. Ektachrome transparency by Steve Calderon.

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FROM THE SHOP

Don Dewey

Sometimes we can relate to the old story concerning the U.S. Congress back in the 1860's. A bill was introduced to abolish the Patent Office as no longer being needed because everything worthwhile had already been invented.

Occasionally we drift off course when faced with the multitude of fantastic products at our disposal and cannot imagine that there could be anything useful that is not already available. About this time we are snatched back to reality by something new and exciting that makes us wonder how we ever got along without it.

Pacer Technology & Resources, Inc., did it to us this time. Back in the early days of instant glues one of the big three was ZAP by Pacer. Somehow ZAP sorta faded into the background with the passing of time. Now, Pacer is back in the forefront with a complete line of adhesives, all improved and offered at highly competitive prices. We will all be reading and hearing a lot about the Pacer Z products in the near future.

Two of the Pacer Z's have really blown our mind, the **Zip Kicker** accelerator for super glues and the **Z-7 Debonder,** a debonding agent to unstick and clean your fingers and other things.

Z-7 Debonder:

Apply directly to cured super glue to soften adhesive. Allow sufficient time for the Z-7 to penetrate. Gently rub with cloth or towel to remove softened adhesive. Debonds super glues from hands, work surfaces, floors. Safe, water-based chemistry will not attack most plastics. Spot test fabric such as clothing and rugs first. Not for use in the eyes. Removes cured cyanoacrylate from heat-applied plastic covering materials. Another Pacer first!

Zip Kicker:

Apply to pre-condition surfaces for bonding (forget baking soda — that's for cooking). Use to form super structural fillets by applying Zap-A-Gap/CA + first, then spray with Zip-Kicker. Repeat for even larger fillets. Allows massive gap filling, parts needn't fit anywhere near close. Excellent aid for bonding metal accessories and assembling miniature figures. Convenient pump sprayer!

We have used these items and to say that we are impressed would be a gross understatement. How did we get along without 'em?

These items should be available at your local dealers. If not, contact House of Balsa, 20134 State Road, Cerritos, California 90701; Robart, 310 N. 5th Street, St. Charles, Illinois 60174; FTE, 127 Fair Street, Kingston, New York 12401.

★

Great Planes Model Manufacturing in Urbana, Illinois, has announced its acquisition of Andrews Aircraft Model Company of Topsfield, Massachusetts. The company has been moved from Topsfield to Urbana.

Anderson explained that his reason for buying AAMCO was to combine the financial strength and marketing capabilities of Great Planes with the quality and great looks of the Andrews line. The result, according to Anderson, will be a truly first class die-cut kit line that will be available to all modelers.

The same strategy worked with the Bridi Hobbies line, acquired last year by Great Planes, and should repeat itself with AAMCO. The only difference is that the Andrews name will remain, and Lou Andrews is now a part of the great Planes staff. He will remain very active designing and building some old favorites along with new designs yet to be released.

Heading up the AAMCO line is the Aeromaster Too, a perennial favorite of R/C modelers around the world. In the past, demand has always outpaced production by almost 8 to 1. While Andrews and Anderson both admit that there will probably still be more demand than supply, they at least are pleased that the Aeromaster will now be available as never before.

★

Prior to introducing a new regular columnist, we request

to page 200

CUNNINGHAM ON R/C

Chuck Cunningham

Noise! More and more, the abundance of noise in our lives is becoming a problem. OSHA is cracking down on noise in the working place. The effect of prolonged noise on workers has ranged from loss of hearing to very strong psychological problems. Many city governments are working hard at controlling public noise. Many flying sites around the country are having problems due to the noise of model engines. If flying sites are in jeopardy, then you can be darn sure that R/C flying itself is in jeopardy.

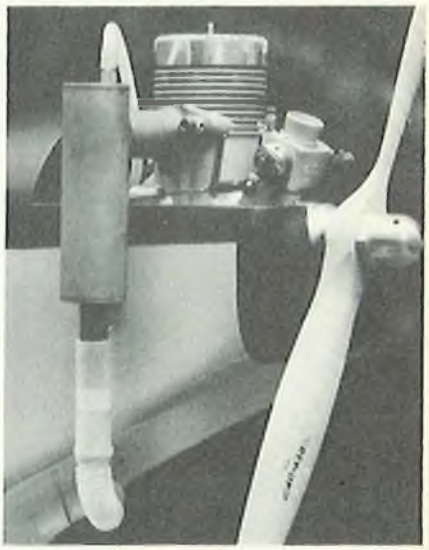
No one really seems to mind an R/C aircraft flying about the sky. No one minds, or considers the possible effect of that aircraft coming out of the sky due to radio, structural, or pilot failure. What people in general complain about is the noise that a powered R/C aircraft puts out in very large amounts.

Naturally, due to the wide ranging nature of the normal flight path of the aircraft, the noise is spread over a wide area. Of course, the noise problem isn't confined to those people who happen to live near the flying site, the most seriously affected are the pilots and helpers themselves. In Don's "From The Shop" column in the August '82 RCM, mention was made of this and a source of ear plugs that would allow hearing of normal speech tones, but would filter out the sound of a high revving engine. This is certainly well worth looking into for you, your family and your friends. But, you and I know that the real culprit is our model engines. If we could really quiet them down, I mean really quiet, then most of the objections to flying sites and most damage to pilot hearing would disappear. Really, gang, we've been sticking our heads in the sand for too long. We need to take the bark out of the engine noise before the public really takes a bite out of us.

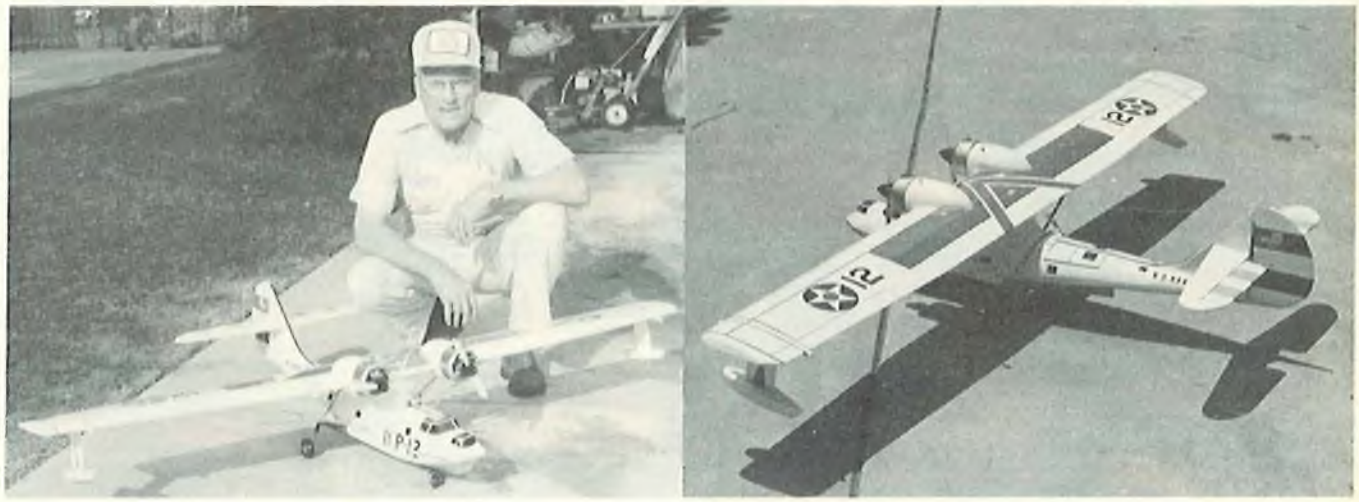
Lazy Ace with Silence-Vox muffler on Webra .91, soft purr at high throttle.

A good example of what I'm talking about is a friend of mine who flies a Fleet bipe, powered by a Kawasaki engine. This engine puts out lots of power, and flies the Fleet just beautifully. But the problem is that my friend hasn't equipped the engine with any type of muffling system, the exhaust exits straight out of the engine, down a very short pipe. The noise that the aircraft puts out in the air is a bunch. In fact, when it is flying, it's darn hard to hear anything else in the air. Yet, most of the large engine

to page 7



Down Flow muffler built by Leighton Eberle on Harvey Proper's Lazy Ace. Keeps the fuel out of the cockpit.



PBY II from July '76 RCM plans No. 649 built by Curly Rucker. Two Max .10 FSR for power. Strap on dolly for land take-off.

powered aircraft don't put out very much noise, due to simple muffler chambers and the fact that the engines are normally turning just about 6,000 to 7,000 rpm in flight.

At the Southwest Jumbo Fly-In a couple of years ago we had a fly-by performed by several antique full scale aircraft — among them were a couple of ancient Piper Cubs. The three Cubs came in low over the field in formation, just about a foot above ground level, then pulled up and turned away. You couldn't hear them. You had to be watching to tell that they were coming, and when they poured the coal to the engines to pull up and turn away, hardly any noise at all. Everyone at that Fly-In was amazed that the average chain saw powered aircraft made a heck of a lot more noise than did the full scale aircraft!

As I have mentioned before, I have listened to the engines of small motor bikes in Italy, powered by high revving two cycle engines. The muffling system on these engines is so good that even standing next to one while it is at idle, you can't tell that it is running, except for the smoke coming from the tail pipe. When revved up to pull away, the sound is very little more than the noise at idle. You see fleets of these motor bikes coming down the street when it is time to go to work and, except for an occasional rouge rider who has removed his sound system, an entire fleet makes almost no noise at all. You can be sure that a normal .60 with a normal muffler would drown out all of them.

I have been flying for the past several months using a muffler that I purchased in Germany last year which seems to be the quietest of any that I have tried. Mine is being used on my new Lazy Ace. It is called a Silence Vox. It resembles a modified tuned pipe. The Lazy Ace is powered by a Webra .91, and in the air this engine pulls the big bird along just beautifully, yet the noise emitted by the engine is just a gentle purr. The nipple to hook up for muffler pressure to the fuel tank is located way back at the end of the extended pipe. Yesterday, while flying, the pressure line slipped off of this nipple and there was a very noticeable decrease in engine power. Also, a lot of gunk was wafted over the aircraft. Hooking back the pressure line restored the engine power, but I'm going to install a filter in this line, because I must be injecting a lot of unburned oil back into the fuel tank, thus lowering the power of the engine a bit. These mufflers seem to be just about the best and most quiet that I have found. They are expensive — the one for the .91 cost about thirty bucks in Germany. I am going to investigate them some more and if I can locate an import source, I will pass this information along to you.

A scratch-built Airmeister by Carl Enslin of Rep. of South Africa. Built from RCM plan No 805, powered by a HP .40 and covered with Super Coverite. Carl states it flies very well. He wanted to pass along his compliments to designer Floyd Manly.

We all must investigate every avenue which will result in quieter engines. The flier who flies with no muffler at all will really lose a field in a hurry. The engine does not necessarily have to be a large one to make too much noise. Last fall at Thunderbird Field a couple of kids were flying a two channel aircraft with a U-control type .15 for power. This engine made more noise than any other at the field, muffled or unmuffled.

While on the subject of mufflers, one of my chief gripes is that most mufflers or exhaust systems simply dump the unburned fuel right back into the open cockpit of the aircraft. Leighton Eberle in Lakeland, Florida, made a muffler for Harvey Proper to put on the Max .90 in Harvey's Lazy Ace. This muffler looks to me to be the real way a muffler should be designed to keep all of the exhaust residue off of the aircraft. I don't know how quiet this muffler is, but it sure does get the stuff off of the cockpit. Who said that to be right a muffler had to hang off the side of the engine and point straight back. Where is that idea chiseled in stone tablets? I'm going to see if I can con Lee into making one for me.

★

The other day I watched a friend lose about a year's work, and untold amounts of money. The test flight on his P-51 just didn't work out right and it kinda met the ground less than gently. It was a Nosen P-51 kit aircraft, powered by a large Kioritz engine. This model has 1800 square inches of wing area and an advertised flying weight of 16.5 lbs. This would give a wing loading of 21 ounces per square foot. The advertised power is a .61 on a prop drive. So, if you add a large engine (as most modelers do) to this fine aircraft you will gain some weight, but you will be pulling that weight with ample power. Say the aircraft, with the addition of a chain saw engine and a certain amount of beefing up, picks up 5 lbs., and now weighs 21 to 22 lbs. The wing loading would then (at 22 lbs.) be a still respectable 28 ounces per square foot. Well within accepted modeling range.

The problem with my friend's aircraft was that his finished product came out weighing 38 lbs.! A wing loading of over 48 ounces per square foot. The extra weight came about in lots of beefing up, paint, retract landing gears, a muffler system that put the exhaust out of the scale exhaust ports, and numerous other places. The exhaust system robbed the engine of about a thousand rpm, and this power loss, coupled with an extremely heavy aircraft, resulted in a crash. The aircraft did lift off of the runway, but was flying on the very edge of a stall. A turn was attempted, then a down wind turn, and, as you know from reading Ken Willard's thoughts on down wind turns, disaster lay just ahead. It crashed into tall weeds which helped save it a bit. It is repairable, but when repaired, will still be overweight.

Now, I'm not relating this story to give my friend a hard time — the reason is that this action and reaction is kinda normal. He started building his dream bird and, as he went along, got more and more carried away with things to add to it to really make it an outstanding scale model. The resultant overweight aircraft just happened to be a big model. I've seen the very same thing happen to models of any size. It used to be rather common at the Nationals. The scale aircraft would be so heavy (and quite often tail heavy) that many of them ended in a crash before even the first flight could be completed. I haven't been to a Nationals for some time now, and I expect that both the concept of weight control and the flying ability of

to page 198

SUNDAY FLIER

Ken Willard

Did you ever look up the definitions of the words "fact" and "theory" in Webster's dictionary? If you haven't, then do so. You'll be as amazed as I was. The various meanings of the word "theory" take up almost half a column of words, and those meanings of the word "fact" take up about one quarter of a column. In contrast, there are some words, such as "thiefdom" that use up less than one line. And that's a fact.

So what, you say.

Well, to get right to the point, aeronautical theory is supposedly based on certain mathematical and physical facts which have been proven in each individual case, but when they are combined into an interacting complex, those facts add up to some theoretical conclusions which are as widely dissimilar in nature as the supposedly learned men who propose them.

Why is that so? The answer is simple; one student of aeronautics will take a series of what he assumes to be the pertinent facts relating to a problem, and arrive at a solution. Another student will do the same thing --- except that he uses a different set of facts to devise his theory. Both may use many of the same facts, but then deviate from there on, using only those facts of which each is aware.

And that's where the fun begins. And the words flow. And the beer flows. And the Sunday fliers argue. Like this:

"The reason an airplane loses altitude in a downwind turn is ---" (followed by many words and gestures).

"Yer outta your cottonpickin' mind! It doesn't lose altitude ---" (followed by more words and gestures).

Let's not get into that again, but just for the fun of it, here are a couple of theories to kick around when the weather ain't fit for the birds.

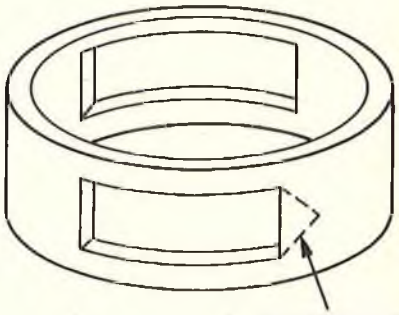
Start with this letter I received from Ted Off in Ventura, California. Honest. When I first received it, I misread the name and thought it was "Teed Off," but closer examination showed that he had scratched out the full name "Theordore." Ted has some interesting observations. Read on:

Dear Ken:

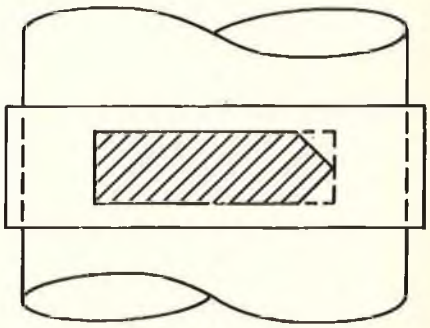
You hit a nerve with your June column on incidence settings for biplanes. I've been collecting miscellaneous notes plus a modest amount of experience with the thought of organizing something on paper but never got around to it. With that introduction, here are some comments on the four basic incidence problems:

***Decalage or the angular relationship between the two wings** — The "accepted" full size biplane theory has been that the upper wing should have more incidence than the lower so it would stall first increasing stability. Many R/C models have been set-up following this theory (i.e., Airtronics "Gere Sport"). There are better arguments that, for our models, this stability problem is not significant and lifting efficiency is lost with this set-up. Hence, most*

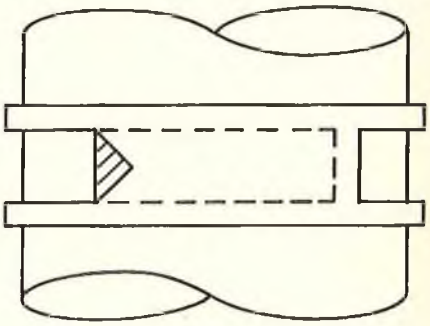
to page 191



FILE ONE END TO "V" SHAPE (CAREFULLY!)



FULL THROTTLE — EXHAUST AREA (SHADED) IS LARGE



IDLE SETTING — EXHAUST AREA (SHADED) DOES NOT CLOSE ABRUPTLY

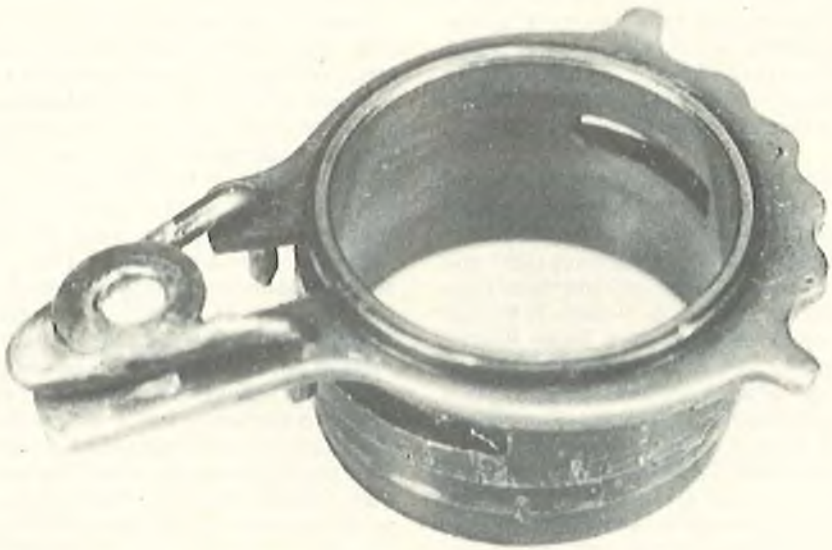
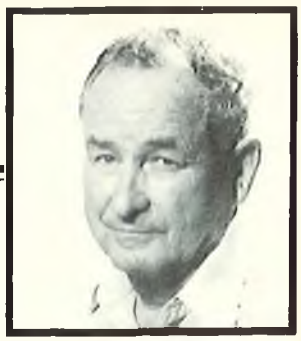


FIGURE 1
EXHAUST BAFFLE THROTTLE SLEEVE MODIFICATION FOR EASIER IDLE SETTING ON .049 BLACK WIDOW

SOARING

Al Doig



This month is going to be kinda like show and tell. I've had some experiences and seen some things that might interest you.

I've been building models long enough to know how to do it, but one thing I can't seem to get the hang of is building light. Either that, or the kit manufacturers fill their servos with helium and use punky balsa. I can never make the target weight. A case in point: I built the Dodgson K-Minnow 2-Meter sailplane. The total flying weight is listed as 40 to 45 oz. — mine weighed in at 49 oz., albeit with five servos instead of four. Subtracting the one additional oz. for the extra servo, it's still 3 oz. over the top weight.

I wrote to Bob Dodgson and found that his K-Minnow weighed 44½ oz. Now, there aren't too many places for obesity in the K-Minnow. It has a fiberglass fuselage, and foam core wings sheeted with balsa. It's possible to load the spar up with epoxy; it's possible to load the fuselage up with epoxy paint; it's possible to build heavy handed in the tail area so that nose ballast is needed; it's possible to use heavy radio equipment. Beyond that, the weight is pretty much determined by what you get in the kit.

"You haven't told him?"

Anyway — I liked the K-Minnow so well, I decided to build a back-up ship. Ah-hah sez I, what a grand opportunity to build a light one. To start, I wrote Bob Dodgson and asked him to send another K-Minnow kit, but could he lay up a special light fiberglass fuselage? As an aside, you may think I get all these sailplane goodies free; I don't, I pay for them just as you do, mostly through my friendly hobby shop. However, in this case I prevailed on Bob to lay up a special fuselage as a favor. He did not particularly recommend the light fuselage because of a loss in strength.

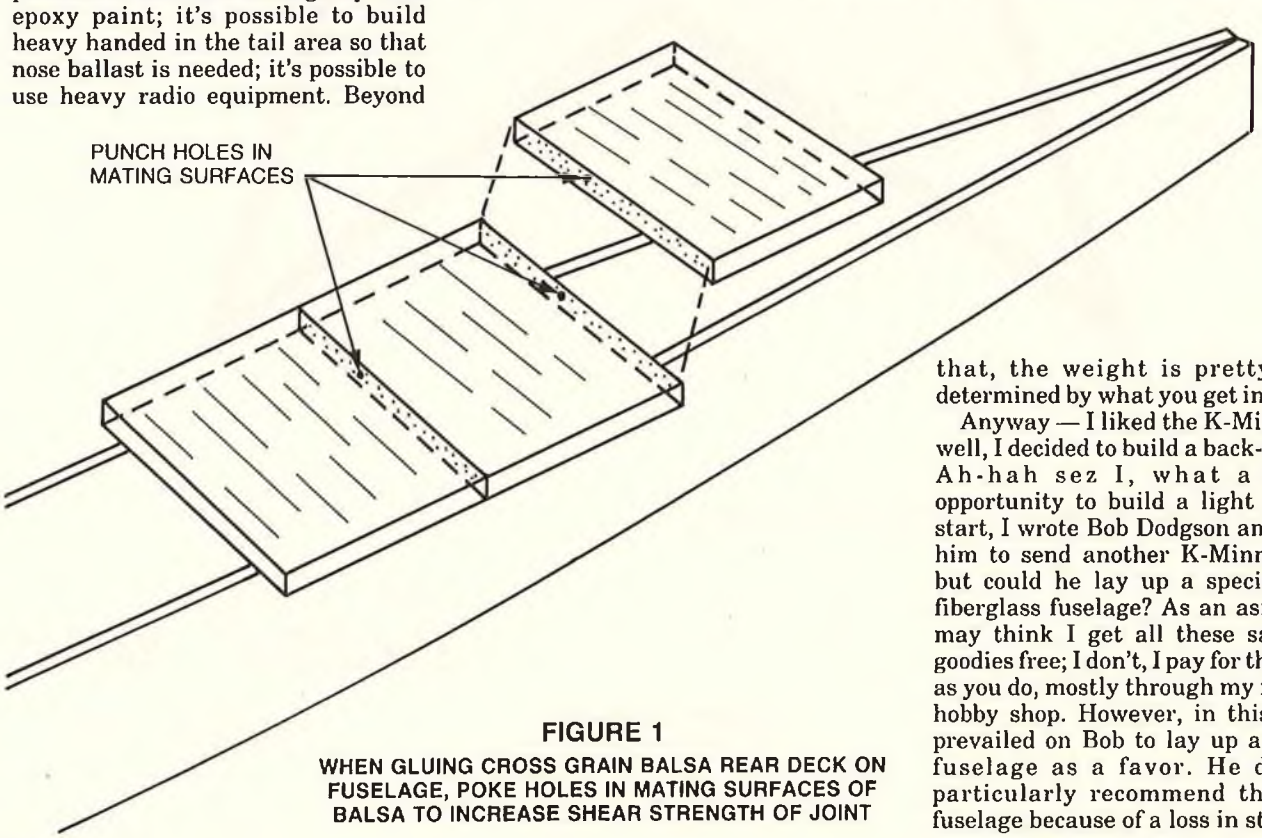
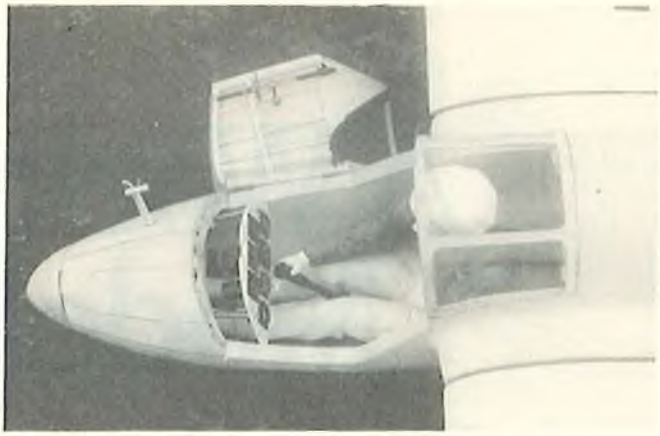


FIGURE 1

WHEN GLUING CROSS GRAIN BALSA REAR DECK ON FUSELAGE, POKE HOLES IN MATING SURFACES OF BALSA TO INCREASE SHEAR STRENGTH OF JOINT

World Class F3B competition is being attacked on the team level. Here's the San Diego team led by Rick Schramak with his "Concept" and team members Bob Anderson, Reg Moore, and Dave Watson.



Scale cockpit of "Minimoa" sailplane built by Dr. Hall.

Modular radio installation for the "Concept" F3B sailplane.

Scale "Minimoa" built about 1976 by Dr. Dennis Hall and acquired by Dave Watson, San Diego. 14.5 pounds all-up weight, 22 oz./ft. sq., 13.5' wing — flies well on slope — 5 lb. nose ballast.

After I threatened to start a rumor that the Camano was just a modified Sagitta, he relented and laid up a fuselage using two layers of 4 oz. fiberglass, instead of two layers of 6 oz. fiberglass with a third layer in front. Weight savings was about 1/2 oz. Although the quality of the 1/16" balsa wing sheeting in the kit is excellent, I found some extremely light contest balsa as a replacement. This again, may not be recommended by the manufacturer because of strength considerations, but it did save about 1½ oz., and the wings do not whimper during zoom launches using a 12 volt winch.

I took extreme care to keep the tail light. I used adhesives sparingly and used cross grain balsa to cover the fuselage top from the wing aft to the fin. The material furnished was Italian poplar. Dodgson had originally used cross grain balsa but changed to poplar because of splitting of the balsa during very hard landings. I decided, therefore, that I would not land hard. Indeed, my Camano 100, which is built using cross grain balsa as the top rear deck, shows hairline cracks at the joints of the last two sections. To prevent this shearing, I poked holes in the mating edges (see Figure 1). This provides good "tooth" for the adhesive and aids in prevention of failure of the joint in shear. The wing sheeting was fastened to the foam cores using 3M Transfer Tape, which is recommended by Dodgson, and is the lightest and most satisfactory adhesive I've found.

For a long time I have used K & B Super Poxy to finish fiberglass fuselages because of its durability and nice finish. However, if you are not careful, you can add ounces using epoxy. I applied one coat of primer and sanded it nearly all off. This fills the

to page 183

Back into the competition scene — the one and only Mark Smith, Chief Honcho of Mark's Models. Won the San Diego Quarter Finals with his original design "Pffft".

Drag flap design for Mark Smith's "Pffft." Actuated by square tube torque rod (no relation) mated with same in fuselage.

GIVE IT A WHIRL

John Gorham

Helicopter Clubs & Associations

Last month we discussed some of the new R/C helicopter clubs and associations which were being formed to unite and help the heli fliers in particular areas. I have just received the newsletter from yet another new association. The newsletter is called "Heli Gram" and it is volume 1, #2. The association is the "Southern Ohio Radio Control Helicopter Association" with president Bob Belluomini and vice president, our old friend and regular 'Nats' C.D. Dwayne Stephens. The "SORCHA" now has 31 pilot members and seems like it's going to keep steadily growing from there. Club patches are underway and the newsletter, which is nicely written and well-presented, seems to be published about every month. Dwayne Stephens says in the newsletter:

"I would like to talk this month about our help sessions. Those present at the organizational meeting will recall the number one objective of the club was to assist new people to get started flying. We have had 4 sessions spaning 6 weeks and this past Saturday, I was surprised and pleased to see the marked improvement of several fliers. Guys that could barely hover 6 weeks ago are now flying around.

"Every session we have had new fliers with new machines that are now on their way learning to hover. The turnout at each session has been very good and I believe the number of people present gives encouragement to the beginners. This is what will keep us going and growing so come on out and participate in the club activities.

"I feel we have a fine helicopter club and I am happy to be a part of it. If I can be of assistance to anyone, please feel free to call; home phone, (513) 863-7325, Dwayne Stephens."

The "SORCHA" holds their flying sessions every 2 weeks from 9 to 12 a.m. at the Showcase parking lot in Springfield, Ohio. So those of you in the area, why not visit and watch the activities?

I found "SORCHA" 'Heli Gram' very informative and I certainly learned from it. One particular dissertation about tracking blades was interesting and I believe that the sketch that was given in the newsletter might be of general interest to you all so here is my version of it without comment.

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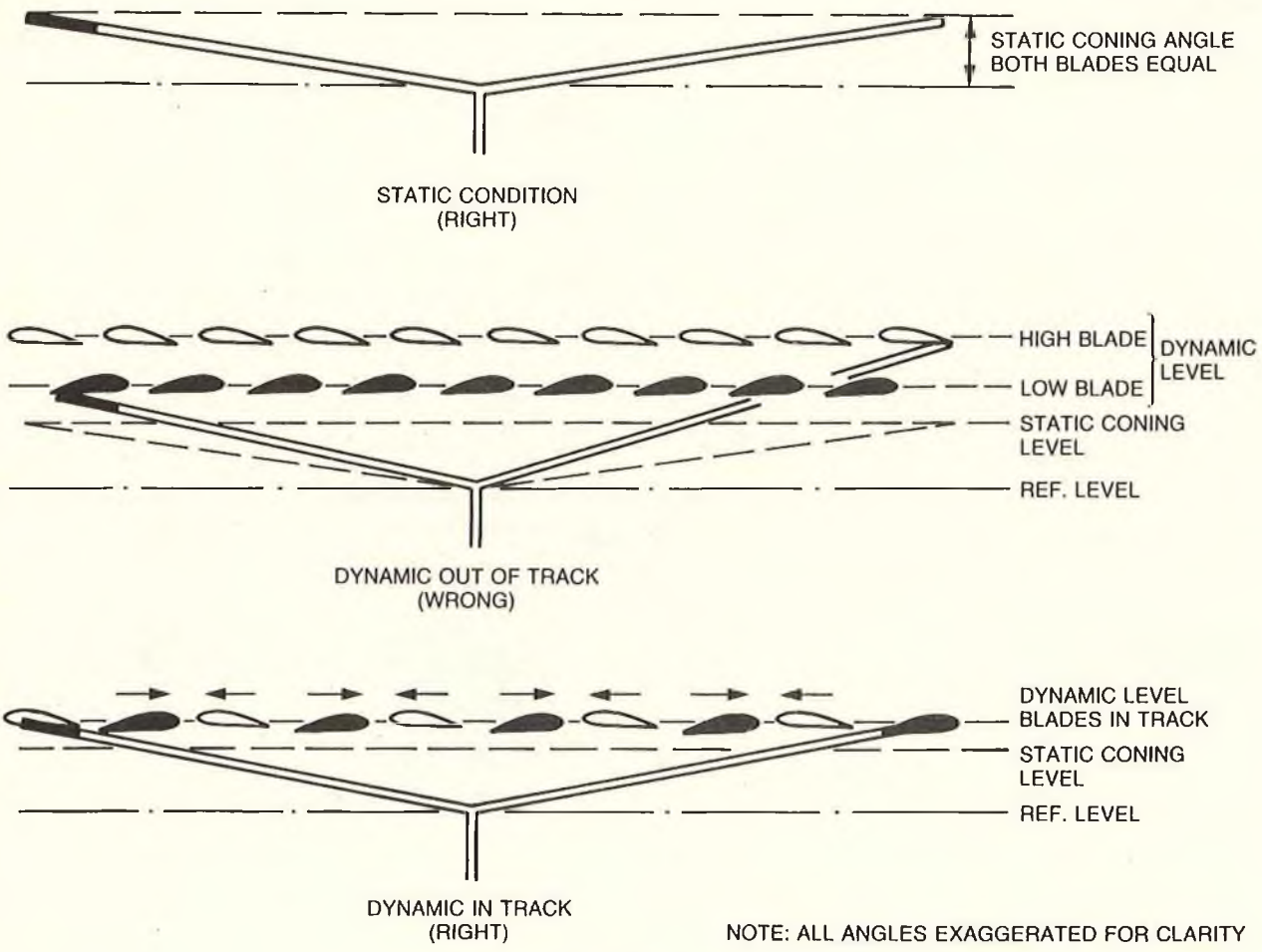
to page 173



SKETCH A

BLADE TRACKING

MONARCH 05

This slow flying airplane gives the beginner more time to think about what he should do.

By Lee Renaud

Since the very beginning of R/C flight, the one type of design that has continually appeared in model publications and on hobby shop shelves has been the R/C trainer. There have been numerous approaches to trainer design over the years, but at the present time trainers can be roughly divided into two categories. One is the 3 to 4 channel trainer using a .19 to .60 size engine for power. The other is the 2 channel, .049 powered trainer. There are many excellent kits and designs which fall into the first category, but there are several significant drawbacks to this type of design where the beginner is concerned. The most obvious is the higher initial cost for both engine and radio. The structure and construction of the larger trainers, while they appear basic to an experienced modeler, can also be quite confusing to the novice looking at his first set of plans. For the beginner, the 1/2A sized trainer is an attractive alternative because of the lower initial cost and simpler construction.

Designed specifically for the new Cox Dragonfly .049 engine, the Monarch .05 offers the advantages of low cost, simple, rugged construction and excellent flight characteristics for the beginner. By using a 1/2A engine

and an inexpensive two channel radio, a person interested in R/C can "get his feet wet" at a much lower cost than he can with a larger engine and a full house radio. The first-time pilot has enough jitters to deal with when he first gets ready to fly his new creation without also worrying about putting two month's rent into the ground as well.

The Monarch's structure is based heavily on that of the successful Olympic 650 sailplane, with both the wing and tail surfaces being identical. The three-piece wing employs a one-piece center section with spruce spars and leading edge which is virtually indestructible, while the plug-in tips serve to make transportation easy (even in small cars). The tail is a straightforward anti-warp structure with separate control surfaces for simplicity. The fuselage is a simple slab sided box which utilizes 1/8" air-ply sides and floor for strength and light weight. The structure has proven to be strong enough to survive poor landings and to be easily repairable in the event of a crash.

The Monarch has an unusually large amount of wing area for a 1/2A airplane. This wing area allows the Monarch to have a very light wing loading. The light loading allows the Monarch to fly at extremely slow speeds, which gives the beginner a definite advantage. One of the most difficult tasks facing the novice is developing the reflexes necessary to fly R/C airplanes. A slow flying airplane gives the beginner more time to realize what the airplane is doing, think about what he should do, and give the proper control input. The use of polyhedral in the wing design makes the model smooth turning and very stable. The large tail surfaces also contribute to the Monarch's stability and make it a very easy handling and forgiving airplane.

Pre-Construction Notes:

To build the airplane you will need a flat work surface at least 11" wide and 48" long, into which you can push pins. A sheet of Celotex, or similar composition board material, works well. Whatever you use, be sure that is is straight and unwarped.

CONSTRUCTION

A few simple tools will also be needed. These include a model knife and/or a supply of single edge razor blades, a razor saw, pliers, a small hammer and a hand drill and drills. You will also need hardwood sanding blocks and assorted grades of sandpaper, a small block or razor plane, a supply of straight or tee-pins and masking tape.

The types of adhesives used are a matter of personal choice, but we don't recommend normal model airplane cement. For general construction, we suggest the use of aliphatic resin glue such as Wilhold or Titebond. Slow drying epoxy such as Hobbypoxy II or Sig will be required and 5-minute epoxy will be useful. We built the prototypes with Jet and feel that the time and weight saved is worth the extra cost. Be sure to follow the warnings on the bottle and check that all joints fit tightly.

Be sure to cover the plans with Handi-Wrap or similar material before starting construction so that the structure does not become glued to the plans.

MONARCH 05
Designed By: Lee Renaud
TYPE AIRCRAFT
1/2A-Trainer
WINGSPAN
72 Inches
WING CHORD
9 Inches (Avg.)
TOTAL WING AREA
650 Sq. In.
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord Center
Double Taper Tips
DIHEDRAL, EACH TIP
4⅞ Inches
O.A. FUSELAGE LENGTH
40 Inches
RADIO COMPARTMENT SIZE
(L)10" x (W)2" x (H)2½"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (Incl. elev.)
5¼ Inches (Avg.)
STABILIZER AREA
126 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8 Inches
VERTICAL FIN WIDTH (incl. rudder)
6" (Avg.)
REC. ENGINE SIZE
Cox Dragonfly .049
FUEL TANK SIZE
Cox Dragonfly Lg. Tank
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2-3
CONTROL FUNCTIONS
Rud., Elev., Opt. Throttle
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply & Hardwood
Wing ..... Balsa & Hardwood
Empennage ..... Balsa
Wt. Ready To Fly ..... 28-32 Oz.
Wing Loading 6.6

Stabilizer:

(1) Cut the stab trailing edge from 3/16" x 1/4" balsa and pin in place over the plans. Be sure that the trailing edge is straight from tip to tip when viewed from above.

(2) Cut the leading edge pieces from 3/16" x 1/4" balsa and use aliphatic resin glue to laminate the 1/16" x 3/16" spruce doublers in place. Allow 5 minutes for the glue to set-up, then trim the ends for the center joint and pin the leading edge in place.

(3) Cut the leading edge brace from 3/16" x 1/2" stock and cut to fit tightly against the leading edges. Work carefully to ensure that the joint is tight and glue brace in place. Install the 1/16" x 3/16" x 3" spruce trailing edge reinforcement.

(4) Cut the 3/16" x 1/2" center ribs to length and glue in place. Be sure that the ribs are properly aligned and are spaced 3/16" apart for the rudder root rib. Use a piece of 3/16" thick stock to check the spacing.

(5) Cut the stab tips from 3/16" x 3/4" stock and fit snugly between leading and trailing edges. Apply glue to joints and pin tips in position.

(6) Cut the stab ribs from 3/32" x 3/16" strip starting from the center. Be sure that the end cuts are angled to fit tightly against the leading and trailing edges and that the ribs fit snugly. When all ribs have been fitted, glue them in place. Allow the stabilizer assembly to dry thoroughly before removing from the plan.

Elevator:

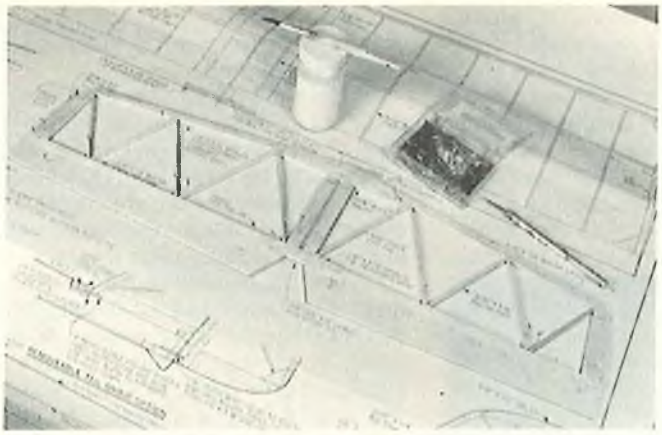
(1) Notch the leading edge of the elevators for the 1/8" dowel tie. Align the elevators behind the stabilizer trailing edge and check that the tie is flush with the elevator. Pin elevators in place and epoxy the dowel in position. Be sure to let the epoxy cure completely before removing from plan.

(2) Use a small plane to bevel the leading edge of the elevator to the Vee-shape shown on the plan. Be sure that the Vee is centered on the edge and is the same angle on both sides. Use a sanding block to finish the edge being careful not to sand a curve in the leading edges. Check fit the elevator against the stab trailing edge to be sure that the edges fit tightly without gaps.

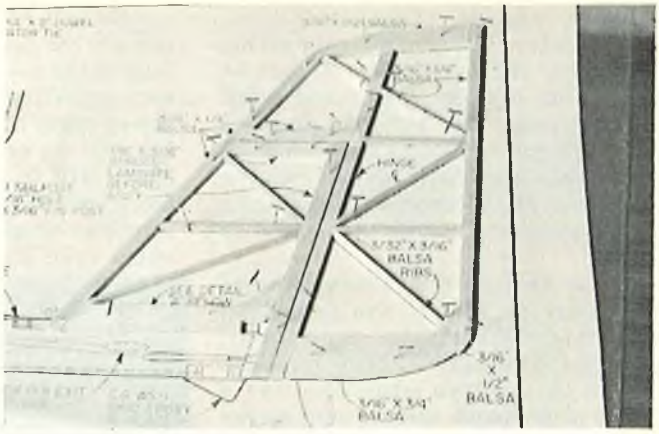
Horizontal Tail Assembly:

(1) Position the stabilizer over the plan and mark the locations of the hinges on the trailing edge. Also mark the hinge locations on the elevator leading edge. Mark the centerline and cut slits in the stab and elevator to receive the hinges. This can be done with an X-Acto knife and No. 11 blade, but we suggest that the hinge slotting kit, Cat. No. HSK-1, from Carl Goldberg Models will make this step

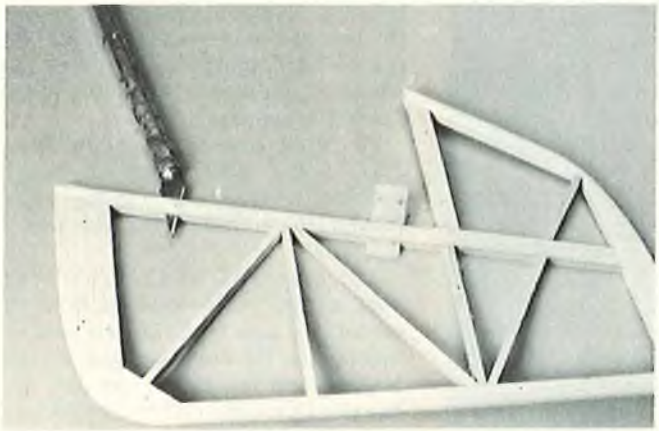
to page 24



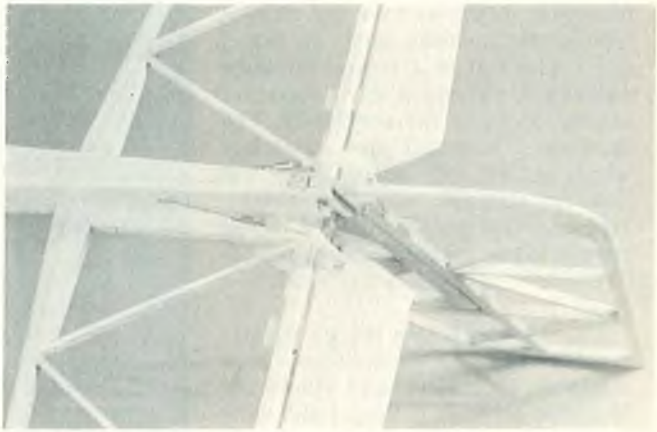
Fully assembled stab and elevator. Note 3/16" space for fin.



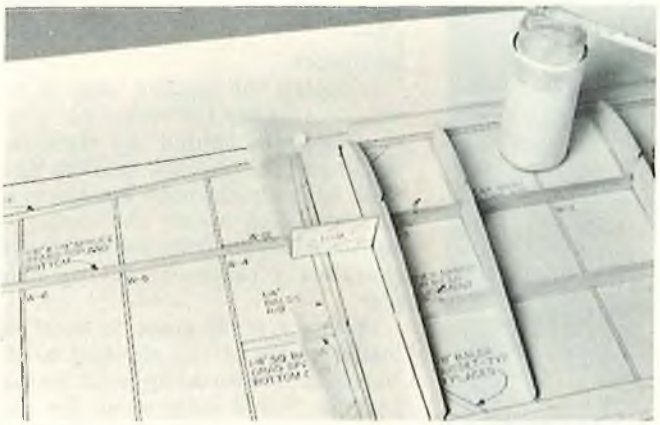
Completed fin and rudder assembly. Be sure to leave 1/16" space between top of fin and rudder.



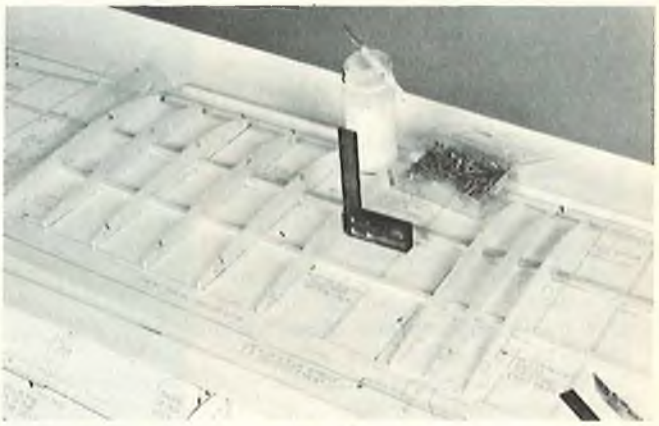
Slotting rudder for hinges. Be careful to cut the slots straight and on the centerline of the surface.



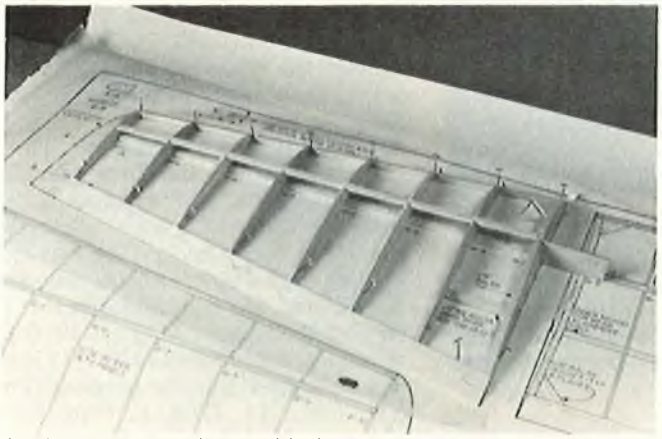
Detail of tail group with hinges and control horns temporarily installed ready to be covered.



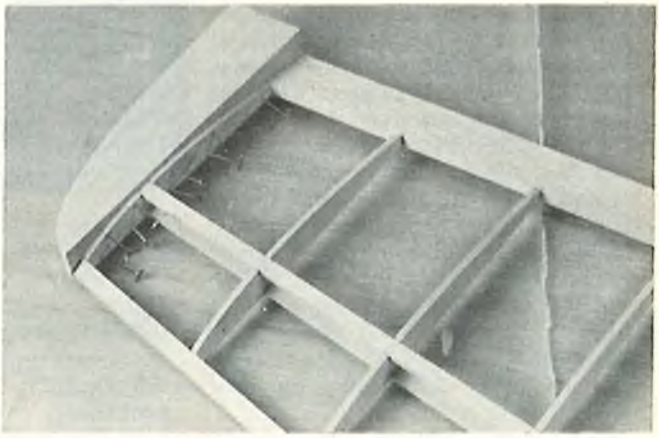
Using the W-11 plywood web to angle the W-3 rib. Make sure the top of the rib is tilting in toward the center of the panel.



Installing the W-2 ribs in the center panel. Note how square is used to align the ribs.

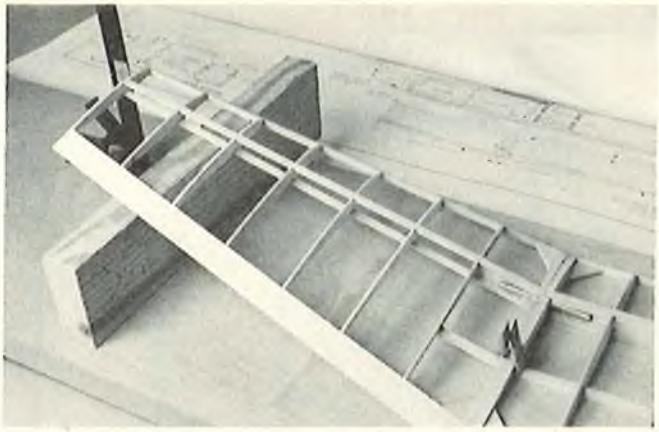


Basic wing tip panel assembly. Note how W-11 ply web is used to angle W-3 rib.

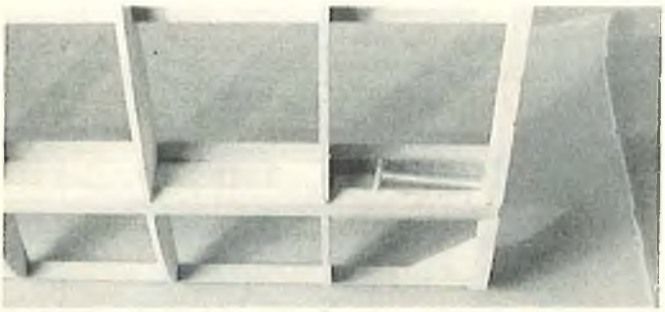


Wing tip block pinned in place after trimming spars and leading and trailing edges flush with W-10 rib.

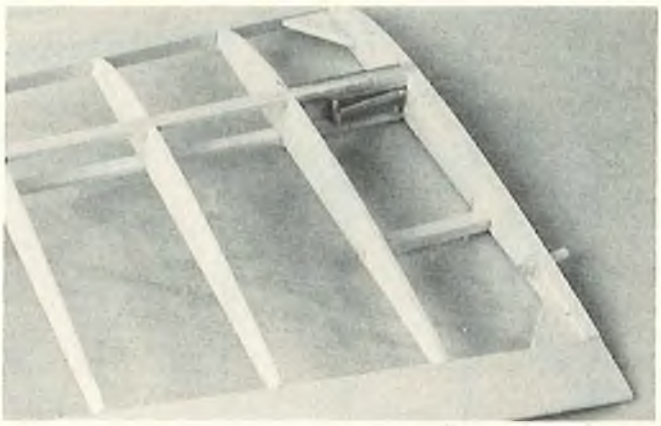
3/16" hole for wing joiner tube drilled in W-3 rib.



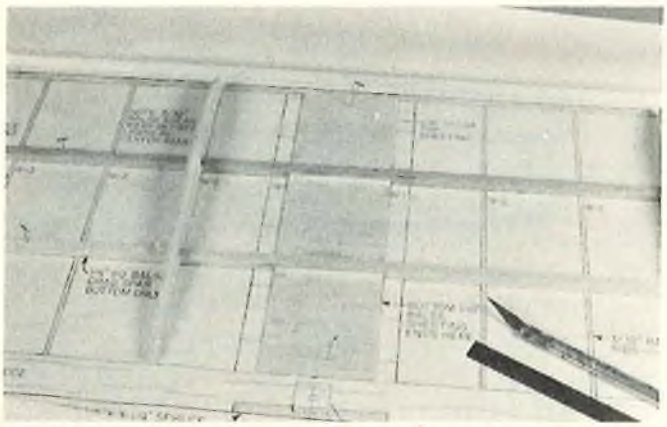
Tip panel blocked up for joiner tube installation. Tube is tack glued with small dabs of epoxy at this stage.



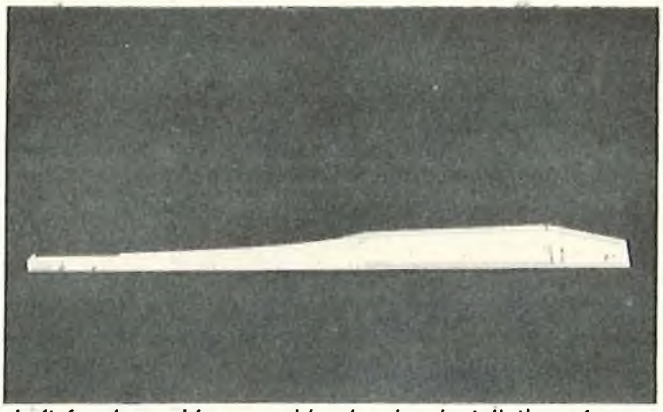
Installation of wing joiner tube. Note how panel is left standing on leading edge while epoxy sets.



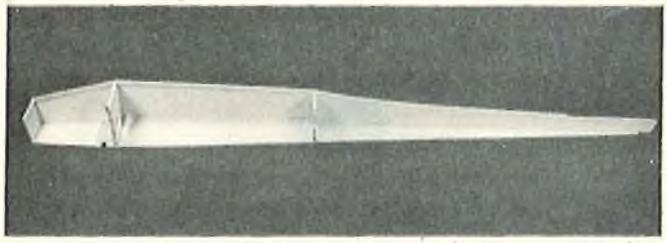
Tip panel detail showing completed installation of joiner tube and 3/16" alignment dowel.



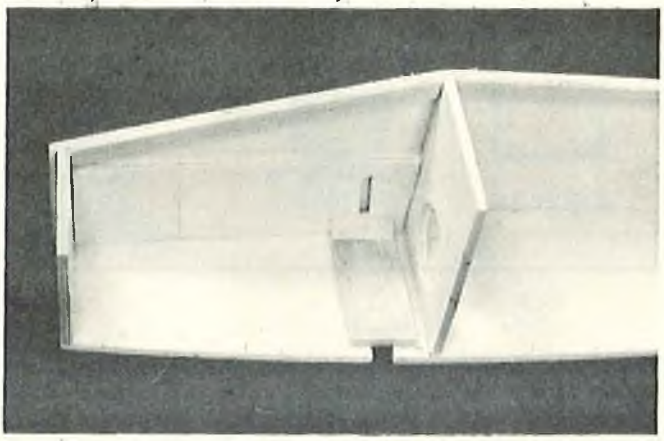
1/16" balsa bottom sheet cut to fit between spars, leading edge, and trailing edge. Note where sheeting ends.



Left fuselage side assembly showing installation of nose doubler, stringers, and triangle stock. Note that tall skid mount and tailpost are on left side only.

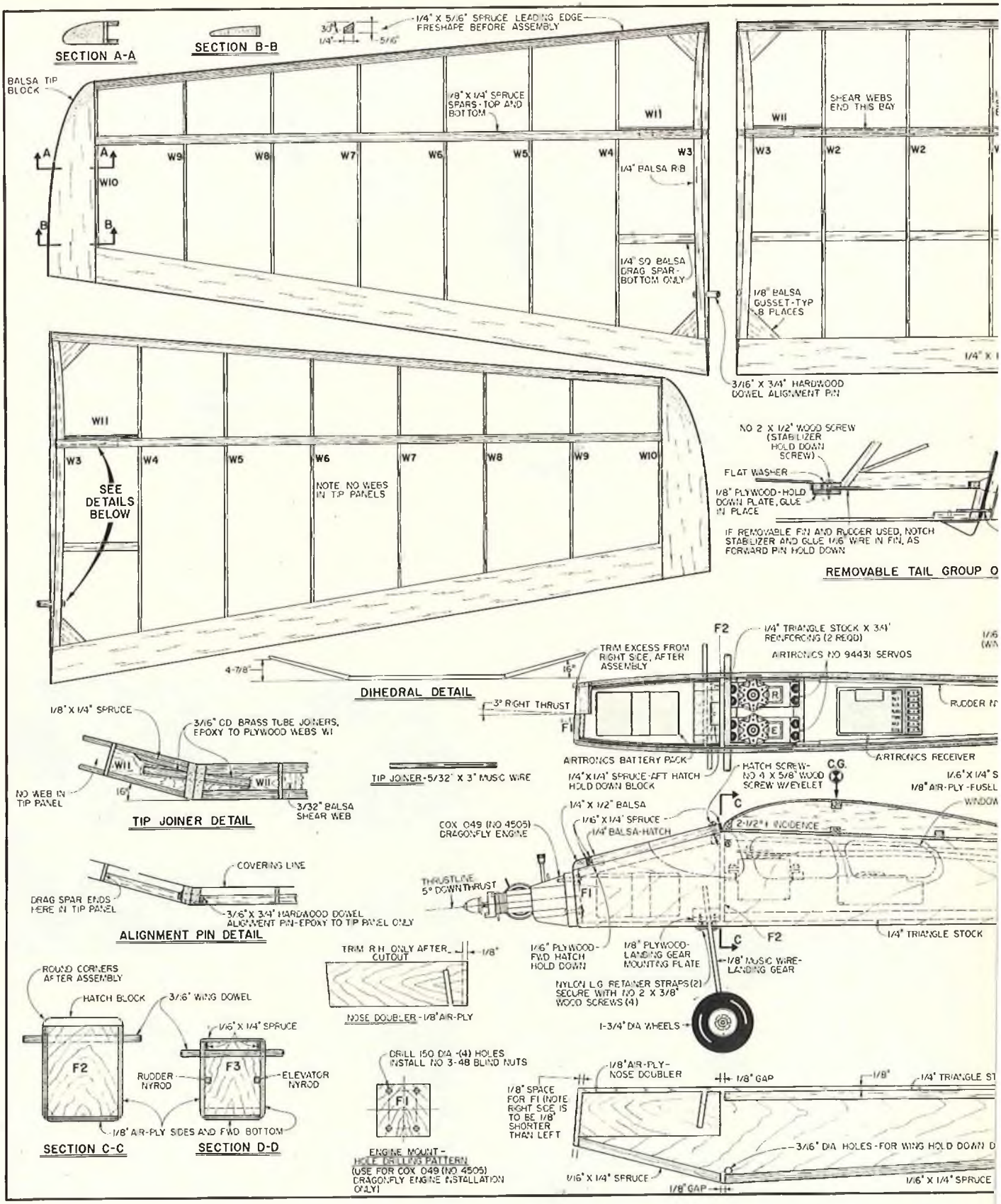


Basic fuselage assembly with left side removed to show internal detail. Structure is simple but very rugged.



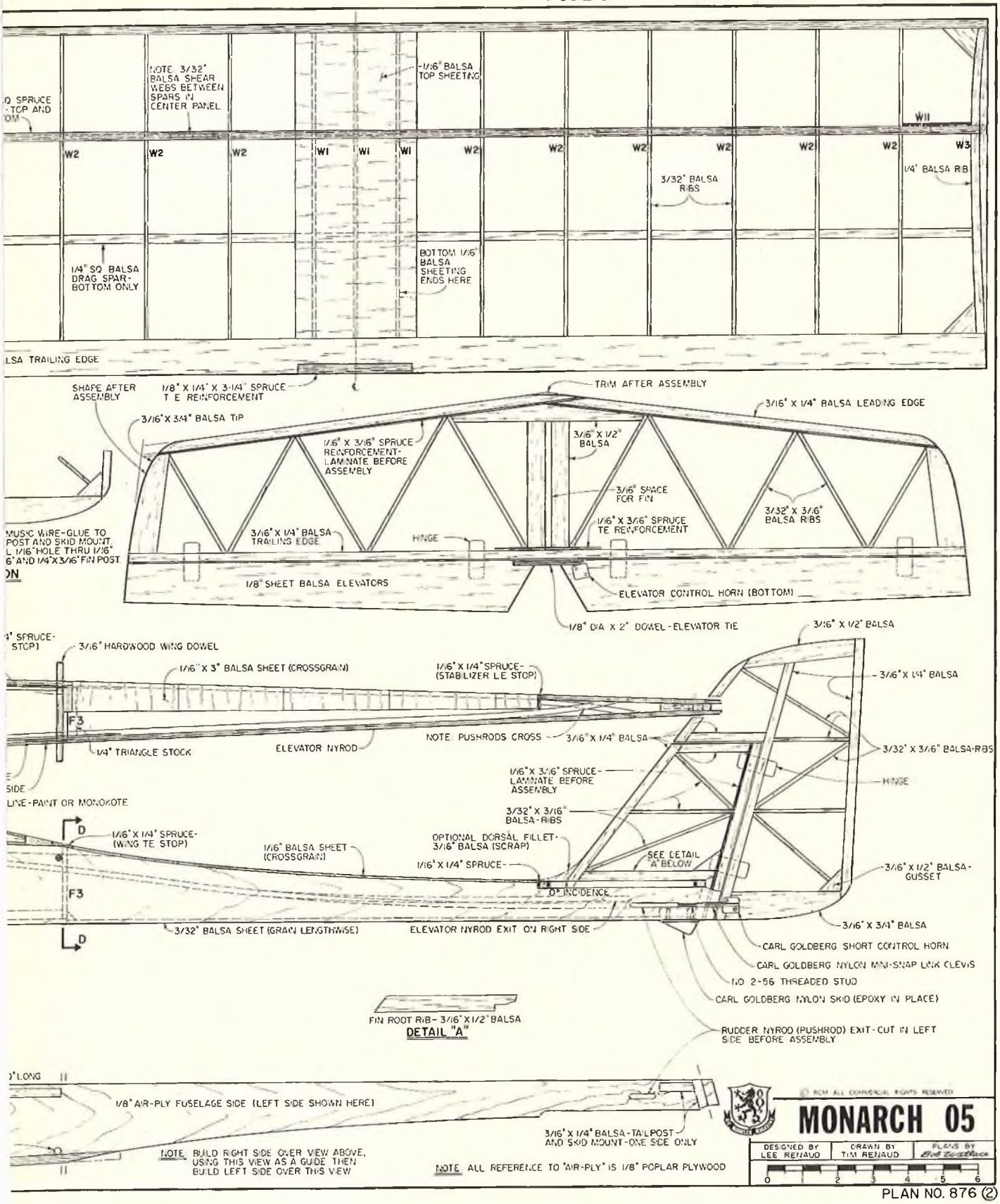
Detail of forward fuselage. Note how right thrust is built in. Right side will be trimmed flush with F-1 when assembly is complete.

Basic fuselage assembly ready for installation of pushrods and top sheeting.



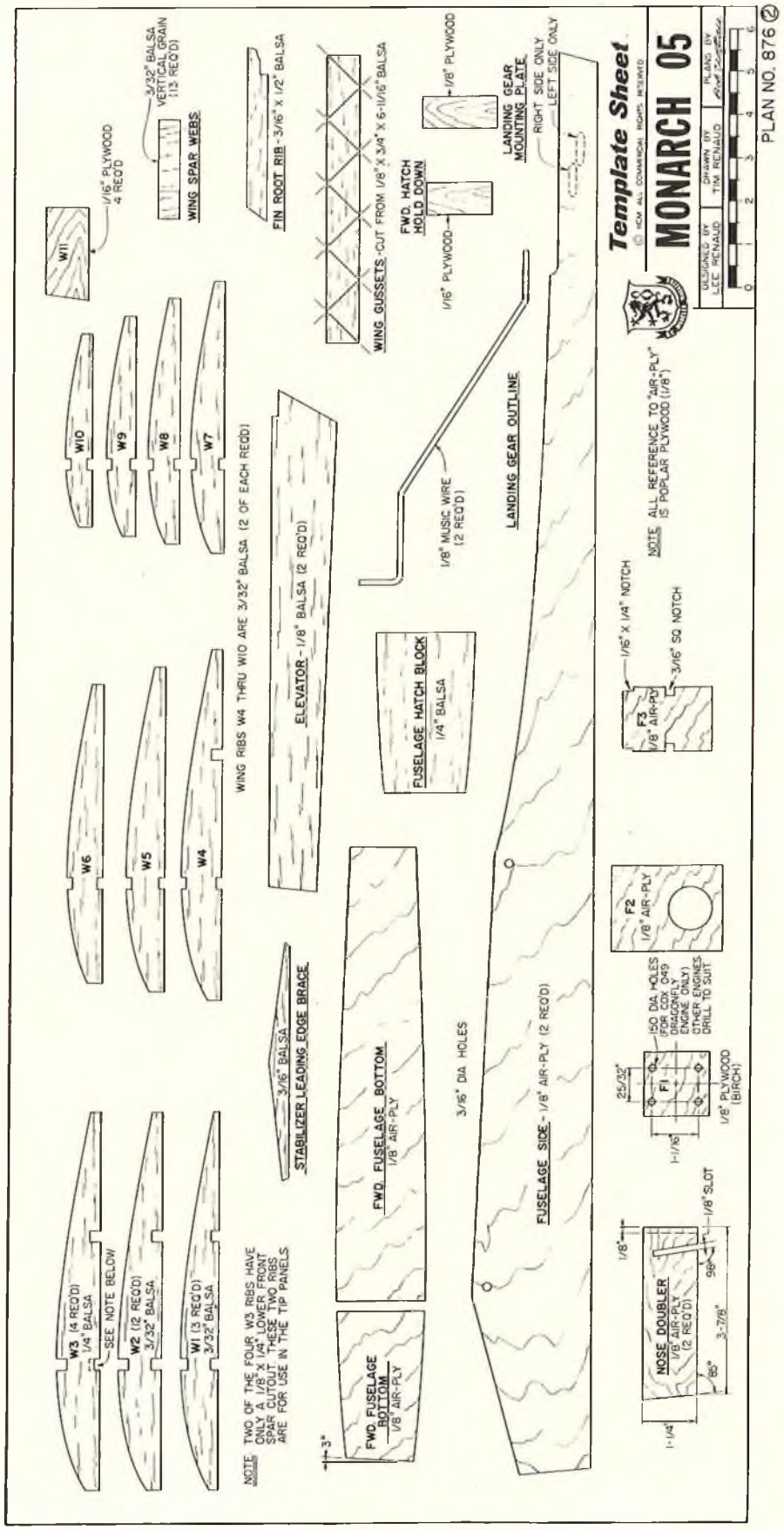
easier and is well worth purchasing.

(2) Cut the individual hinges from the molded tree and fold them back and forth a few times to break-in the hinges. Slip the hinges into the elevator until the hinge line is flush with the leading edge, and then push the hinges into the stab slots until the two surfaces touch. Work the elevator up and down to be sure the hinges work smoothly without binding. Correct any problems by moving the hinges or enlarging the slots. When you are satisfied that the alignment is correct, use Hot Stuff or 5-minute



epoxy, to secure the hinges in the stabilizer. Work the elevator up and down while the adhesive is drying to avoid gluing the surfaces together. When dry, cut off the excess hinge stock on the stabilizer side. Leave the elevator in place, but do not glue hinges yet.

(3) Use a sanding block to blend the stabilizer and elevator tip shape into a smooth continuous curve. Lay the assembly flat on your bench and block sand the surface of the stabilizer until all joints are smooth and flush. Turn over and sand the other surface. Now



sand a slight taper into the elevators and stab trailing edge so that they blend together. Be careful to keep the trailing edge of the elevator 3/32" thick or it will be easily warped when covering.

(4) Use a plane; or knife, to carve the stabilizer leading edge and tips round. Finish shaping with the sanding block blending the tip contours and then round the elevator trailing edge. Final sand with fine paper and separate the stabilizer and elevator. Mark the location of the elevator control horn holes and use a 3/32" diameter drill to drill through the elevator. This completes the assembly of the horizontal tail surface which is now ready for covering.

Fin:

(1) Cut a piece of 3/16" x 1/2" balsa as shown in detail "A" to form the fin root rib, then pin the root rib in place. Cut the fin trailing edge and spruce doubler to length and laminate together. Note that these pieces extend to the fuselage bottom surface. Pin the trailing edge in place, then glue the root rib against it and pin in place.

(2) Cut the fin leading edge to length from 3/16" x 1/4" stock, apply glue to the forward end of the root rib, then pin leading edge in place. Cut and fit the 3/16" x 1/4" tip rib and glue in place. Cut the gusset from 3/16" x 1/2" strip with the grain direction as shown for maximum strength and glue against the root rib and fin trailing edge. Cut and fit the 3/32" x 3/16" ribs and glue. Leave the fin pinned in place over the plan until the rudder has been assembled.

Rudder:

(1) Cut the 3/16" x 1/4" rudder outline pieces to length and pin the center vertical spar in place against the fin trailing edge. Pin the trailing edge and leading edge in place then cut the 3/16" x 1/4" rib and glue in place, allowing a gap between this rib and the fin tip rib. Cut the tip ribs from 3/16" x 3/4" stock and glue in position. Be sure that the rudder vertical spar butts tightly against the bottom of the rudder tip.

(2) Cut the corner gussets from 3/16" x 1/2" strip and glue in place. Cut and fit the 3/32" x 3/16" ribs, then glue these in place. Allow to dry completely before removing from board.

(3) Bevel the leading edge of the rudder to a Vee-shape from the bottom of the 3/16" x 1/4" rib to the lower end. Work carefully and finish up with a sanding block. Check that the edge is straight and fits tightly against the fin trailing edge.

Vertical Tail Assembly:

(1) Position the fin over the plan and mark the hinge locations on the

trailing edge, then mark the rudder leading edge. Cut slits and install the hinges as you did for the horizontal tail.

(2) Sand all surfaces and round the leading and trailing edge of the assembly. Round the tip and rudder base but do not round the two 3/16" x 1/4" ribs. Check the hinge action and locate and drill the holes for the control horn. Check the fit of the fin between the stab center ribs, sanding the fin if the fit is too tight. The vertical tail surfaces are now complete and ready to cover.

Wing Center Panel:

(1) Pin the 1/4" x 1" tapered trailing edge in place over the plan, using a pin every second rib to hold it securely.

(2) Unpin the stack of W-2 ribs and use 2-3 ribs as spacers to locate the bottom spars. Press the rib aft end tightly against the trailing edge and pin through the 1/4" x 1/4" balsa rear spar to hold it in place. Secure the spruce forward spar with pins placed straddle fashion. Don't pin through the spruce it will weaken the spar and may split the wood.

(3) Install the outermost W-2 rib, then glue one of the 3/32" balsa shear webs to the inboard side of the rib and to the lower spar. Glue the next W-2 rib to the inboard edge of the shear web, allowing the shear web to determine the rib spacing. Proceed this way — rib, shear web, rib, shear web, until all of the W-2 ribs are installed. Try to apply the glue neatly and remove any excess with a balsa sliver. This will avoid large blobs on the lower surface which are hard to sand off later. Check that the ribs are straight from the leading to trailing edge and are square with the work surface.

(4) Apply glue to the forward edge of the W-2 ribs and press the leading edge tightly against the ribs, using pins to hold it in place. Angle the pins backward to hold the leading edge, but don't pin through the strip.

(5) Cut 3 pieces of 1/16" x 3" x 2½" sheet from 36" stock. Trim these pieces to fit snugly between the spars and the spars and the leading and trailing edges at the center of the panel, with the grain running span-wise. Mark the location of the W-1 ribs on the spars, leading and trailing edge and install the sheet making certain that is is down tight against the work surface, pinning in place as required. Glue the three W-1 ribs in place over the sheeting.

(6) Sharpen one end of the 3/16" x 3-3/32" long brass tubing and use this as a drill to cut a 3/16" diameter hole in the four W-3 ribs. Be sure that the hole is directly in line with the forward edge of the main spar notches and that the top edge of the hole just touches the bottom of the top spar notch. Now cut the 3/16" diameter hole for the 3/16" diameter rear alignment dowel. Drill the W-3 ribs in sets so that the holes will line up exactly when the completed wing is assembled. Glue the W-3 ribs in place using one of the W-11 ply shear webs as a gauge to tilt the ribs for the proper tip dihedral angle. Check to be sure the ribs are not bowed or twisted.

(7) Apply glue to all rib notches and install the 1/4" x 1/4" spruce top spar. Be sure that the top surface of the spar is flush with the top surface of the ribs. Epoxy the W-11 ply web in place using clamps to hold it tightly against the top and bottom spar.

Tip Panels:

(1) Cut a 36" length of 1/4" x 1" tapered T.E. stock into two 18" lengths then cut the inboard ends at an angle to fit against the center panel. Pin the trailing edge in place with the inboard edge protruding slightly beyond the joint line. Use W-3 and W-10 ribs to locate the 1/8" x 1/4" spruce spar and straddle pin the spar in place. Glue all the tip ribs, except W-3, in place. Make sure that they are square to the work surface.

(2) Cut the tip drag spar from 1/4" x 1/4" x 6" balsa and pin in place, using the notch in W-3 to locate the spar. Install the W-3 rib, using one of the W-11 ply shear webs as a gauge to tilt the rib for the proper tip dihedral angle.

(3) Apply glue to the front edge of all ribs and install the tip leading edge, with the inboard edge protruding slightly beyond the joint line. Apply glue to all spar notches and install the top 1/8" x 1/4" spruce spar. Be sure that the spar is flush with the top surface of all ribs.

(4) Cut the tip spar filler from 1/8" x 1/4" x 6" spruce and glue it to the upper tip spar as shown in the tip joiner detail on the plan. Epoxy the W-11 ply shear web in place on the forward side of the spars. Be sure that the web fits tightly against both spars and the W-3 rib.

(5) Trim the spars, leading edge and trailing edge flush with the W-10 tip rib. Glue the tip block in place with 5-minute epoxy. Carve the block flush with the top surface of W-10, then shape it to the cross sections shown on the plan.

Tip Dihedral Joint and Final Wing Assembly

(1) Trim the spars, leading edge and trailing edge flush with the W-3 ribs at either end of the center panel. Prop up the panel so that the bottom surface of one W-3 rib is 4⅞" above the work surface. Use a coarse sanding block to sand the spars and the leading and trailing edges flush with the W-3 rib, using the method of fitting hand launch glider dihedral joints. Sand only until the spars and leading and trailing edges are flush; be very careful not to change the dihedral angle of the rib or round off the edges of the rib.

(2) Trim the excess from the spars, leading and trailing edges at the inboard end of the tip panel. Prop up the panel so that the bottom surface of the W-10 rib is raised 2-7/16" above the work surface and sand the spars and leading and trailing edges flush in the same manner as the center panel. Again be very careful not to change the dihedral angle or round off the edges of the rib. At this point check the fit between the center panel and tip panel; there should be a good tight fit along the entire joint line between the W-3 ribs, and the tip and center spars should be in a straight line, with no forward or rearward sweep. Correct any problems with careful sanding until you have achieved a good fit before going on.

(3) Cut one of the 3/16" O.D. x 3-3/32" long brass tubes in half so that you have two pieces of equal length. Plug one end of each of the tubes with scrap balsa to keep epoxy from running inside the tubes. Sand the outside of the tubes with coarse sandpaper and then clean the tubes with thinner or acetone to ensure a good bond.

(4) Push one of the tubes through the hole in W-3 in the center panel, and pin the center panel to the building board. Push the second brass tube through the hole in the W-3 rib in the tip panel. Slip the 5/32" wire joiner into the tube in the center panel and slide the tip panel onto the joiner, being careful that the ends of the brass tubes remain flush with the outer surfaces of the W-3 ribs. Prop up the tip so that the bottom surface of the tip rib is 4⅞" above the working surface.

(5) Check that the brass tubes are snug against the ply webs. If they aren't use a small rat-tail file to open the holes in W-3 slightly so that the tubes will fit tightly against the webs. Check the fit between the tip and center panel one final time to ensure there are not any gaps or misalignment. Look at the tubes and make sure they are equally spaced between the spars as shown in the tip joiner detail on the plans, and when satisfied with the alignment, spot epoxy the tubes in place with 5-minute epoxy, being extremely careful not to epoxy the joiner inside the brass tubes.

(6) When the epoxy is completely cured, re-check alignment and correct any problems before continuing, then separate the panels and remove the joiner. Mix a batch of slow drying epoxy. Hold the center panel with the

to page 150

AR-1

By Jack Caldwell

Photo By Steve Calderon

INTRODUCTION

If you like speed, you've got to have a ship that will penetrate — this is it!

For years, the thrill of slope soaring has been an obsession with me. At first I haunted the nearby hills of Livermore, California, where I flew a variety of floaters. Sometime later, my brother in-law introduced me to coastal soaring at a site near Santa Cruz, California. We stood on a cliff overlooking a stretch of sea whose beauty and sound were a treat in themselves. I'd never seen so many types of gliders in one place. I was surprised to see the speeds attained and the aerobatics performed. I could hardly wait to start building and flying the type of gliders needed to meet the challenge of the coastal conditions.

Recently, the spiraling cost of gasoline for the 150 mile round trip to Santa Cruz has forced me to do my flying closer to home again.

My SR-7 and leadsleds won't fly well without that great coastal wind. I've had to find a plane with the same capability as the fast slope ships, that will fly in the lighter lift of the Livermore hills.

It has taken some time and experimenting, but I've finally designed one that makes inland soaring as exciting as the coastal variety.

Some of the special feautures of the Ar-1 are: a sharp entry on the leading edge; landing flaps and a T-tail design. The Ar-1 flys inverted, has a respectable roll rate and does inside

and outside loops close enough in size to make vertical Figure 8's a snap. It has a very gentle stall and the recovery is quite smooth.

If you like speed you've got to have a ship that will penetrate the wind. For a slope ship to do this, one must increase the wing loading. Want to go faster? Add more weight. But heavy airplanes don't fly in light air, so we trade weight for streamlining, hence the sharp leading edge. (Don't be tempted to deviate from the design if you want top performance.) The AR-1

MATERIAL LIST

Balsa:
(4) sheets 1/16" x 4" x 36".
(3) sheets 1/16" x 3" x 36".
(3) sheets 3/16" x 3" x 36".
(1) sheet 1/4" x 3" x 36".
(2) 3/16" x 5/16" x 36".
(2) 1/4" x 3/8" x 36".
(1) 3/16" x 1/2" x 36" — wing shim.
(2) 1¾" x 5/16" x 36" — trailing edge stock balsa.
(1) 1" x 1½" x 12".
(1) 2" x 2" x 24".
(4) 3/8" x 36" — triangular stock balsa.
(1) 1/2" x 3/8" x 36".
(1) 3/8" x 1½" x 6".
Spruce:
(4) 1/8" x 1/4" x 36".
(2) 1/4" x 1/4" x 36".
(1) 3/8" x 3/8" x 2" (can use pine).
(1) 1/4" x 3/8" x 6".
(1) 2" x 2" x 4" (pine or redwood nose block).
Birch Plywood:
(1) 1/16" x 6" x 48" (rib template and fuselage doublers).
(1) 1/8" x 6" x 12".
Miscellaneous:
(1) 1/16" x 12" brass tubing.
(1) 1/8" x 12" brass tubing.
(1) 1/16" x 36" aluminum tubing.
(1) 1/8" x 36" aluminum tubing.
(1) 3/32" x 36" steel wire.
(1) 1/16" x 36" steel wire.
(1) set flex tubing and cable (available from Hobby Lobby International #HLH 805).
(1) antenna tube.
(1) brass threaded coupler.
(6) metal clevises
(1) Kit of Sig 25X foam.
Servo mounting tape, Titebond glue, Hot Stuff, 6 minute epoxy, 30 minute epoxy, MonoKote, 1½" fiberglass tape.

is not recommended as a first airplane, but if you are tired of flying rudder-elevator, and have experience with quick response, high performance floaters, the AR-1 will be a nice change. When you can't fly with seagulls, the AR-1 will keep you up there with the buzzards.

CONSTRUCTION

The construction sequences may seem strange to you, but as you build, the reasons for my method will become clear.

Vertical Fin:

Select the lightest material for the inner core parts.

Cut core parts from soft 1/4" balsa. Cut outer skins from medium-hard 1/16" balsa. The grain of the core pieces should be parallel to the tailpost. The grain of the outer skins will be parallel with the leading edge of the fin. Cut a piece of drive tubing 28" long. Cut a 1/8" x 1/16" shim to center the drive tube in its slot.

Pin a skin over the plans, glue the front core piece in place and add the 1/8" x 1/16" shim. Glue in the aft core piece, drive tube and tail post. Glue on the top skin and the leading edge. After the glue has set, remove from plans and sand to shape. Do not install the trailing edge stock, tail skid or vertical fin cap at this time.

Fuselage: (Part 1)

Cut the sides, bottom and tail-boom top sheeting from 3/16" balsa. Cut out the doublers from 1/16" birch plywood. Glue the doublers to the sides, making sure you end up with a left and right side.

Lay the sides, bottom to bottom, inside up.

Mark the location of formers F-1, F-2 and F-3. Lay the bottom inside up and mark the centerline from the nose to the tail. Cut out formers F-1, F-2 and F-3 and the tongue at F-3 from 1/8" birch plywood and mark the centerline.

Glue the triangular stock to the inside of the sides. Trim the tail section of the triangular stock to clear the elevator tube, antenna tube and tail post.

At the tail post location, temporarily clamp 1/4" scrap spreader between the fuselage sides. Don't glue.

Install F-3 but don't glue. Wrap rubberbands or masking tape around the fusealge at F-3 to hold the sides in place. Epoxy F-2 in place and rubberband it to hold it in place. Set the fuselage assembly over the plans and align the center marks on formers F-2, F-3 and tail. Epoxy F-1 in place and clamp the nose section together. When set, remove the rubberbands and the clamp. (Do not remove the clamp at the tail post.)

Align F-1, F-2, F-3 and tail with the centerline of the bottom sheeting and glue in place. Cut the spreader pieces and install where needed between the sides of the fuselage to match the curve of the bottom. Do not glue the spreaders, as they will be removed. Rubberband or pin the sides and the bottom together.

After the glue has dried, remove the spreaders. Glue the tail-boom top sheeting in place. When set, remove the tail post spreader and sand the fuselage to shape from F-3 to tail. Lay the fuselage on a flat surface and weight it down. Insert the elevator drive tube, antenna tube and tail-fin. Epoxy the fin in place and make sure it's straight.

Remove former F-3, spot glue the antenna tube and elevator tube in place to align with the notches in F-3.

Mix 3/4 ounce Sig 25X foam

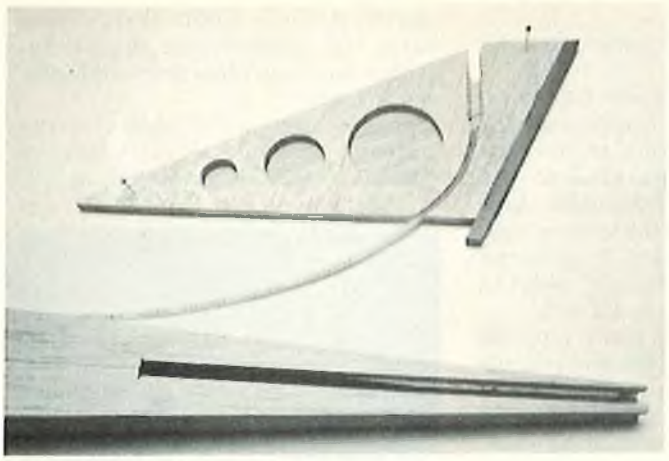
AR-1
Designed By: Jack Caldwell
TYPE AIRCRAFT
Sport Aerobatic
Slope Glider
WINGSPAN
74 Inches
WING CHORD
9" (Avg.)
TOTAL WING AREA
665 Sq. In.
WING LOCATION
Shoulder Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Swept L.E.
DIHEDRAL EACH TIP
1/2" Under W14
O.A. FUSELAGE LENGTH
40¼ Inches
RADIO COMPARTMENT SIZE
(L)7¾" x (W)1½" x (H)1¾"
STABILATOR SPAN
19¼ Inches
STABILATOR CHORD
3½" (Avg.)
STABILATOR AREA
67.4 Sq. In.
STABILATOR AIRFOIL
Symmetrical
STABILATOR LOCATION
T-Tail
VERTICAL FIN HEIGHT
5 Inches
VERTICAL FIN WIDTH
7½" (Avg.)
REC. ENGINE SIZE
NA
FUEL TANK SIZE
NA
LANDING GEAR
NA
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Stabilator, Ail., Dive Brakes
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply & Spruce
Wing ..... Balsa, Ply & Spruce
Empennage ..... Balsa & Spruce
Wt. Ready To Fly ..... 39 Oz.
Wing Loading ..... 8.5 Oz./Sq. Ft.

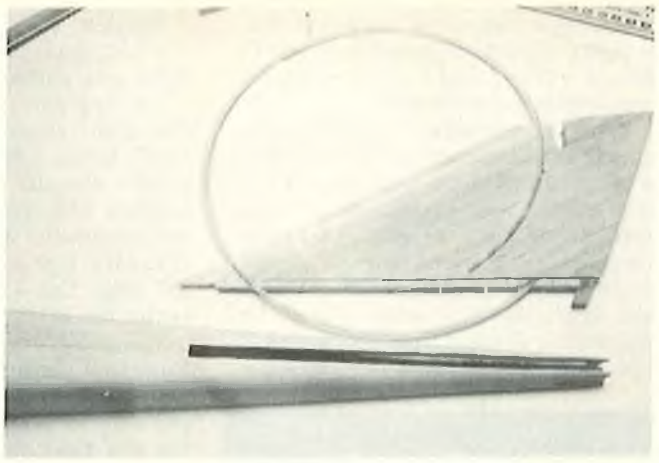
according to the instructions on the can, and pour into tail-boom. When the foam has set, cut excess away to the aft side of former F-3.

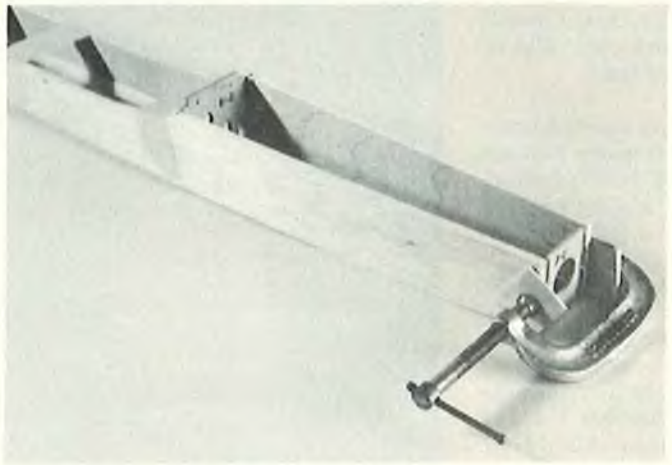
Assemble and epoxy former F-3. When set, epoxy this assembly in place.

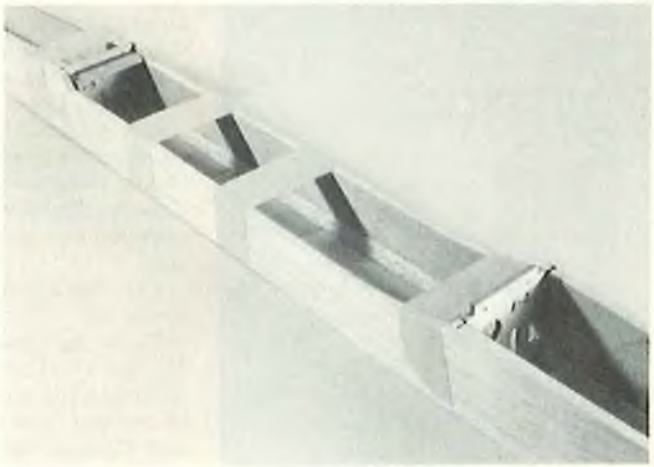
Glue the trailing edge stock to the

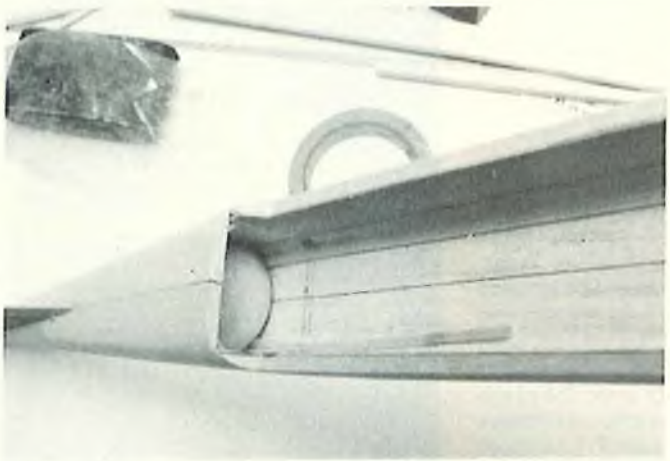
text to page 33



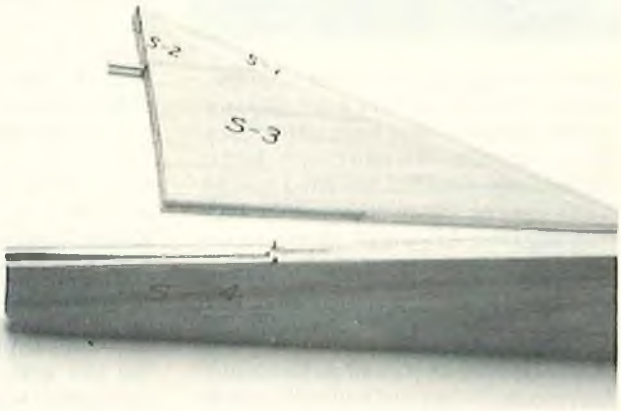


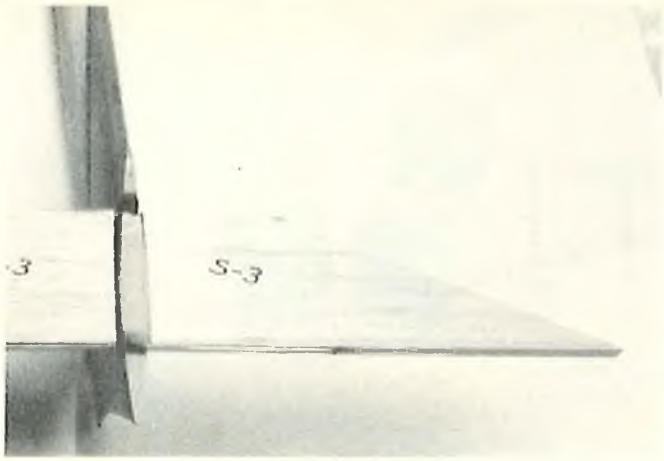


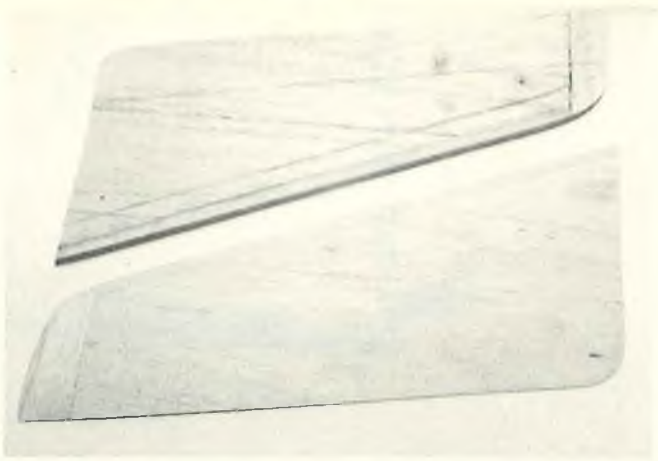


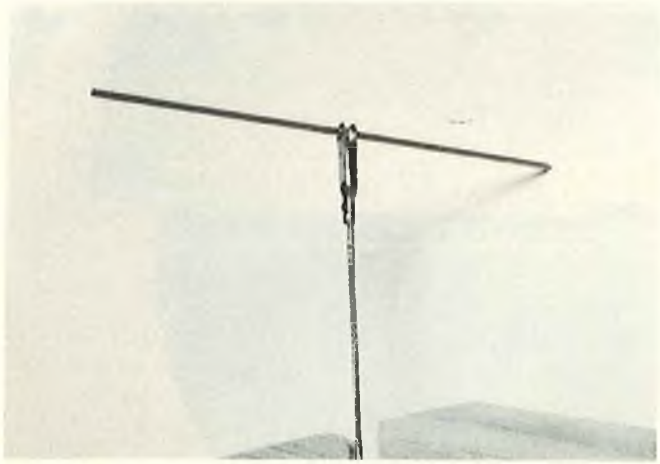


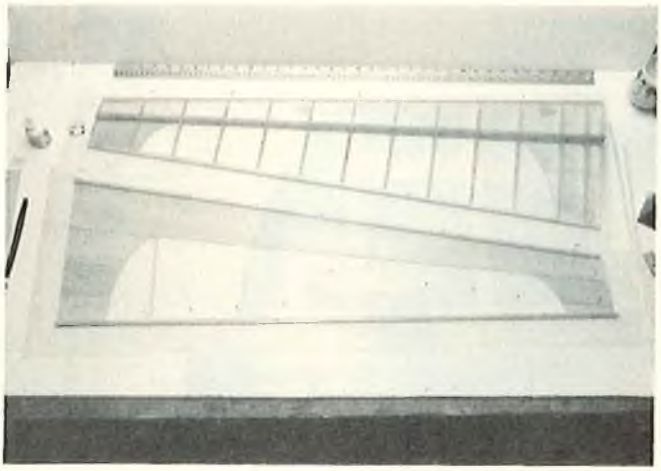
Row 1: (L) The tail fin has a soft core and alternating grain to save weight and increase strength. (R) Tail boom is pre-shaped before fitting tail fin in place. Note extended tail fin core keys into tail boom.
Row 2: (L) Fuselage is conventional balsa/plywood construction. (R) Former 3 is only used as a spacer at this point. Note the tab on F-3 that will anchor the wing hold-down tongue.
Row 3: (L) An essential part of the tail boom strength is due to polyurethane foam. The antenna tube and stabilator drive tube are already in place.
Row 4: (L) Excess foam is trimmed off and F-3 is then installed. (R) Stabilator parts are cut from light but strong balsa.



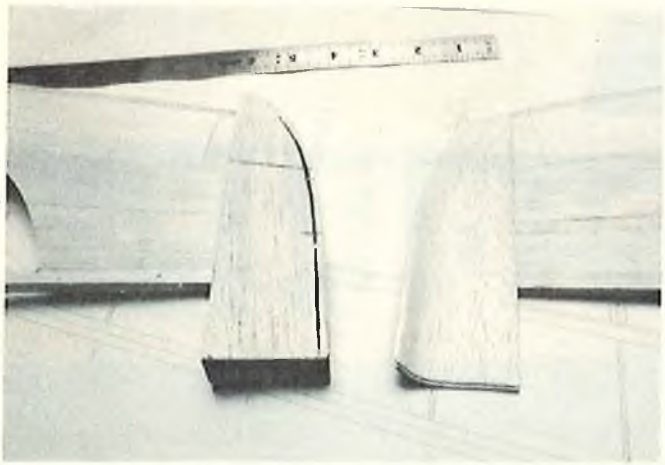


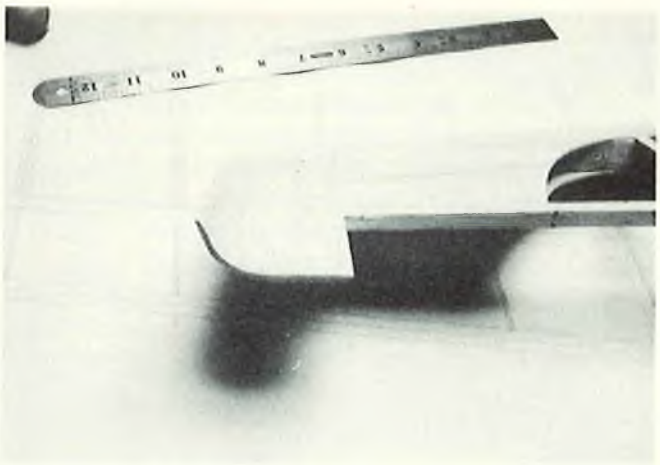


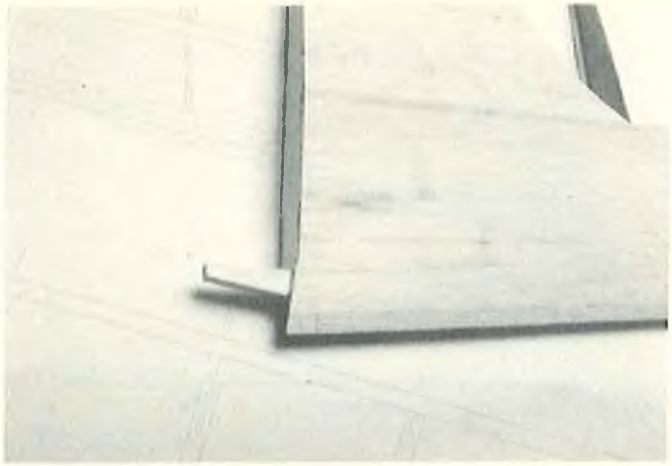


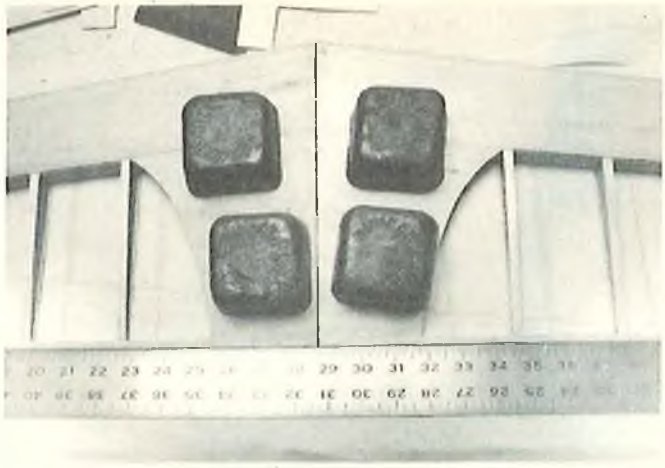


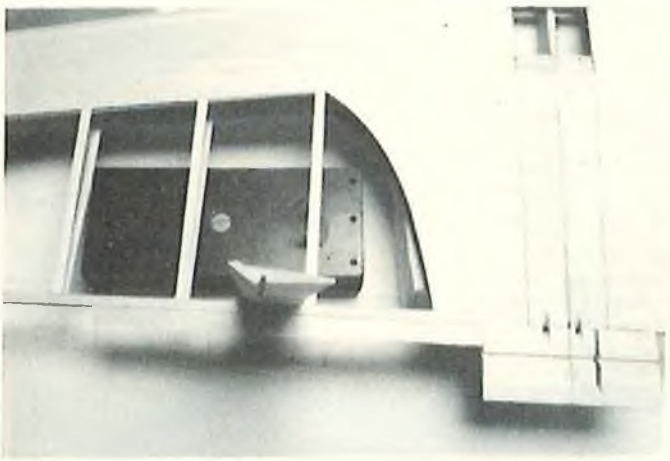
Row 1: (L) Tail fin cap must be left off until stabilator is completed. (R) Stabilator panels before and after shaping. Note sanding lines on unshaped panel.
Row 2: (L) Stabilator drive link. (R) Wing panels being built.
Row 3: (R) Leading edges must be shimmed up.
Row 4: (L) Wing tips are best carved in pairs. (R) Finished wing tip. Note tip sheeting.

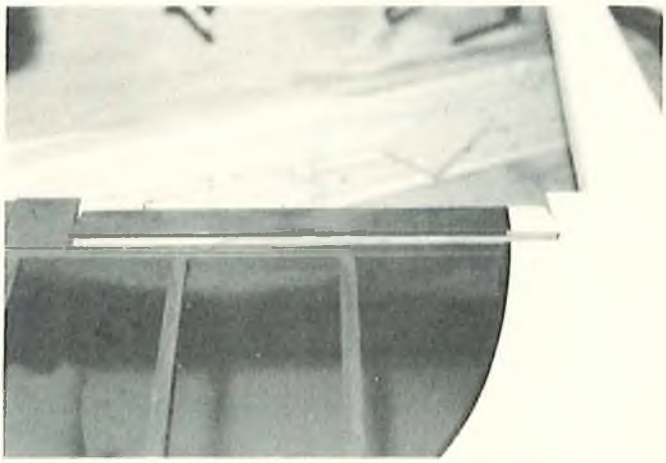


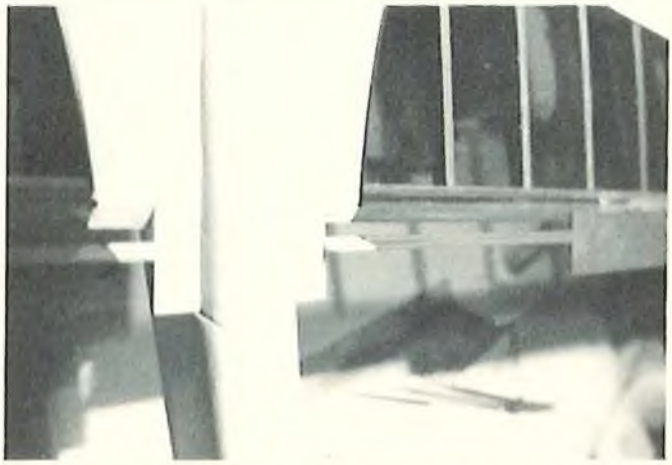


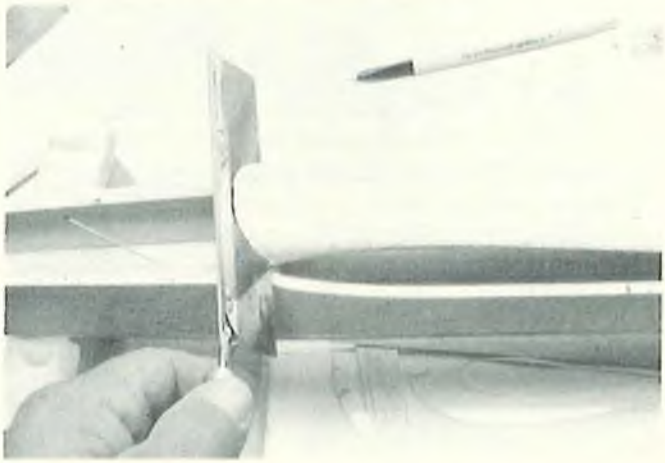




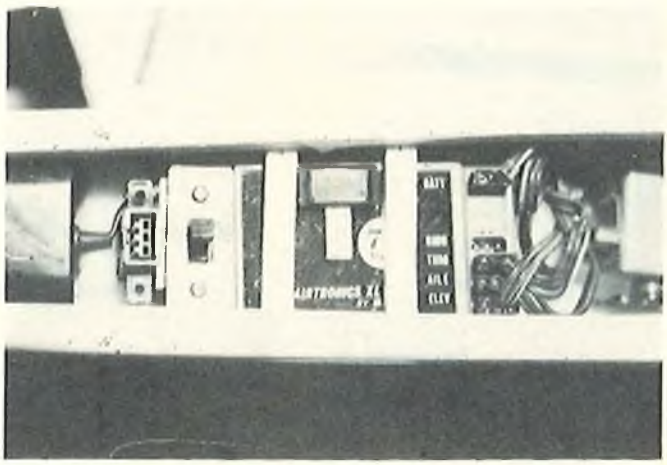








Row 1: (L) Wing hold-down block. (R) Wing trailing edge aligned with straight edge and weighted while epoxy sets.
Row 2: (L) Note end view of dive-brake and filler at trailing edge of wing. (R) Trim setting on dive-brake, don't forget to MonoKote dive-brake and aileron before installing.
Row 3: (L) Dive-brake full open. (R) Turtledeck being constructed.
Row 4: (R) Switch and charging plug attached to receiver with double tape. Balsa strips on top of receiver are not glued in place.



aft part of the tail post. Finish sanding the fin to shape. Glue in the 1/2" triangular balsa filler at F-3.

Glue in the 1/8" x 3/16" cockpit side rails. Using epoxy, install the preshaped redwood noseblock. Sand the remainder of the fuselage to shape, except for the canopy fairing section.

Fit and glue the tail skid in place. Cut the wing turtledeck from a 2" x 2" x 13" balsa block. Cut the canopy and canopy fairing assembly from a 2" x 2" x 11" balsa block. Do not cut the canopy fairing away from the canopy. Tack glue the turtledeck and canopy assembly to the fuselage. Sand to shape. Set the full size W-2 rib template in the wing saddle and scribe both sides of the turtledeck. Set this assembly aside.

Wing:

Cut out all the rib patterns W-1 through W-14 and the full size airfoil of W-2. (If you do not wish to cut up the plans you may want to trace these onto another sheet of paper.) Glue these to 1/16" plywood with draftsman's rubber cement, available at stationery stores. Accurately cut and sand to final shape. Don't skip this step, as you will be making two sets of ribs from these templates. If you should damage a wing section, you can go back to your rib templates for perfect replacement parts.

Get out your favorite flat building board. (I prefer celetex for ease of pinning.) Pin on your plans and cover with waxpaper or plastic wrap to protect them.

Cut the tapered leading edge shims from 3/8" x 1/2" x 36" balsa, tapering from 3/8" to 1/8". If you're careful you can get two shims from this one piece. Using the guide marks to the outside of W-1 and W-14 at the spar line, cut your lower sheeting to fit from these guide marks to the aft side of the sub-leading edge. Use medium hard 1/16" x 4" x 36" balsa.

If you have a table saw you may wish to preshape the balsa sub-leading edge and the spruce leading edge pieces before assembling.

Tape the lower leading edge sheeting to the sub-leading edge, fold open a gap and run in a bead of Titebond. Close this back, wipe off excess glue and pin down until dry.

While this dries, cut the 1/4" wide capstrips from 1/16" scrap. Pin the shim to the plans so that the aft part of the shim extends slightly behind the sub-leading edge sheeting joint. Pull the tape off the sub-leading edge assembly. Pin the assembly on the top of the shim. Bow the assembly to the approximate shape of the ribs. Line up the trailing edge of the sheeting with the trailing edge of the spar line.

Take two pieces of 1/4" x 3/8" x 36" sub-trailing edge material and cut a 3/32" x 1/8" x 14" long notch for the aileron torque link, extending from the W-1 rib out on each piece. Pin the trailing edge in place with previously notched areas top aft. Cut and fit the center section sheeting, tip sheeting and lower capstrips. Pin in place and Hot Stuff all joints.

Now check the ribs, making sure they are 1/16" below the top of the sub-trailing edge, to accommodate the top capstrip and sheeting. Install and glue the lower spar. Install and glue ribs W-1 through W-14. W-1 should be angled 1/32" on both wing panels.

Cut the top spar 1/32" shorter than the lower spar. Install the top spar and vertical shear webbing. When installing the shear webbing, the lower part will sit on top of the lower capstrip. Glue in place with Titebond.

Cut out the upper sheeting. The upper sheeting will extend from the aft part of the top spar to the front of the sub-leading edge. After the shear webbing has thoroughly dried, block sand it flush with the top spar. Shape the top of the sub-leading edge, using a long sanding block to keep it straight.

Install the top leading edge sheeting. This shold be glued with Titebond. Align the back edge of the sheeting with the trailing edge of the top spar. Lay a long piece of wood along the spar to hold the sheeting in place and weight it down. Shape the sheeting tight to the ribs as you are pinning it in place to the sub-leading edge. Do not wet the sheeting, as this will tend to warp the wing.

Install the center sheeting, tip sheeting and top capstrips. When this is dry, lift the wing from the plans and sand the front of the sub-leading edge straight to receive the spruce leading edge. This should be installed with epoxy. If you work fast you can use GMP 6-minute epoxy. If you need more time, use Devcon 30-minute epoxy. Line up the top of the spruce leading edge with the top of the wing. Use short strips of masking tape to hold this assembly until set. Wipe off the excess epoxy.

Install the tip blocks, carve and sand to shape. Lightly sand the sub-trailing edge to the shape of the airfoil. Now shape the leading edge.

Check the fit of the wings at the root section using a 1/2" shim under each wing tip at W-14. If the two W-1 ribs do not fit snugly, adjust by sanding until they do.

Cut out the forward wing mounting block. Cut away the front of the center ribs to accommodate the wing mounting block. Fit and epoxy in place to one wing.

Lay your wings on a flat surface with waxpaper under the wing center section and epoxy together with 1/2" shims in place to keep the top of the wing flat. Be sure the trailing edge of both wings are straight. Weight this assembly down until epoxy has set.

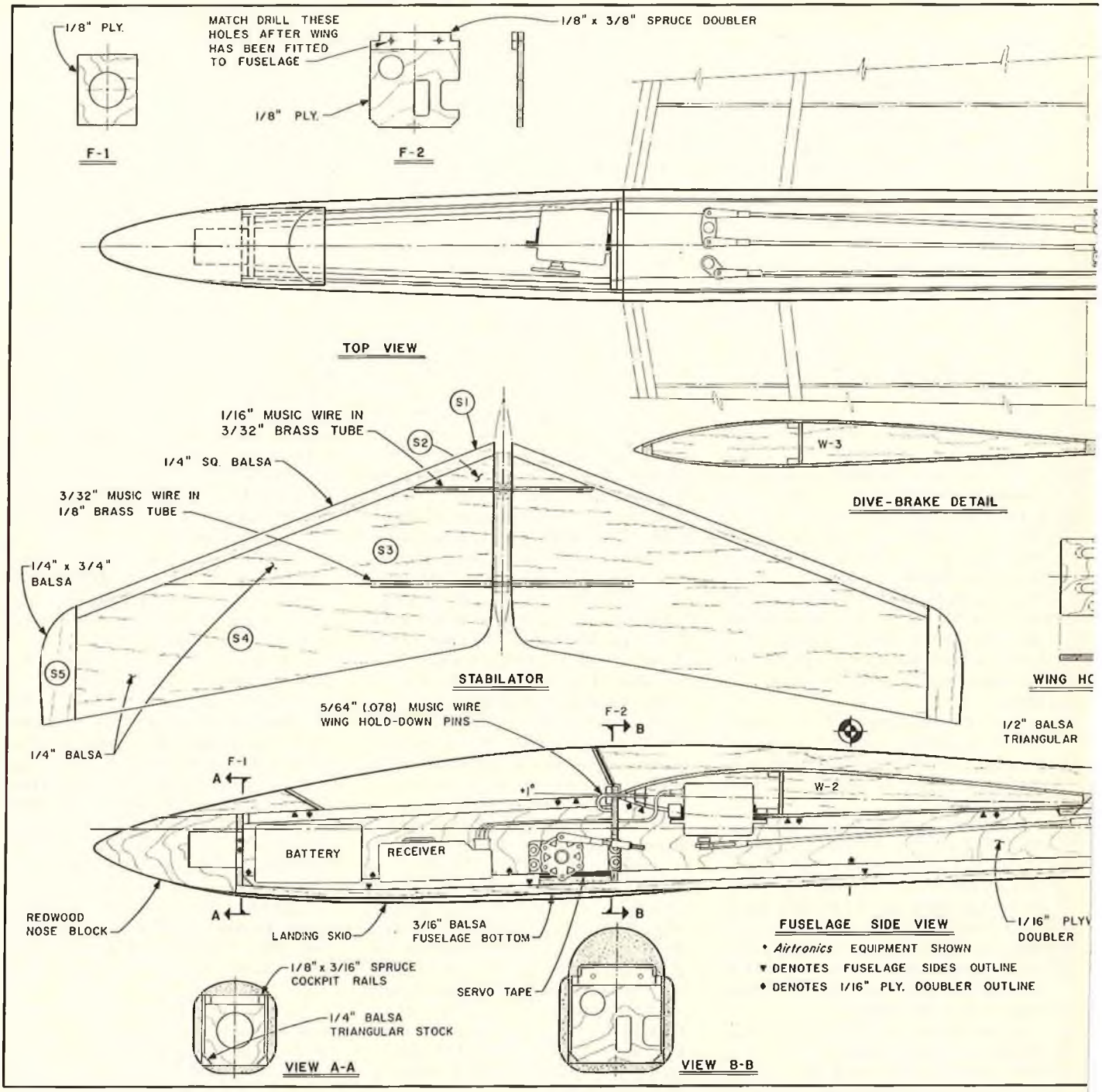
Remove the wings from the building board and cut out the lower sheeting forward of the wing spar to accommodate the aileron and dive-brake servos. Install the servo mounting rails. Take the 1¾" x 5/16" x 36" trailing edge pieces and lay them in place on the plans. Mark them W-1 left and W-1 right. Measure out 14" on each side from W-1. Cut a 1/8" x 1/16" groove for the aileron torque rods on the top leading edge.

From the tip end of each, cut off 23¾" to be used for the ailerons. Taper the leading edge of the ailerons ten degrees and set aside. With the remainder of the material, cut a 1/8" x 1/8" groove on the bottom side, 1" from the trailing edge. Out of this material we want two 9" pieces for the dive-brakes, two 1¼" outboard filler pieces and two 2" center filler pieces for the center section. Glue the two 2" center pieces together. Cut a recess to receive the dive-brake control horn. Glue this piece to the trailing edge of the wing. Make sure that the bottom of the wing and the bottom of the trailing edge center section are flat.

Cut the two holes to receive the aileron torque rods. Make up the right and left torque rod assemblies. **Note:** the left aileron torque rod is longer than the right side. Make up the dive-brake torque rod assembly and set aside. The aileron torque rod tubing is 1/8" O.D. aluminum. The torque rods are 3/32" O.D. steel wire. The dive-brake tubing is 3/32" O.D. aluminum. The torque rod is 1/16" O.D. steel wire. The dive-brake bellcrank was made from 1/16" printed circuit board material, copper both sides. This solders nicely to steel wire when you use a good soldering flux.

Prepare the ailerons by cutting out a notch on top to receive the aileron torque rod, keeping it flush with the top of the aileron. Fit and install the hinges, but do not glue at this time.

Split the two dive-brakes per the plans. Glue the front section from the dive-brake to the trailing edge of the wing. Glue in the 1¼" filler pieces, keeping them flat with the bottom of the wing. Lay your aileron torque rod assembly in the locations provided at the trailing edge of the wing. Make sure the tubing is flush with the top of the wing. Hot Stuff the tubing in place. Do not apply Hot Stuff within 2" of the ends of the tubing. This will prevent gluing the aileron wires to the tubing. Apply a piece of masking tape over the wires where they pass through the wing. This tape should be sealed tight to the wood so it just barely covers the aileron tubing. Sand



the leading edge center section of the wing to fit the fuselage saddle, leaving 1/16" clearance at F-2.

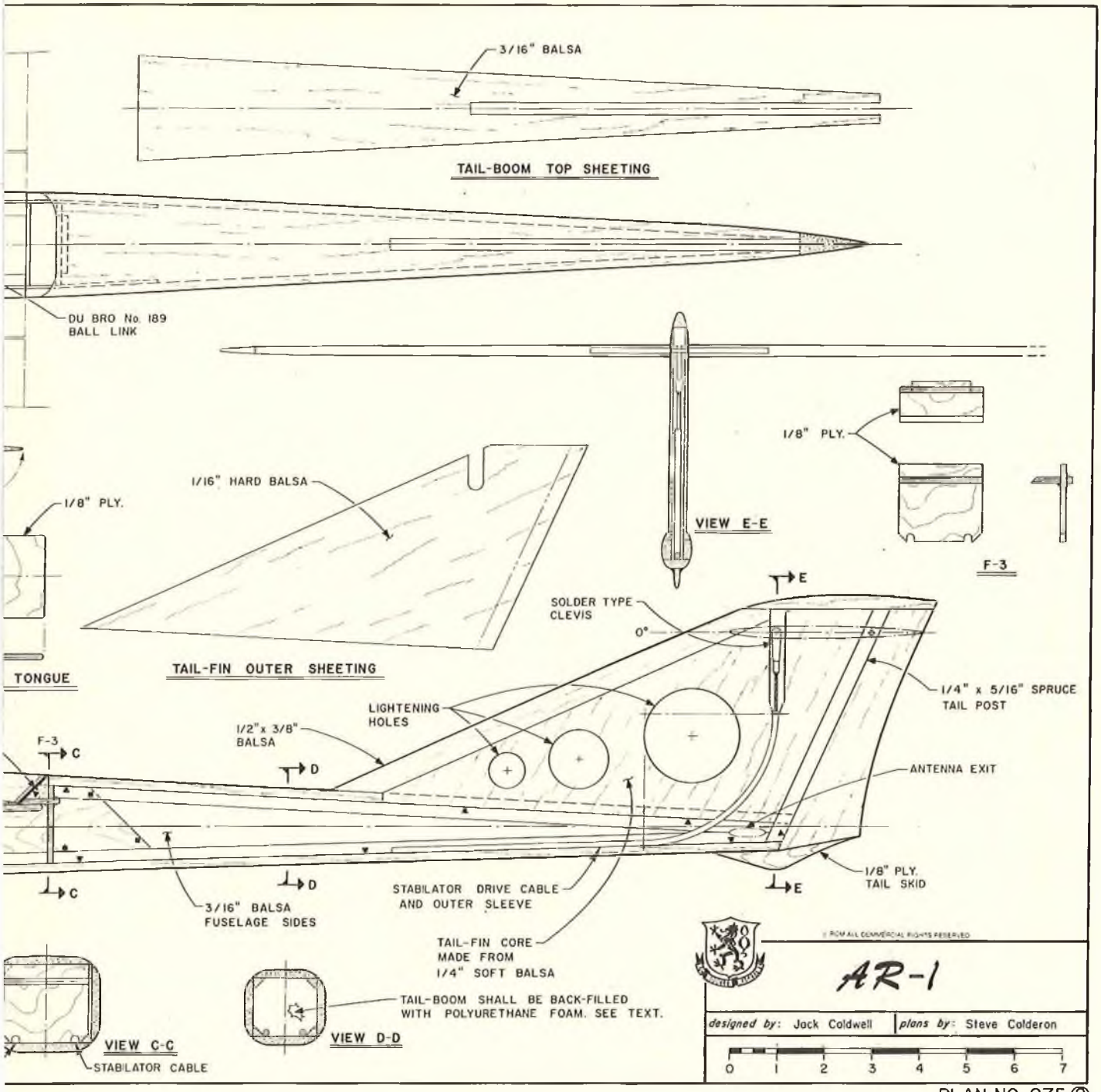
Apply fiberglass tape from the trailing edge, wrap around the leading edge, back to the servo opening in the bottom of the wing. I suggest Devcon 30-minute epoxy for this. You can cut the epoxy with lacquer thinner to make brushing easier. Turn the wing over and apply another strip of tape from the servo holes to the front edge of the aileron torque rods. Be careful not to get epoxy on the aileron linkage.

Make the aft wing mounting tongue, cut holes to receive the aileron linkage, recess for dive-brake pushrod and epoxy in place.

Remove the turtledeck and cut away the airfoil section from the lower part and fit to the top of the wing so the turtledeck aligns with the canopy and fuselage. Cut the canopy away from the canopy fairing. Cut the front and back turtledeck formers from 1/16" plywood and glue in place. Cut the rear canopy former from 1/16" plywood and glue in place. Set the wing in the fuselage and measure from the back of the tail skid to each wing tip. The distances should be equal. Drill two holes through F-2 into the leading edge of the wing for 1/16" mounting wires. Pin the canopy in place. Protect the canopy and aft part of the fuselage with plastic wrap so you don't glue the whole thing together.

Epoxy the turtledeck onto the wing. Be sure to align it with the aft part of the fuselage and canopy. Align and epoxy the canopy fairing in place. Finish sanding the front of the fuselage.

Temporarily drop in the dive-brakes and the wire assembly. Fit the dive-brakes to the trailing edge of wing, leaving adequate space for



PLAN NO. 875 ②

MonoKote. When you are satisfied with the fit, Hot Stuff the aluminum tubing into the dive-brake slots. Drill two 1/16" holes 2" on either side of the center of the aluminum tubing. MonoKote the wing and dive-brakes, except for the bottom of the filler pieces and the bottom of the center section.

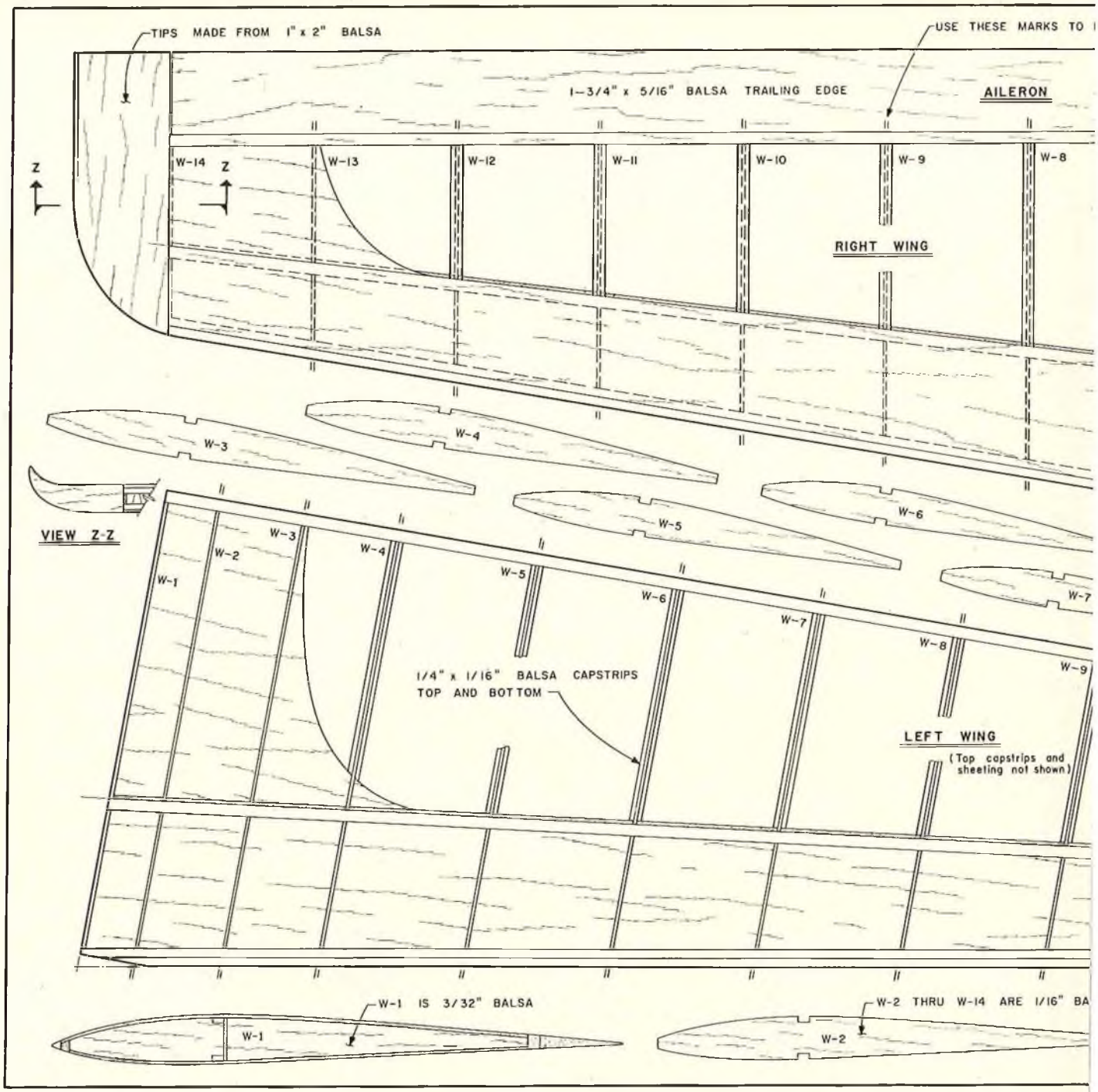
Set the dive-brake assembly in place. Install the dive-brake servo. make up one end of the 1/16" linkage wire with a clevis and solder. This clevis will be used at the dive-brake control horn. Hook up the dive-brake servo to the throttle on the receiver.

Turn on the radio and set the throttle and trim to the top of the receiver. Turn off the radio. Make sure the dive-brakes are fully closed and the control horn is in the rear position. Install the threaded coupling and clevis to the servo. Cut the 1/16" linkage wire to the proper length and solder. Turn on the radio and cycle the dive-brakes to make sure everything works right. Full down trim and throttle should set the dive-brakes at a 90 degree angle to the trailing edge. Hot Stuff the tubing to the filler pieces and the center section. Be careful not to glue everything together. Close the dive-brakes and apply Hot Stuff through the 1/16" holes previously drilled in the dive-brakes. Install the ailerons and Hot Stuff the hinges and aileron torque rods. Install the aileron servo and adjust the linkage. Set the ailerons for 3/16" up and 3/16" down for the first flight.

Fuselage: (Part 2)

Drill a 3/32" hole in the fin for the stabilator pivot wire.

Install the stabilator servo platform. Install the stabilator servo using servo mounting tape at the angle shown in the top view on the plans.



Make the stabilator actuator assembly from 1/16" steel wire and a clevis. Remove the pin from the clevis by grinding off the head of the pin and punching the pin out. Center the steel wire through the clevis and solder. Cut an adequate length of steel cable and solder to the actuator assembly. Slide through the tubing and align with pivot wire. Center the stabilator servo and the actuator assembly. Install the clevis and brass coupling to the servo. Cut the elevator control tubing 5/8" from the coupling. Align and glue the tubing to the side of the fuselage. Cut the cable to the proper length and solder to the coupling.

Stabilator:

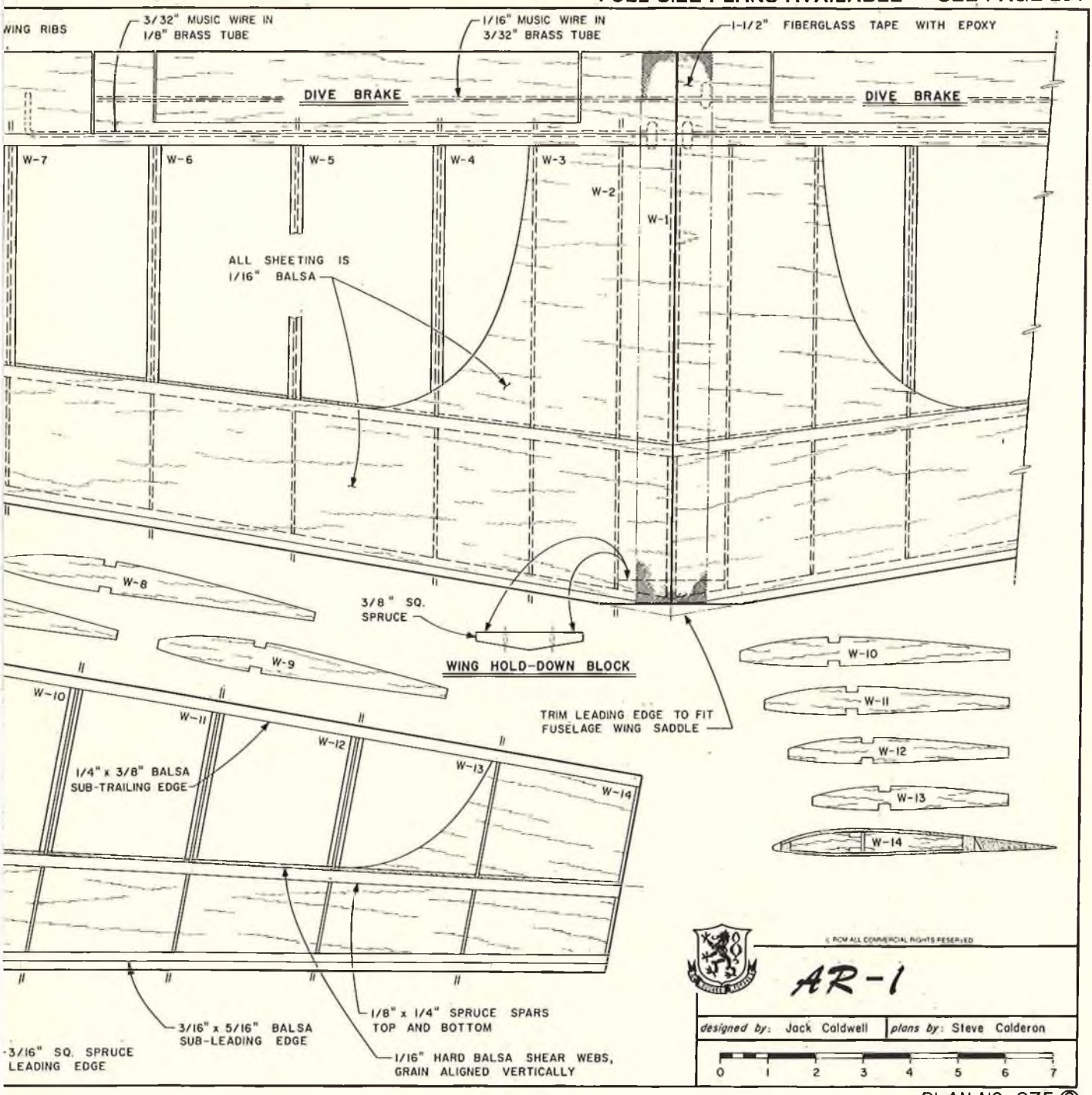
Cut parts S-2, S-3 and S-4 from the lightest balsa. Cut parts S-1 and S-5 from medium hard balsa. Groove S-2, S-3 and S-4 per the plans. Make sure the grooves are a little on the loose side, to allow for adjustment when fitting to the stabilator wires. Cut two pieces of 1/16" brass tubing and two pieces of 1/8" brass tubing and slide the tubing onto the elevator pivot and the actuator wires. Rubberband both S-3 pieces in place and block both sides of S-3 to level. Hot Stuff tubing to S-3, being careful not to glue the tubing to the wires. Add a drop of Hot Stuff to the pivot wire at the tail post. Be careful not to glue the stabilators to the pivot wire. Remove and lay both S-3's on a flat surface over a piece of plastic. Hot Stuff S-1 and S-5 in place. Sand to shape and MonoKote.

Hot Stuff 1/4" x 3/8" balsa block to the top of the fin and finish sanding. MonoKote your AR-1.

Install the canopy latch. Slip the radio antenna through the antenna tube. If you have any excess antenna, route it up the back of the fin and tape it in place.

Install your radio and balance your

FULL SIZE PLANS AVAILABLE — SEE PAGE 204



PLAN NO. 875 ②

new bird.

Balancing the AR-1:

The balance point for the initial set-up should be at 6⅞" from the trailng edge of the wing. Balanced at this point, my bird weighed 39 ounces. This gave me a wing loading of 8½ ounces per square foot.

First Flight:

Now off to your favorite hill. Try to select a day when the wind is 10-12 mph. Range check your radio. Set the trim on the stabilator and ailerons at center with dive-brakes fully closed. If you have never flown an aileron ship of this type, before you toss your AR-1 off, I should give you a few pointers on how it flies. Due to the flat wing style, the AR-1 must be flown into and out of the turns. Whatever attitude you put the AR-1 into, it tends to stay in until you give it opposite control to return to level flight. It is not like a plane with dihedral, which will tend to return to level flight.

Now is the moment of truth. Give the AR-1 a brisk toss straight out, directly into the wind and be ready to apply a little down, if needed. Go for a bit of altitude and set your trim for level flight. As you make your turn, the nose will drop a bit, but as you level off again, she will pick up a bit of speed and the nose should come back up.

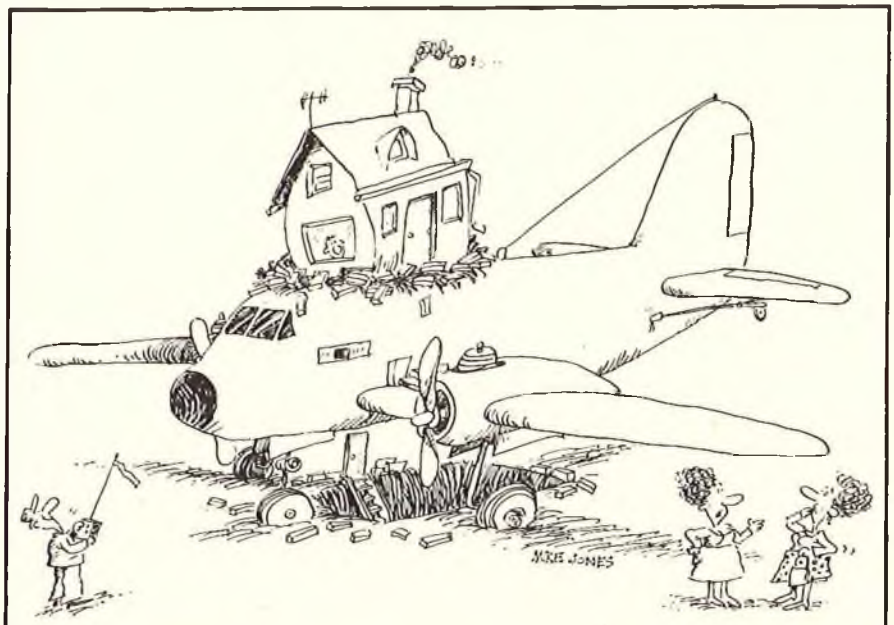
If you are not used to flying this type of glider, remember you must keep the speed up for it to perform well.

To land the AR-1, drop the trim on the dive-brakes. Start your downwind leg, make your final turn, set up into the wind and apply full dive-brakes. Apply a little down elevator and set her down. After a little practice at setting your elevator trim, the AR-1 will just about land itself. I hope you will enjoy flying the AR-1 as much as I do. □

BIG IS BEAUTIFUL

Dick Phillips

Some miscellany this month, several subjects and some interesting items. I had a letter from Dan Santich not too long ago in which Dan included a couple of pictures of his P26A, one of which appears with this column. It is all but impossible in black and white to do justice to the paint scheme Dan has done with his bird. The main fuselage color is a medium blue, the stripe on the fuselage is red outlined in white, tail is white with red striping and a vertical blue bar on the leading edge of the rudder. Fuselage colors carry on over the speed ring. The wing is yellow (at least on top) and striped with red near the inboard root. The headrest is white with red accent marking. I'm not all that familiar with the P26 and its various color schemes and don't know what this one represents, but, despite what it sounds like in description, it is one pretty bird and attests to the imagination used in painting the original aircraft. Seems a far cry from some of the WW II camouflage jobs though, doesn't it? In any case, the model is a superb example of the model makers art and I'm sure Dan will do extremely well with it.



"I don't mind him building 1/2A or 1/4 Scale models in the basement — but this is definitely the last giant scale plane he builds!"

Several new products crossed my workbench recently and they look like real winners. Tom Runge, of Ace R/C, Inc., sent along some new items from Ace. First among them is what Ace calls a 2 x 5 Redundant Power Source. Basically, it's a small electronic package which is available in either assembled or kit form and it is probably the best insurance you can have for a large or a scale model, or, for that matter, for whatever you are flying.

Almost one-third of the radio failures we experience are caused by some fault in the battery. This figure excludes wiring and switch failures so you can see there is a correctable fault area here that would certainly significantly miminize radio failures.

The redundant battery system uses two identical batteries to supply the voltage required by the receiver. These batteries feed through the source and, should either fail, that battery is removed from the system and the receiver continues to operate from the remaining battery. Two LED's on the face of the heart of the system keep you informed of the status of the batteries. One of the battery LED's goes out during a flight and that battery has a problem and the system has electronically removed it from the circuit and it's time for you to find out why. Both LED's still lighted and you are okay to continue flying. Note: this does not indicate that the battery is fully charged, just that it is still operating properly.

The two battery packs used with the system require one cell more than a standard pack. This 20% increase is required in order to provide the power consumed by the system itself and it offers an additional benefit; servos receive the same 20% boost in power and respond better to signals received.

A longer charge time is required, of course, in order to properly and fully charge the batteries and your TX charger is used in that the new RX system you will be using is basically similar to the batteries in your TX.

Older, four wire, center tap systems cannot be used with the 2 x 5 Redundant Power Source and your servos should be kept in good operating condition (i.e., clean pots, etc.).

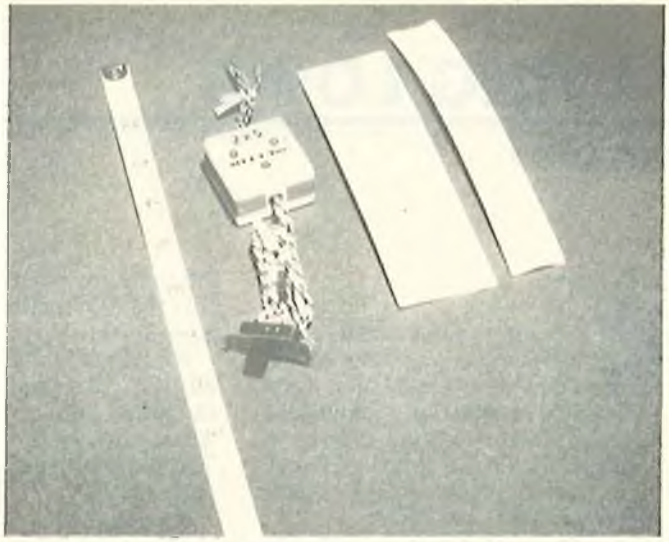
As mentioned above, the system is available assembled or in kit form and was covered very thoroughly by its developer, George Steiner in a construction article in the March 1982 RCM, for those of you who wish to investigate further.

The ability to eliminate the almost one-third of radio problems associated with your batteries is a very significant advantage and one which should be part of every large model and certainly every scale model. I shouldn't say "eliminate" the problem as batteries can still fail, it's just that, with the 2 x 5, if a battery fails, it's eliminated from the system and flight continues on the second battery. You still have to determine the cause of the failure and correct it. I would think it's a lot more acceptable to do this by removing the offending pack from the model and doing the job than it would be to dig the pack out of the remains of that beautiful scale model in order to determine the cause of the failure!

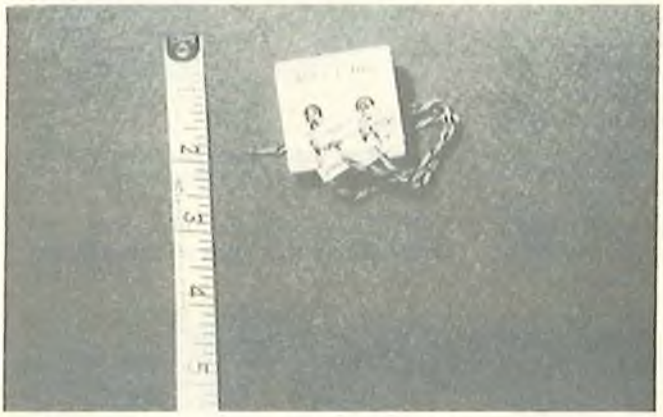
Another addition to the Ace line is a Christy Mixer which permits the mixing of two controls (such as aileron and rudder, or throttle and tail rotor in a helicopter). Just the thing to give you the features of the newer, fancier radios on that old box you've been flying for years and just can't bear to part with.

Personally, I feel if you are going to fly at all, you should be able to coordinate aileron and rudder "by hand" rather than with electronics, but that's a personal choice and one I wouldn't fault in someone else. I can

P-26A by Dan Santich, well-known scale modeler. Dan's color scheme is detailed in text.

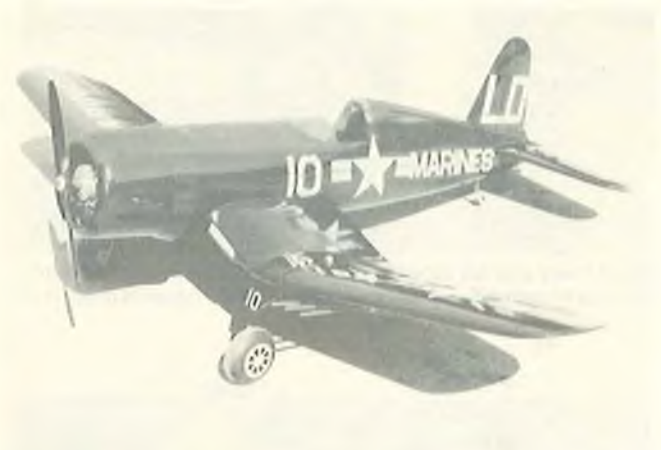


Ace R/C's 2 x 5 Redundant Battery System. Excellent protection against battery failures and available assembled or in kit form.

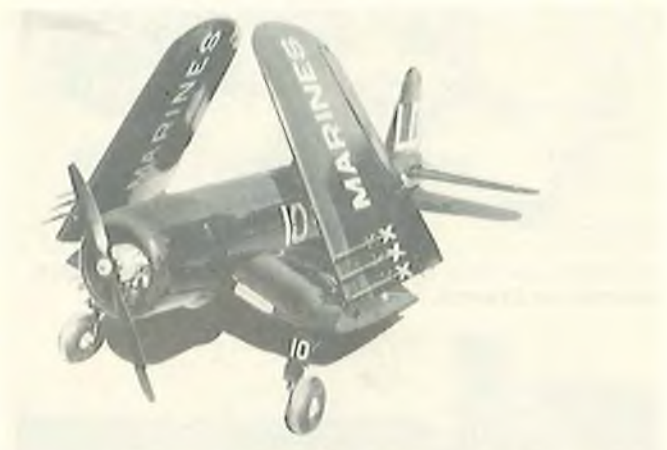


Ace Christy Mixer. Designed to mix two servo inputs as in rudder/aileron or throttle/tail rotor.

Ace R/C's new Noise Trap. Kit makes up into 6' servo lead which eliminates radio interference from long leads.



Ziroli Corsair by Maurice McCall and Bob Spink of St. Albert, Alberta. F4-U flew first 50cc Quadra to take the air in North America.



Folding wings on McCall/Spink Corsair make for ease of transport and storage.

certainly see the need for it in the helicopter example quoted above. To me, flying helicopters is a bit like balancing a dinner plate on top of a billard cue while going down the rapids in a canoe, and any help available should be used! The mixer really comes into its own when operating ruddervator on a V tail or flaperons or such double duty control from a conventional radio. The Ace addition to the market is a nice compact little box with minimal weight penalty and is available in a bi-directional model or as a uni-directional unit.

The third little goodie from Ace is their Noise Trap. Many of you will be familiar with the problems encountered with some radios when long servo leads are used and the servos go wild when a stray signal is generated. This can be somewhat disconcerting to say the least, and a means of eliminating its occurrence must be a good thing. As Ace says, you could use chokes --- but at what value, in what part of the lead should you put it, and other imponderable questions.

to page 138

FLYING LOWE

Don Lowe

Zimbabwe:

Continuing the account of our adventures in Africa, made possible by invitations from the National Association of Zimbabwe Aeromodellers (Dennis Hunt, in particular) and the South African Association of Radio Flyers, represented by Gerry Levy.

Following the ten days in South Africa, Clara and I journeyed with Dennis Hunt by V.W. van north from Johannesburg to Salisbury, Zimbabwe, a distance of some 800 miles. We stopped at Pretoria, S.A. enroute to see the Voortrekker Monument, dedicated to the memory of the 1834-1837 Great Trek north by the Boers to escape the English Government's control over their lives.

The South African Legislative branch of their government is located in Pretoria. The buildings and grounds are beautiful. We are told that the Administrative branch of the government is located in Cape Town.

We stopped for the night at a motel built in the rondavel plan with a thatched roof (modeled after an African hut with a circular floor plan). The interior was much the same as our early motels.

By noon the following day we were at Beitbridge, the Zimbabweian border check point. We spent an hour going through customs and then journeyed on to the Zimbabweian Ruins. This is a fascinating place to visit. The walls are built up of flat stones laid without mortar centuries ago. The historical record of these ancient structures is hazy and it intrigues the imagination about the people who long ago built such magnificent walls. If you are fortunate enough to visit Zimbabwe, you must take time to see these ruins.

Anne and Roger Stern, and Barry Hunt (kneeling). Anne flips "Capricorn."

Salisbury was our next stop and there we spent a week with the Hunts

to page 128

Four P-8's and their owners. (L to R): Roger Stein, Chris Halgreen, Ian Edwards, and author.

Nigel Kinsey and his modified EU-1 scaled from magazine data! Features homemade pipe and spinner — a very capable modeler!

Author put on a flight demo with Phoenix and talked to the crowd through a mike — effective!

Roy Green and Cris Halgreen prepare to fly 1/6 Scale Citabria. Note size of crowd at Salisbury Air Show.

Barry York intercepts witch at end of her ride. Barry is Z Air Force maintenance chief.

The iron flies — clown chases.

Dennis Hunt (right) and "Zeb" — caretaker.

Scene at Hunt's model factory.

For this you use a telephoto!

Friendly guy!

Clara (Lowe) and Dennis Hunt, our host at Z ruins.

Air show signs invaded the whole house of Ann and Roger Stern.

RCM PRODUCT REVIEW

Balsa U.S.A. FLY BABY BIPE

SPECIFICATIONS

Name	Fly Baby Biplane
Aircraft Type	Stand-Off 1/3 Scale
Manufactured By	Balsa U.S.A. P.O. Box 164 Marinette, Wisconsin 54143
Mfg. Suggested Retail Price	$105.99
Available From	Direct from Mfg.
Wingspan	88 Inches
Wing Chord	14 Inches
Total Wing Area	2,464 Square Inches
Fuselage Length	75 Inches
Stabilizer Span	37 Inches
Total Stab Area	Approx. 407 Square Inches
Mfg. Rec. Engine Range	Quadra or similar
Recommended Fuel Tank Size	16 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa, Plywood
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (12 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba 6 Channel
Engine Make & Displacement	Quadra 2.2 cu. in.
Tank Size Used	16 Oz.
Weight, Ready to Fly	307 Oz. (19 lbs., 3 oz.)
Wing Loading	17.9 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Well thought out design. Parts quality and complete hardware. Detailed instructions. Looks and performance of the finished model.

WE DIDN'T LIKE THE:

Landing gear, but it is scale. Cabane strut mounting method.

The original Fly Baby was a long wing monoplane and the Pete Bowers creation won the 1962 Experimental Aircraft Association design contest for low cost home-built aircraft. A few years later he decided to add a second wing to the original fuselage and make it a biplane. The wings were shortened and swept back to keep the C.G. in place and to let the pilot get in and out; the result was a rakish little bird that was fun to fly. The R/C kit by Balsa U.S.A., P.O. Box 164, Marinette, Wisconsin 54143, is a 1/3 Scale version of the biplane and does an excellent job of capturing the Fly Baby. Technically, Balsa U.S.A. calls the kit Stand-Off Scale but the rib spacing and outline are scale. You don't have to stand very far off.

When the kit box weighs almost 16 pounds and measures 13" x 6½" x 42", you start to get some idea of the size of the model. No pictures are on the plain brown box, so the only way you'll know what you have is to open the kit. We did and have one warning, don't unpack until you are ready to start building, it won't all go back in. Every possible corner is filled with parts, stacks of sheet and die-cut balsa, plywood, and bundles of stick balsa, not to mention several large blocks. The amount of wood is overwhelming but one of the most impressive items is the huge ABS cowl. A very complete hardware package with control horns, steel clevises, rigging cable, and an assortment of other small parts is included. The Fly Baby Bipe is available by direct order only and Balsa U.S.A. has a set of dummy engine cylinders that will add a lot to the scale appearance.

Construction:

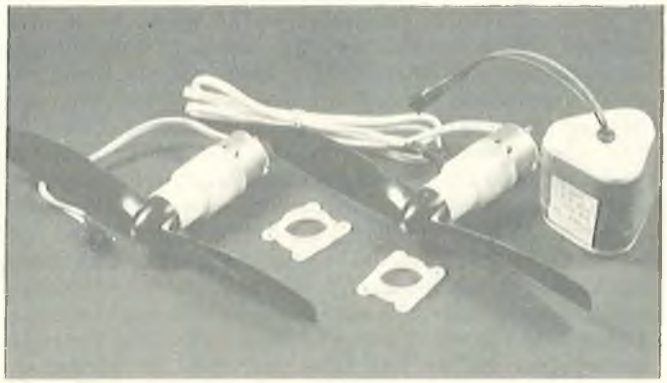
The first step is to clear off a large building area. If you have any doubts, try unrolling one of the huge plan sheets. Both wings, all four panels, are on one 36" x 91" sheet. The fuselage and tail surfaces are shown on a 36" x 79" plan. Everything is full size, so you can build on the plans. A smaller sheet, only 24" x 58", has the "N" struts and several other items. In addition to the details given on the plans, a dozen pages of instructions and pictures cover part identification and building sequences. Pay very close attention to the length and size of wood specified — everything is planned out for efficient use of material.

The fuselage is basic stick construction with a lite ply doubler from the firewall to the trailing edge of the lower wing. The framework is assembled on the plan sheet and then the second side is built on top of the first, so that both sides are identical. When the doubler is added, remember to make one left and one right side. We made one minor change while building the sides. The plans call for the upper longeron to be 1/4" x 3/8" balsa; we substituted spruce of the same dimension. The spruce adds rigidity with very little weight penalty. Devcon 5-Minute Epoxy was used for all the fuselage joints and all joints are

to page 123

RCM PRODUCT REVIEW

Peck-Polymers PONY BLIMP



SPECIFICATIONS

Name	PONY BLIMP
Aircraft Type	R/C Dirigible
Manufactured By	Peck-Polymers P.O. Box 2498 La Mesa, California 92041
Mfg. Suggested Retail Price	$249.00
Available From	Both Mfg. & Retail
Length:	11 Feet
Diameter:	4 Feet
Volume:	80 Cubic Feet
Useful Lift:	28 ounces
Recommended No. of Channels	3
Rec. Control Functions	Rud., Elev., Forward, Off, Reverse — 4 ch. for all of above, plus: Control for water ballast and helium release.
Basic Materials Used In Construction:	
Blimp Envelope	Fire & Ultra Violet Treated Gray vinyl.
Gondola	Balsa, Ply Steel, Nylon Plastic
Tail Assembly	Balsa, Ply, Super MonoKote.
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (12 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	RS Systems, 7 ch.
Motor	(2) VL Hylork .02
Battery	(1) 1,000 mAh, G.E. Nicad.

SUMMARY

WE LIKED THE:
Completeness of hardware, the quality of all components.
WE DIDN'T LIKE THE:
Storage problems when blimp is filled — if deflated, no problem.

What floats like a butterfly, doesn't sting like a bee, and certainly doesn't look anything at all like a pony? Why, it's the Pony-Blimp, that's what, and we have to say right off the bat that this 11' long lighter than aircraft is not your run of the mill R/C model, either. Bob Peck of Peck Polymers, P.O. Box 2498, La Mesa, California 92041, is the designer and Pony-Blimp is the result of three years of experimentation with radio controlled blimps. It's also the winner of "The Creative Excellence Award," by the Hobby Industry of America as stated in the literature that accompanied it. So, if you are tired of running your R/C car in circles, or getting your feet wet while retrieving your R/C boat, or just plain hate crashing your R/C glider or plane, then maybe, just maybe, a blimp might be in your future. Read on, brother.

It's always fun to open up a new kit, but sometimes happiness turns to sorrow upon closer examination. Such, however, was not the case here. Contents were impressively packaged, and only a glance was necessary to see that the kit was, indeed, one of quality. Contest grade balsa and plywood parts were printed or die-cut for easy construction (more on this later). Some of the items that were packed in clear plastic bags were: wood blocks, gondola/fin assembly, ballast tank, helium release valve assembly, electronic switch assembly, and the blimp envelope. Also packaged in plastic bags were: plastic control hinges and links, swivels, wood screws, 2-56 machine screws with washers and nuts, landing skid, servo tape, windshield, and pilot.

Construction:

Plans and instructions are some of the best we've seen, and can easily be followed by the novice builder. Aside from

seven (yes, seven) sheets of plans, are two instruction manuals. The construction manual is 10 pages of clear, concise, well-written building instructions. Between the plans and the manual, there should be no problems in the building process that can't be solved by one or the other — or both. We mentioned two manuals . . . the other one is a 9 page operational booklet, and we'll get into that in a little while. At any rate, the plans and manual are complete, detailed, easily understood, and rate a big fat "A" on the

report card.

Die-cut balsa was noted to be above average, and ply die-cutting was satisfactory with some clean-up required before final assembly. Non die-cut balsa parts were printed on the sheets and, of course, had to be cut out by knife. Vacuum formed plastic parts were noted to be very satisfactory, quality-wise.

Construction was pretty straightforward and required minimum skill. Wire hook-ups require the builder to follow a very basic schematic, and do a small amount of simple soldering. A very basic knowledge in this area would be helpful, but is not really a necessity.

The helium release valve and the ballast tank assembly are of vacuum formed plastic and go together easily.

Top Flite Super MonoKote was used on the gondola and fin assemblies, and no special techniques were required, and no problems encountered. The gondola was finished in white, and the fins in white and yellow.

The Pony-Blimp envelope was already fabricated, of course, and comes in two colors, orange and blimp gray — the orange is $20.00 extra and also 2' longer. It can be ordered with or without the 6" high silk screened "Pony-Blimp" letters on the sides. The envelope material is fire and ultraviolet treated vinyl, and is 11' long, and 4' in diameter. A patch kit containing glue and patch material was included.

Power:

The Pony-Blimp was designed to fly indoors using two VL Hytork electric motors. These are the VL Hytork 48-Std., which includes 4/1 reduction gears and props, or use Astro Flights 02 electric motors.

Radio:

An RS Systems 7 channel was used, although a 3 channel radio is all that is required for basic controls of turn, elevation, forward, reverse, and off. A 4 channel is suggested if you wish to also control water ballast and helium release (all parts for the ballast and helium control are included in the kit). We found sufficient room for the smaller "bantam," "midget," or "micro" servos, with servos of the standard or larger size requiring a bit more planning.

Flying:

Even though the Pony-Blimp was designed with indoor flight in mind, we decided to try it outdoors with the idea that most modelers would not have access to large indoor sites. Mentioned earlier was the flight manual . . . (or operation booklet might be a better term here). This 9 page booklet is, like the plans and construction manual, first rate and will give the novice blimp pilot all the instructions necessary to conduct a successful flight.

We limited our flight times to under 10 minutes even though the 1000 mAh nicad would have allowed a full 15 minutes before requiring a session with our rapid charger.

General control of the blimp was very good, but takes just a little getting used to. The difference between aircraft control lag and blimp control lag is pronounced, and the good words here are **plan ahead!** As temperatures rise, the helium lifts more . . . and more, and tends to make flight even more interesting. Use of the helium release valve does, of course, cure most or all of this problem. On the other hand, the ability to use the water ballast for trim can be very effective when more lift is desired.

Conclusion:

The Pony-Blimp was easy to put together and easy to fly. The quality and completeness of the kit is truly outstanding measured on anybody's scale. The plans and instructions have been further updated even though we could honestly see no reason to make them any better — an indication of Peck Polymers' continued drive for excellence. Improved, too, is the material used in the helium release valve, to slow or stop minor leakage noted in an earlier model.

The Pony-Blimp was fun, and as you might suspect, is a

real attention grabber. There are, to our minds, a couple or three points that must be stressed in overall consideration of this rascal. First, where do you store it if you keep it inflated? We have been keeping ours under the roof of a small carport. Second, how do you transport it while it is inflated? Not, we'll guarantee you, in a Honda or Rabbit! (The manufacturer recommends the blimp be stored deflated, which would cause no problems in both storage and transportation.) And, finally, where will you fly it? We tested it outdoors, but kept it tethered at all times in case an early morning breeze came up. Pony-Blimp is definitely best when flown indoors, but where, is the problem. It would be great at an indoor stadium, and perhaps even a large shopping mall, provided permission was forthcoming, of course. As a club project, Pony-Blimp might be just the ticket. Cost of helium could be easily handled by club funds and could allow inflation and deflation (for ease of storage and transportation) each session. And a club might stand a pretty good chance of being allowed to fly it in the high school gym during half-time activities, or whatever. Pony-Blimp could easily tow 2 or 3 helium filled balloons with a nylon banner suspended below extolling the virtues of the club, the school, the local blood bank drive, or whatever!

Suggested flying sites for blimps: Outdoors, if very calm. Indoors you need a space about 40 to 50 feet square. When in a small area, use less power for the best flying.

Helium Cost:

When looking for helium, check the telephone directory under — Balloons — Welding Supplies and Gas. Check a couple of places as there are some large price differences. We suggest that you ask for tank rental prices instead of purchasing a tank of your own which costs between $100 to $200.

We checked with a shop in Anaheim, California, which delivers helium throughout most of California. Prices from: Unique Promotions, 1740-D S. Anaheim Blvd., Anaheim, Calif. 92805 (714) 535-2090.

214 cu. ft. tank — $32 includes 30 days rent and filler assy. (fills Pony-Blimp 2.6 times — cost $11.98 per/fill).

150 cu. ft. tank — $25 includes 30 days rent and filler assy. (fills Pony-Blimp 1.8 times — cost $13.88 per/fill).

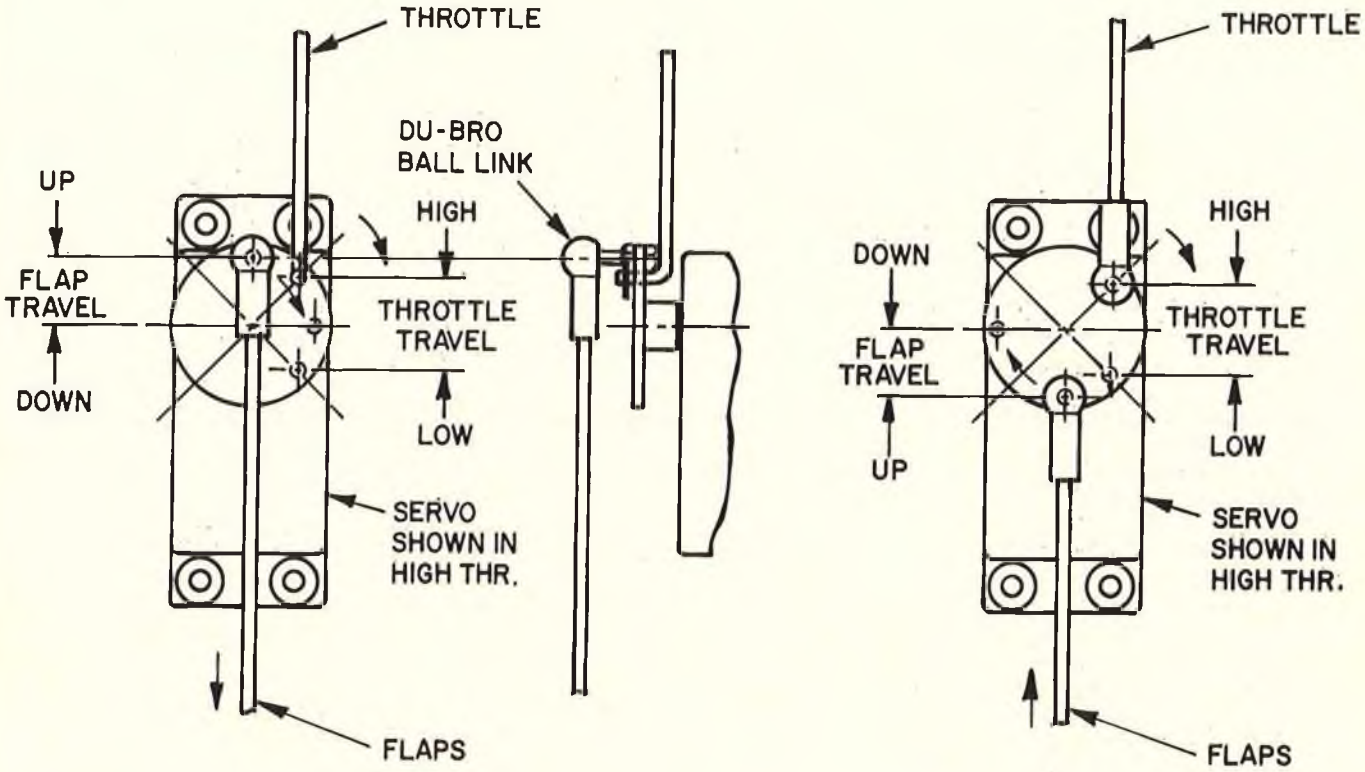
Although you can rent a balloon filler assembly with the helium tank, you may want to make your own helium filler valve that has a pressure regulator, gauge, 3' long high pressure hose and balloon valve. The filler assembly is available from Peck Polymers for $69.95. It is much easier to fill the blimp with the 3' hose.

In closing, Bob Peck and Peck Polymers are to be commended for the quality, design, and engineering we have experienced with their Pony-Blimp. What's that? Did we hear somebody out there say it wouldn't do a Cuban 8 . . . or even a square loop? It's true, all right . . . but it won't spin in and crash either! Think about it! □

HERE'S HOW

By Jerry Smith

THROTTLE / FLAP CONTROL HOOKUP



LOW WING AIRPLANE

HIGH WING AIRPLANE

Very few things are free these days. Not too long ago I drove into a filling station and asked the attendant to put some air in my tire. I was amazed when he said, after finishing, "That will be 25 cents for the air." "Of course," I said with disbelief and paid him. And, so it is with our model hobby. Very few things are free. Not even the air in which we fly our airplanes. However, if we are resourceful it is possible to cut down the cost and make our hobby dollar go a little further. For example, it is possible to get two functions with one servo. In this case I am talking about a throttle/flap servo combination. This means it is not necessary to install an extra servo to operate the flaps. One of those very few free items I was just talking about? Well, not quite. It is still necessary to buy some extra fittings, however, this is cheaper than buying another servo and finding a place to mount it.

Looking over the sketch, we see two throttle/flap hook-ups. One for low wing airplanes and one for high wingers. In the case of the low wing arrangement, it is necessary for the flap pushrod to move aft. The same direction the throttle pushrod must move to close the carb. Conversely, on the high wing airplane, the flap pushrod must move in the opposite direction as the low throttle. Thus accounting for the two separate linkage arrangements shown.

Taking note of the servo movement we see that the throttle travel is completely linear and much longer than the flap travel. The flap movement is non-linear with most of the travel occurring from half throttle to full closed. The ideal situation is to have no flaps until half throttle, however, it is impossible with this arrangement. By moving the flap pushrod ball link slightly over center on the servo output wheel, it is possible to come close to the ideal situation. 35 to 40 degrees of flap is all that is necessary to slow down your hot sport or scale airplane.

With this particular arrangement you have no choice but flaps every time you reduce the throttle. There really isn't anything wrong with this except on an extremely windy day you might not need the slowing effect of flaps. Or, certain aerobatic maneuvers requiring low throttle might be difficult to perform. However, there are trade-offs in every situation that require a choice on our part. I have flown an airplane with the throttle/flap hook-up as described and found it very reasonable. It happened to be a fast little sport job with a very thin wing. I was pleasantly surprised with the flap action as the airplane came home over the fence.

If you are looking for a cheap way to add another function without the cost of a servo, try my suggestion. You will be surprised how easy it is to hook up. Something new to try and show the gang at the flight line. □

SCALE VIEWS

Col. John deVries

The Pike's Peak R/C Club held their first Scale Rally in June. Two classes of models were registered — static and flying. But, like all Rallies, there were no rules except those related to safety. All flying scale models were checked by the Safety Committee — and flying was strictly optional for all entrants. **Three times** as many scale models were entered in the Rally as any scale **contest** ever sponsored by the Club! The lack of competitive pressure resulted in scale fliers **flying** their masterpieces — to the delight of the crowd. And — despite a gray day and the 7200' altitude of the Colorado Springs, Colorado, R/C air strip, some pretty spectacular flights were made.

"Kit-Bashing"

Variety is the spice of life! Except among scale R/C modelers, that is. There seems to be a tendency among scale modelers to stick with Mustangs, Spitfires and Cubs — all proven designs for which **kits** are readily available. Nothin' wrong with that, but with literally thousands of real aircraft that have been designed and flown, it seems a shame that we aren't a bit more adventuresome when it comes to selecting a subject for our latest scale project. I realize that many scale builders really don't want the hassle of designing a model from "scratch" — or, that the research involved in doing something different can't compare with the ultimate purpose, flying a model that looks like a real airplane. But, there **is** a way of achieving variety without spending a lot of time at the drafting board or in the aviation library.

Model railroaders call it "Kit-bashing," as do plastic airplane assemblers. It amounts to using bits and pieces from several **kits** to produce a model that isn't readily available 'over the counter' at the local hobby shop. We can do it too — within certain limitations — and produce a scale model that is substantially different from all of the other entries at the local contest. And, we can do it without resorting to the purchase of a bunch of expensive bits and pieces. We're suggesting the **selective modification** of kit and magazine plan model designs that change the outward, scale appearance of the model **without** changing the basic aerodynamics of the model. We can change outlines and details while retaining moments, areas, and incidence angles to produce fascinating R/C models.

Part of our task is made easy by the manufacturers of real aircraft. Very frequently, they produce a "family" of aircraft that share major components, like wings and fuselages. Lockheed comes readily to mind, as an example. Practically all of the early Lockheeds shared the same fuselage — it was built in the same concrete "tub." High-wingers, like the Vega and Air Express had the same, basic fuselage as Lockheed's low-wingers — Sirus, Altair and Orion. Only the cutouts for wing mounting, entry doors and cockpits differed from model to model. Currently, I'm taking this course of action — converting Great Planes', Inc., Lockheed Sirus fiberglass and foam kit to a Lockheed Altair. The essential changes are adding retracts, modifying the cockpit enclosure, revising the horizontal tail surfaces a tad and widening the fin a couple of square inches worth. But, what I'm doing is precisely what Lockheed did to produce the Altair — from the basic Sirus.

Curtiss also built aircraft "families." The wings of practically all of the biplane Hawks were of the same size and Clark Y airfoil — from the P-1 through the P-6, including many of the Navy Hawks. Tail feathers were also similar, if not the same, throughout the series. And it's fun, duplicating the bumps and scoops for a Hawk, that is different from the P-6E presented in the Goldberg kit. It only took a little bit of "digging" to determine that Matty Laird used the **same** wing design on **both** the Solution and Super-Solution racers of the early 30's. Minor fuselage differences, some changes to tail feathers, landing gear fairing — they're the same airplane "under the skin." Ryan aircraft followed a similar pattern, so it's not too difficult a task to "update" a Royal Spirit of St. Louis kit model to a later Ryan of the Brougham series.

Another consideration. Modifying an existing aircraft model to an easily documented, but one-off, example. For instance, there are a great variety of Stearman configurations, based on the PT-17. Dusters and aerobatic pilots changed engines, added cowlings and pants to produce craft that **look** entirely different from the Boeing/Stearman product, but are aerodynamically the same "under the skin." Racing versions of WW II fighters, "cleaned-up" after the war, provide a number of one-off, distinctive craft to model with a minimum of effort — usually a bit of block sanding and a sporty paint job is all that is required.

Even kit manufacturers have flirted with the design modification idea. Top Flite, for example, produces a widely-seen North American P-51B kit. But, for a while, they also offered a conversion kit — to change the model to a "D" model. The conversion kit contained a couple of fuselage-changing balsa blocks, a bubble canopy and a set of "how-to" drawings and instructions. Speaking of the Mustang — we can remove the inner wing projections, increase the height of the fin and rudder and slim the fuselage a tad, and produce an "H" from a kit. And, it'll stand up to the scrutiny of most scale judges!

While we're making some modifications to the "looks" of our model, we're making some very important **assumptions.** Most prominent among these is that the original model we're working with **will fly!** Thus, our modified model **should** fly at least as well. We're also assuming that the original C.G., noted on the drawings, is correct as are the engine thrust line and the stab incidence angle. Since we're concerned with mostly cosmetic changes, we can further assume that our completed model will be pretty close to the original design as far as weight and wing loading are concerned — and that we'll use the same sized engine as the kit/plan called for. We don't want to change **any** of these parameters or our new model might not fly, at all!

So — how do we go about the task of creating a special scale model from an existing kit or magazine design? First, we have to decide which way we want to go. We can't strip the top wing off of a Waco and call it a P-40! Generally speaking, we have to stay within the same "family" of a particular company. We **can** put a "round-engine" on the front of a P-40 and produce a P-36 (or, vice-versa, which is exactly what Curtiss did!).

Second, we have to have a selection of photographs and **good** drawings that show **both** aircraft we're

Dale Alyea's Stafford B-24, modified to include gun turrets. Dale, from Pueblo, Colorado, is District IX V.P. for the IMAA. In the background is Rich Pabilonia's Royal B-17. Both models were entered in the static display portion of the recent Pike's Peak R/C Club's first Scale Rally.

Tony Paul's big scale Stinson. Quadra engine, bird is covered with Ceconite and painted blue and white --- with Krylon spray cans! Flies beautifully!

Bill Dunn's monster Hawker Hurricane. Bill drew his own plans for this 85" span, .60 powered beauty. Markings represent bird Bill flew during the Battle of Britain --- he was the first U.S. "ace" of WW II.

Another of Bill Dunn's home-grown scale designs --- the Fairey "Flycatcher." This .60 powered biplane has an 80" span and features rubberband loaded lower wing flaps for true scale operation. Biggest problem is to balance the pull of the bands to flying speed so flaps deploy on the landing approach! Seems that the local Colorado Springs newspaper provides just the right bands for this great flying scale ship.

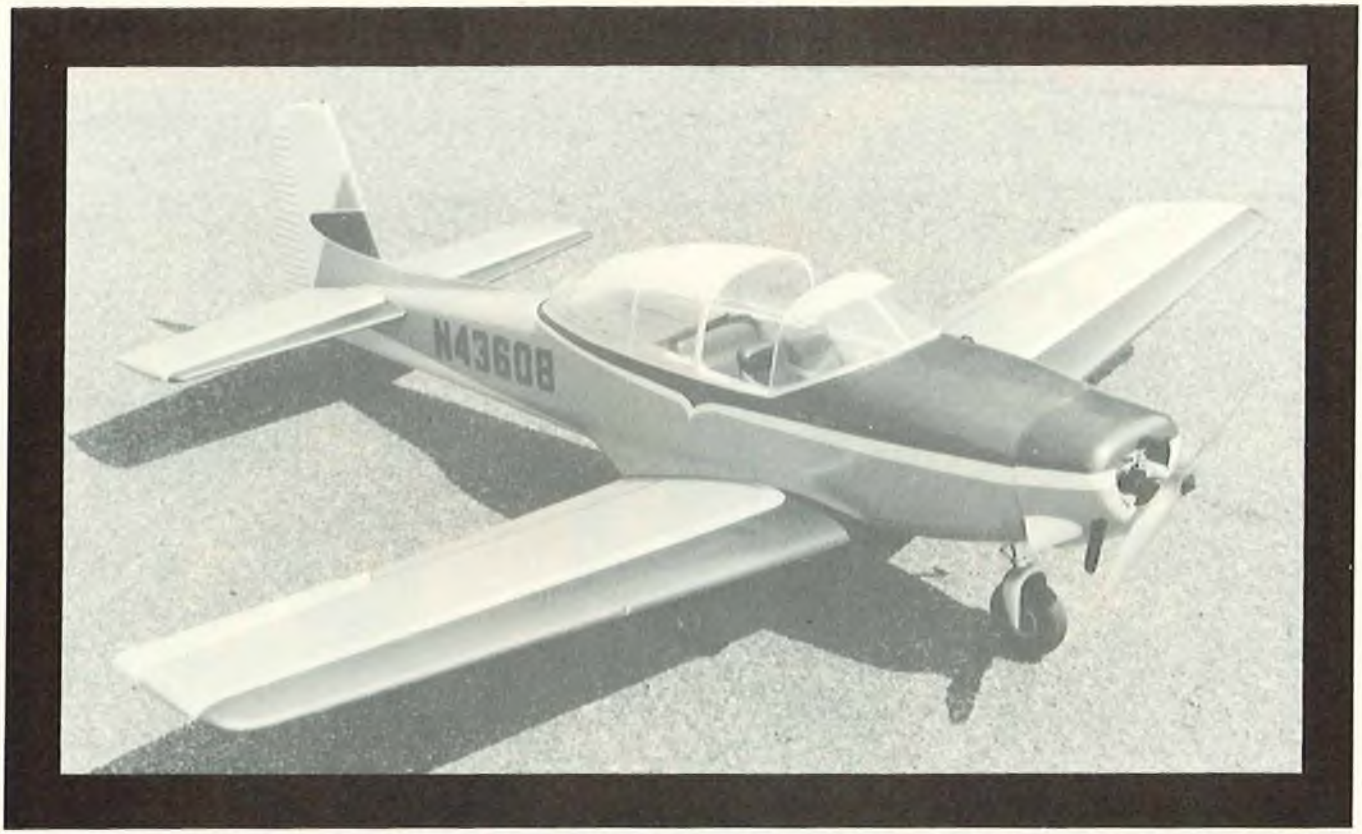
Col. Bill Turner's scale Porterfield. Bill, retired from the Air Force, worked for Porterfield before entering the service.

Close-up of Steve Tesnear's Heath LN-4, built to Model Builder plans. A .60 powers Steve's cream colored Heath --- and it flies very realistically.

considering; of the original "real" airplane and the modified version we intend to produce. Although this sounds like we've set up a 'double documentation' problem, it really isn't. We only need enough data on the kit/magazine plan design airplane to be able to pick out the differences we intend to duplicate. The kit or the magazine article usually provides all of the information we'll need for this comparison. Thus, our primary effort will be directed to acquiring info on the "new" craft — which we'll have to do anyway, for the constructional changes (and to produce the documentation presentation if the model is to be entered in scale contests).

Third, and most important, we must plan the "new" model while **not** changing any of the fundamental measurements of the original. Within limits (10 sq. in.) we should duplicate the wing area and airfoil shown in our kit drawing — and the incidence angle should remain the same. Small changes in vertical surface area (due to fin/rudder re-shaping) shouldn't pose any flight control problems later on. The landing gear position may be shifted a bit — but, keep it pretty close to the scale location unless you want a model that's a "bear" to taxi. While you're at it, check the kit/design

to page 123



THE CLASSIC RYAN NAVION

By Walter A. Musciano

A LONG TIME MODELER'S FAVORITE

Part II will follow in the November issue with complete construction article.

PART I

by Walter A. Musciano

The Author thanks William Wagner and James V. Mulvey of the Ryan Aeronautical Co.; William Winter; and Henry (Hank) Tremont for photographs and technical information which made this article possible.

Since its introduction by North American Aviation in April 1946, the Navion has been a favorite subject for many modelers, however, very few kits have appeared over the years. The reason for this scarcity is probably the cost of manufacturing the enormous bubble canopy which is one of the outstanding features of the design. Patience, Navion fans, for a Navion project is on its way to the pages of R/C Modeler.

The word Navion is an acronym for North American Aviation and the plane made a big splash in the personal airplane field when it first appeared. The craft was an all-metal, four-passenger pleasure, sport, or business type with many big plane features at a moderate price. Powered by an air-cooled six cylinder 185 hp Continental E-185-3 engine swinging a variable pitch Hartzell propeller, the Navion cruised at 150 mph while the top speed was 157 mph. Range, with two pressed steel 39½ gallon wing located fuel tanks, was just over 500 miles. Empty weight was 1,660 lbs. and the useful load was 1,016 lbs., giving it a gross weight of 2,676 lbs. Fully loaded, the Navion could take-off into a 10 mph head wind, with flaps up, in a 560 ft. ground run. Rate of climb was about 800 ft./min. with a service ceiling of 14,000 ft. With the hydraulically operated flaps down, the stalling speed was 58 mph as was the landing speed. Landing into a 10 mph headwind with 40 degree flaps, at 58 mph touchdown speed, the craft required a 330 ft. ground run.

The design and construction of the Navion accented accessibility, low maintenance cost, and comfort. The elevator and horizontal stabilizer assemblies were interchangeable, left and right. All hinge points were fitted with ball bearings and control surfaces were easily removable. The monocoque engine mount was structurally part of the fuselage thereby eliminating the conventional steel tube design. In addition, any part of the engine was easily accessible for inspection or repair via large hinged panels.

The wing design gave the Navion exceptional aileron control at low speeds when approaching a stall. The root sections of the wing were the first to stall, thus eliminating the tendency of the plane to roll and it maintained excellent lateral control through the stall. The careful selection of airfoil sections gave the Navion the finest flight characteristics without loss of performance.

Visibility was excellent throughout 360 degrees, thanks to the enormous bubble canopy. The hydraulically retractable tricycle landing gear contributed to the same superb control tower visibility while the craft was being operated on the ground. This made the Navion a very safe plane to taxi, take-off and land. A large nose wheel was fitted to improve handling and to eliminate the difficulties normally encountered on rough field landings and take-offs. The nose wheel was steerable through 20 degrees.

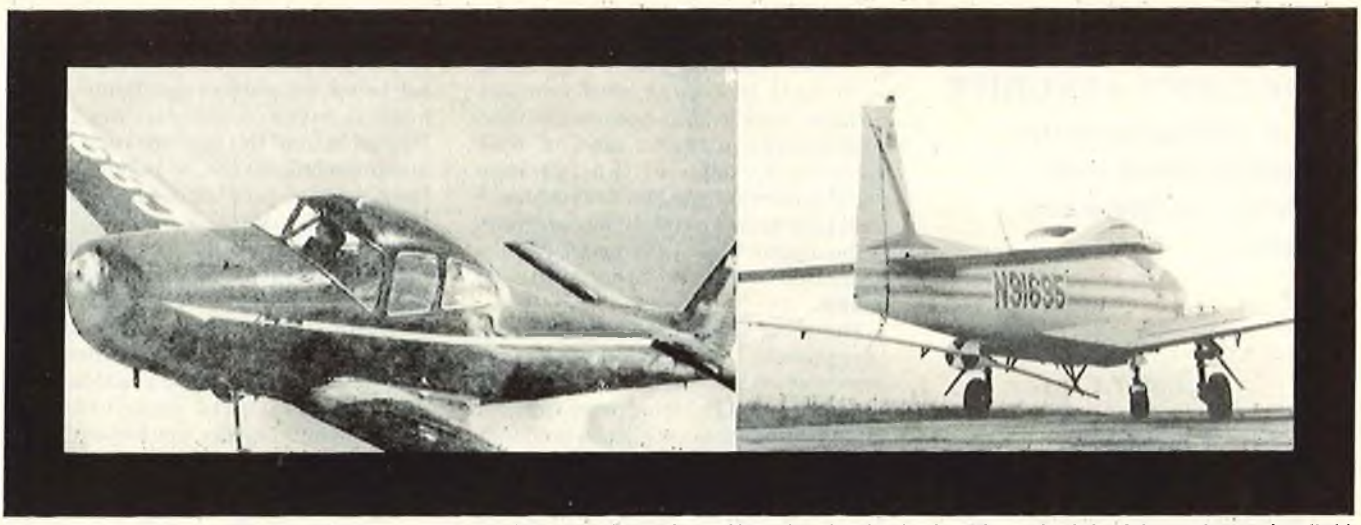
The Navion's control system was of the pully and cable design, with dual wheel and pedal controls for the pilot and a co-pilot. The right hand or co-pilot's controls were, however, easily and quickly removed to accommodate a non-pilot passenger. The craft was very rugged and exceptionally stable; a sweet plane to fly. The control system was simplified so that the craft could be handled with the wheel control alone; operating the elevator and ailerons only. All necessary turns could be negotiated with the ailerons under normal conditions. The aileron cables and rudder cables were interconnected; the rudder cable being spring loaded. The rudder pedals became effective only when slight pressure was applied to overcome the spring connection.

Considerable effort was directed to the Navion's interior design to provide comfort, luxury, safety and styling for the pilot and passengers. The entire passenger enclosure was constructed as a single unit for strength and passenger safety. The widest part of the fuselage was in way of the cabin which provided the roominess and appointment of a luxury automobile interior. The individual front seats were adjustable and the back seat could be removed to accommodate 435 lbs. of luggage in 46 cu. ft. of space. The co-pilot's seat was also removable to provide additional cargo space for salesmen, farmers or sportsmen. The normal luggage compartment was located behind the rear seat and could accommodate 80 lbs. of luggage with four passengers aboard. Several Navions converted this luggage compartment into heavy camera and other apparatus compartments to conduct aerial surveys and other scientific undertakings. The luggage compartment was covered when the canopy was in the closed position. The four seats could comfortably accommodate husky six-footers with ample leg room and the plane could be entered without stepping on the seats.

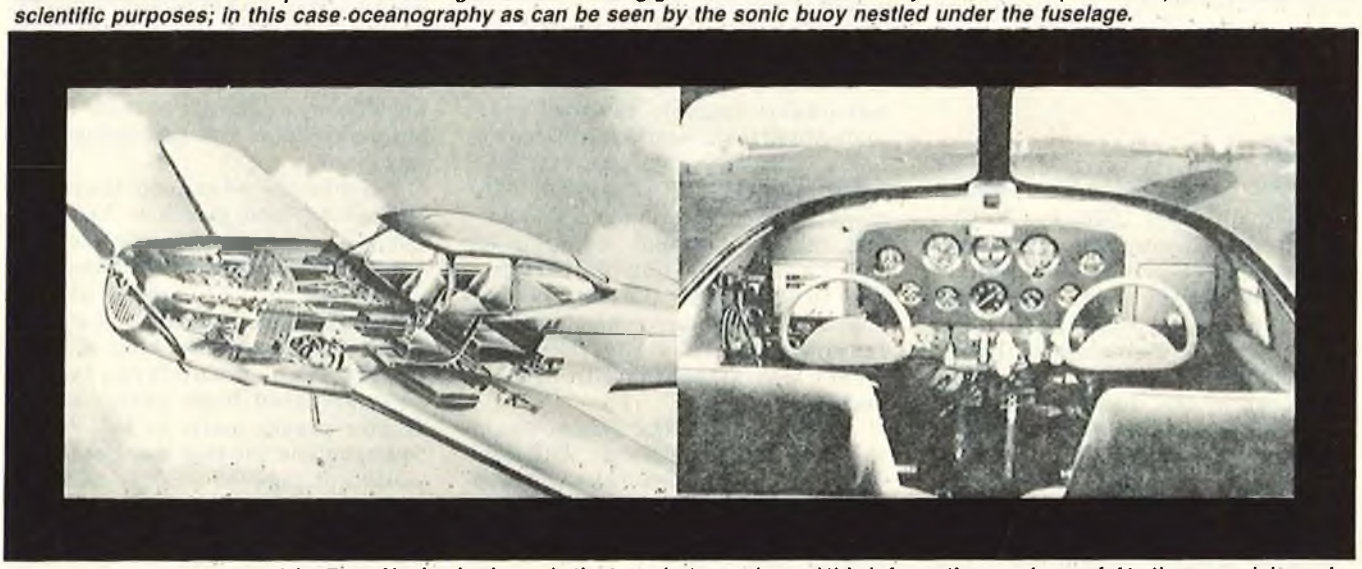
The United States Army Air Force purchased about two hundred Navions for Liaison and Observation work. These received the military designation of L-17, L-17A, and L-17B. The Navion saw extensive service in the Korean conflict during the Fifties in both its natural 24 ST aluminum skin and camouflaged in war paint.

Despite its advanced features, ruggedness and excellent handling qualities, the Navion's conservative speed could not compare with the high stepping go of some of its contemporaries, regardless of cost. It soon became evident that a mass production manufacturer of sophisticated high performance fighter planes, such as the WW II Mustang and the post war Sabre Jet, could not hope to avoid production losses with a relatively inexpensive private type. Within a few years of its introduction, the design and production dyes were sold to the Ryan Aeronautical Company who, after making several modifications, began marketing the plane in 1949 as the Ryan Navion. The new Navion manufacturer added a 20 gallon auxiliary fuel tank behind the rear seat which increased the range to 750 miles. Also improved was the cabin ventilation and sound proofing. The 185 hp was gradually increased over the years to 205 hp, 225 hp, and 265 hp engines.

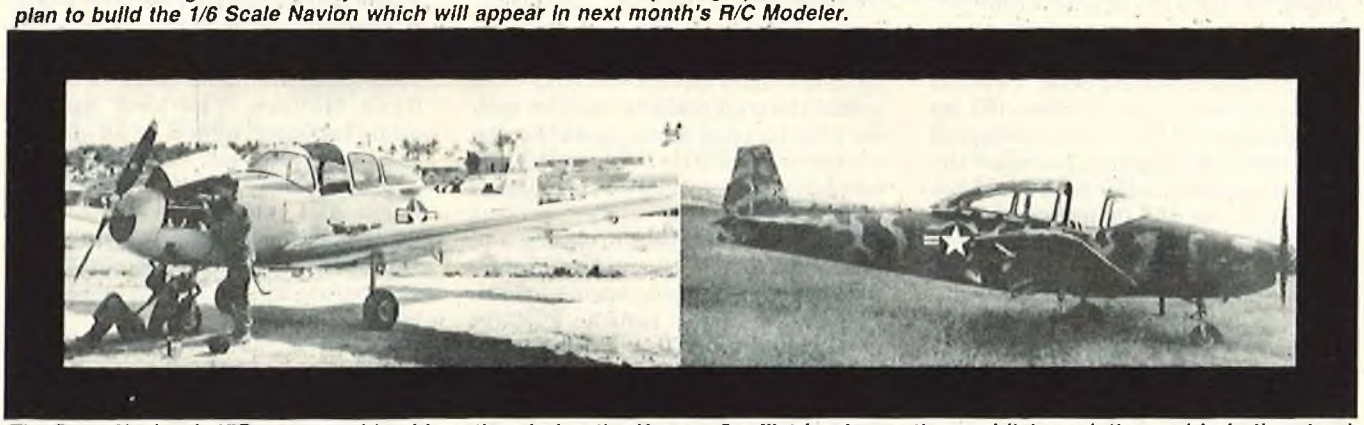
In 1955, Ryan had stopped production and sold the design plus tooling to a Houston, Texas Corporation and in 1961 the craft was being manufactured by the Navion Aircraft Company of Galveston, Texas. By this time the plane had undergone so many design changes that it bore very little resemblance to the original North American and Ryan production models. Gone was the magnificent bubble canopy with its 360 degree vision and in its place was a conventional four window cabin and standard hinged doors. Cylindrical streamline wing tip fuel



The "First and the Last" of the bubble canopy Navions are shown here. Note the simple single-color paint job of the early version (left) and the most recent with its multi-striped scheme (right). Notice the wing and fin located registration numbers on the early version. The later Navion featured a simplified fillet fairing and main landing gear covers. As with many Navions this particular plane was used for scientific purposes; in this case oceanography as can be seen by the sonic buoy nestled under the fuselage.



The interior arrangement of the Ryan Navion is shown in the two photographs and this information can be useful to those modelers who plan to build the 1/6 Scale Navion which will appear in next month's R/C Modeler.



The Ryan Navion L-17B saw considerable action during the Korean Conflict in observation and liaison duties and in both natural aluminum and war paint. Camouflage colors were tan and brown or tan and dark green with very light powder blue-gray undersides.

tanks were added and the dorsal fin had disappeared by 1962. A small prop spinner was added to complete the transformation. The Navion interests changed hands several times and our information indicates that the Janox Corporation of Arcanum, Ohio, were the most recent owners.

Despite the Navion's many outstanding features and splendid innovations the design was not financially rewarding to its several manufacturers. Perhaps it was too advanced and ahead of its time and not fully appreciated by the airplane buyers of the private sector. This substantial airplane is one of the best values on the used plane market today and there are many of the thrity-five year old Navions efficiently operating; serving farmers, businessmen and sportsmen.

It will, forever, remain one of the truly classic personal-type airplane designs and the Navion makes such a great R/C project that a 1/6 size or a 2" to the foot scale Navion construction project will be presented in R/C Modeler in next month's issue. Don't miss it! □

POWER BOATING

Howard Power

I have been receiving quite a few letters each month. It's really fun to read about the activities and share the many problems of those who have written. Unfortunately, my contest and work schedule does not allow me as much time as I need to adequately answer your letters as quickly as I would like. If you have written and I haven't answered you yet, please be a little more patient. My mail is of such quantity that I cannot afford (in time or money) to respond to those of you who don't include a stamped, self-addressed envelope with your questions. Please remember to include a return envelope or you may never receive an answer. I would also like to solicit new ideas, solutions to problems, and other such information. There has to be many of you out there who know much more than this writer about how to build fast boats and more powerful engines. Let's hear from you. Share your knowledge so that our great hobby can grow.

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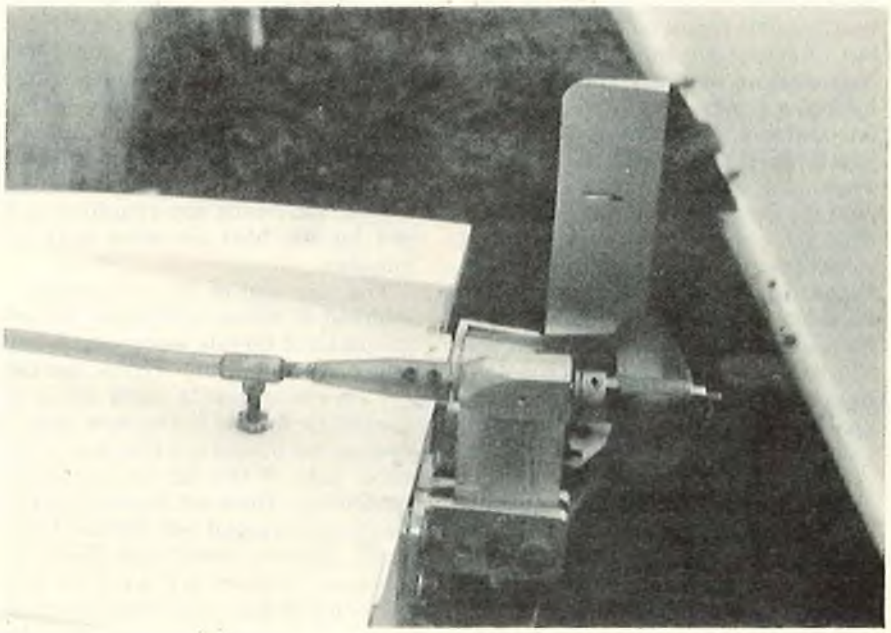


Wing Ding flex drive system.

Dear Sir:

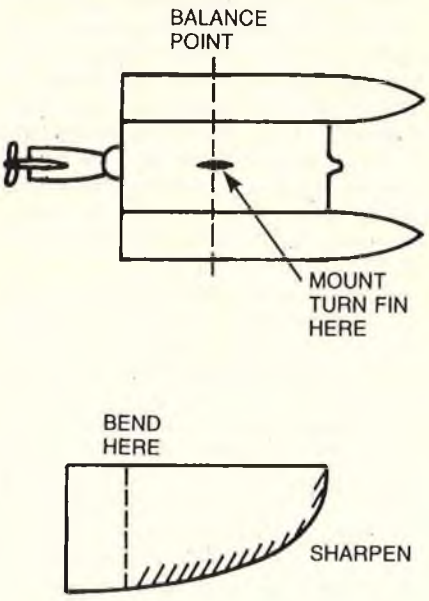
I am building an Octura Wing Ding 60 and plan to drop a Rossi .80 in the mount. I have been into R/C boating for five years and possess three fine hydros including my Atlas U-1 scale, however, this is the largest engine with the most juice I have ever used. Therefore, my question is this: What type of drive line do you recommend I use? The .80 is 4.6 hp at 22,000 rpm and will probably turn an X467 or 1470, I think. I haven't spared expense up to now, and I don't want junk hardware. I want the best you can recommend. Could you also give me your comments on lead teflon versus needle bearings?

How do you feel about the exhaust throttle set-up, and who makes it for the Rossi .80's?

The Aeromarine Lectra starter is a real jewel and fits beautifully on a flat Octura mount. The battery pack is somewhat large, but will fit in the radio box with room to spare. If you have tried one, you'll really fall in love with it. My reasoning is not only in water starting, but having the drive line in the water instead of burning up in the starting blocks.

I read your monthly column, and always learn something new. This time I would like to contribute a little hint or two.

On outboard tunnel hulls, remove the turn fin and, with the gas tank empty, balance the boat on your finger. Measure 1/2" ahead and, out of 1/8" aluminum, cut out a 3" skeg, 3" long and from 1" to nothing. Sharpen both sides to look like the accompanying drawing and 5-minute epoxy to bottom of hull. Make about 4 or 5. The 5-minute epoxy will break off clean if you hit something without destroying the hull.



This fin enables all 3.5 tunnels to turn on a dime wide open without tipping over, from the 3-D Phase I to the Prather. They run straighter and faster and literally turn around in their track and slingslot out of the corners. With my Phase I tunnel and Lil Lightening I can actually perform very tight turn patterns without a hint of instability. "Try it, you'll like it." Incidentally, my 3.5 outboards run well over 40 mph with hot fuel and a hand cupped E-20 prop.

Every time you finish for the day, with any engine, remove the plug and fill the whole engine with WD-40. Run it through and leave it there. My engines start with one bump every time, even if I haven't used them for a month. Also, with the outboards, I find that 3-In-1 Oil dripped under the flywheel before each run with the boat upside down gives me limitless wear on upper bearings. With the engine mounted on the outdrive, very little oil reaches the front bearings and the constant pressure of the starter as well as high rpm will eat them if not taken care of.

I drilled a 1/16" hole in the center of the outdrive through the aluminum housing and stuffing box. My grease needle fits perfect and keeps the whole outdrive full of grease without having to remove the engine every run. If you don't keep the whole outdrive full of grease including lower bearings, you will eat flex shafts like cookies. I know — I learned the hard way.

Thanks for letting me bend your ear.
Bill Hansen
San Luis Obispo, California

The Rossi .80 is a fine engine. Several years ago, when the first of these engines reached the U.S., we were able to obtain one and we have run this motor in a Wing Ding and in several deep vee designs. I'm not sure how the most recent motors are timed, but these older models had very conservative exhaust timing. They had, as a result, very high torque at low rpm and, in fact, if you tied your boat to the dock it would pull it down! The motor would not turn anywhere near the quoted 22,000 rpm. We found that the exhaust timing had to be raised to just over 175° total duration to get this motor to turn just under 21,000. The modified motor was successful enough to power a .40 size Ward Craft deep vee hull to a NAMBA deep vee straightaway record average speed of just over 64 mph. Several passes were made at just over 65 mph. At the same period of time, Frank Ward held the 65 class record at just over 62 mph. As you can see from these speeds, the Rossi .80 should not be expected to produce very much more power than a good .65! The .65 can run safely at higher rpm than the .80 because its reciprocating mass is smaller. The .80 is basically a bored and stroked .65 engine and, as a result, the flow passages in the case are probably not as efficient. The .80's larger reciprocating mass creates more power robbing vibration. As a result of these factors (and probably some I haven't mentioned) the .80 will not produce the same power increase as the increase in the displacement might indicate. We see a very similar phenomenon when we compare 7.5cc and 11cc engines. Many times a good 7.5cc boat is as fast or faster than the 11cc boats. For these reasons I can see no reason to use any stronger drive line components than you would for a .65 sized motor.

I use a 3/16" flexible drive shaft in my Wing Ding as shown in Photo 1. The drive shaft runs in a 7/32" I.D. brass tube shaft log that is glued into the hull and is supported by a 8-32 bolt that is hard silver soldered to the shaft log at its end. An Octura surface drive strut is mounted at the centerline of the hull with a 5 degree strut angle to the left. This offset counteracts the right turning tendency caused by the propeller running on the surface. An Octura hardened stub shaft rides on twin needle bearings mounted in the strut. I prefer the needle bearings because lead teflon bearings need water cooling to insure reasonable lifetime. If you use teflon bearings you must be very careful not to over-rev your motor on the beach. Prolonged operation without cooling can melt the bushings and produce a wobbly drive shaft. Teflon bearings for 3/16 shafts should have approximately .001" clearance or they will be ruined quickly by heat build-up. Since your hydro is supported at the rear by only the propeller (therefore the strut bearings), bearing loads are higher than those experienced by monoplanes. My experience indicates that needle bearings used on hydros are more trouble-free than teflon bearings as long as you do not allow water to corrode the needles. I suggest using WD-40 oil to lubricate the needles after each day's running or if you let the boat sit more than 30 minutes.

The rear end of the drive cable is soldered to either a Norco or Octura streamlined ferrule using Sta Bright silver bearing solder. Never use two set screws opposite each other to secure the ferrule to the stub shaft. I use two set screws but they are on the same side of the ferrule along the center axis. These set screws engage a flat that is ground into the hard stub shaft. I have never had these set screws loosen up and do not recommend the use of Loctite on these screws. A pair of teflon thrust washers are used on both sides of the strut. The ferrule is mounted so that the drive dog is resting against the rear thrust washer and the strut. Keep 1/16" to 1/8" clearance between the front of the strut and the washer in front of the ferrule. This allows the cable to grow in length as it is twisted tight by propeller torque. The other end of the drive cable is hard silver soldered using Highery 45% silver solder. Use Hughey white silver solder paste flux and heat the cable using a propane torch until the solder flows onto the last 3/4" of the cable. This end of the cable is the most critical since overheating can cause weakness. If the cable does break you will not, however, lose the other drive line components. The cable will break right away if you goof. Feel confident if the new cable lasts the first day running since it will probably last for the rest of the season.

If you use any solders other than the types mentioned I cannot predict how long your cables will last. Do it my way and it will work! I also do not recommend any of the commercial cable connectors that clamp. These cable nuts tend to distort or break when tightened enough to reliably hold the cables on high powered hydros. Any distortion produces a wobbly shaft and causes additional vibration. I use a cable nut made from a 1¼" length of 1/2" steel hexagonal stock. This nut is drilled 3/16" through its center in your lathe. The nut is then drilled half way through so that it can be threaded to match the crankshaft. Four 8-32 set screws are used, two each on any two faces that are 120 degrees apart. This nut holds the cable without any chance of wobble. Hughey Boats manufactures a very similar cable nut for many of the popular engines. Your Rossi .80 will require an 8mm crankshaft thread which may not be available from Ed.

Exhaust throttles work well on the Rossi but to my knowledge no one (at this time) makes a commercially available exhaust throttle for this engine. If anyone out there does have these throttles available please let me know. The Rossi .80 comes with what I feel is one of the best carburetor set-ups available. In my opinion the carb is the way to go. Be sure that you use pipe pressure or you will not have any luck at all getting the .80 to run. Set the low speed needle so that (when you look into the carb from the engine side) the end of the needle is lined up with the bottom of the vee shaped fuel opening in the spray bar. The high speed needle should be set somewhere between 2¼ to 3 turns out. With these settings the motor will idle slower than you can believe and acceleration will be instantaneous. Try it.

In my opinion the use of a built-in electric starter on a racing boat is not very practical since it involves a severe weight penalty. I'm sure that sport boats would really benefit from its use. You don't have to worry about burning up an ABC racing motor on the beach as long as you do not exceed its usual operating rpm. The ABC liner set-up just expands as it gets hot and seizing usually associated with steel liners and ringed pistons does not occur. You will damage your motor only if you over rev it.

Dear Mr. Power:

My Hot Shot 21 fiberglass boat runs well after reading your last article on the proper props, but I have two questions.

I can't get the motor to run any lower than half throttle. Is a carb with idle mixture in order?

My boat is balanced at 9" from the transom, and has small washer shims supplying down thrust and it still has a tendency to fly. Is this normal?

I am going to build a Dumas Pay-N-Pak with a Dumas hardware kit and an OPS 3.5 inboard. Any hints on prop, fuel, and anything else you might think of to save me (a newcomer) from a lot of misery?

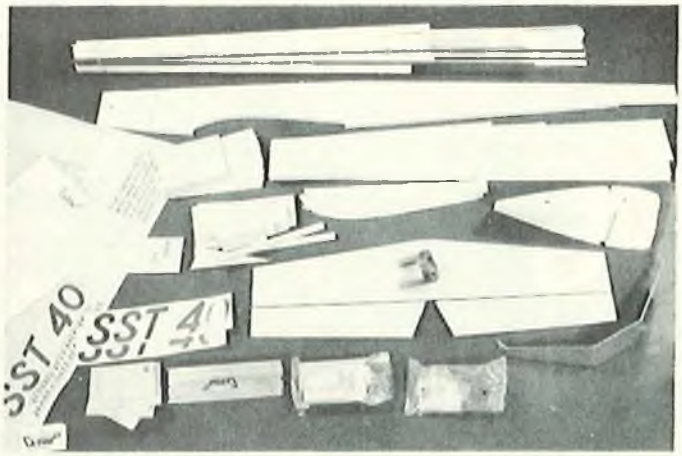
Mike Lupo
Columbus, Ohio

The newer K & B 3.5 engines are supplied with a simple rotating barrel

to page 122

RCM PRODUCT REVIEW

Champ Model Prod. SST 40



SPECIFICATIONS

Name	SST 40
Aircraft Type	Aileron Trainer
Manufactured By	Champ Model Products 14625 Carmenita Rd #225 Norwalk, California 90650
Mfg. Suggested Retail Price	$64.95
Available From	Both, Mfg. & Retail
Wingspan	54 Inches
Wing Chord	11.5 Inches
Total Wing Area	648 Sq. In.
Fuselage Length	43 Inches
Stabilizer Span:	21 Inches
Total Stab Area:	115 Sq. In.
Recommended Engine Range	30-45
Recommend Fuel Tank Size	8 Oz. Tank
Recommended No. of Channels	4
Rec. Control Functions	Rudder, Elev. Throt. Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply & Spruce
Wing	Balsa, Ply & Spruce
Tail Surface	Balsa
Building Instructions	Yes
Instruction Manual	Yes (6 Pgs.)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Kraft KP6C Gold Spectrum
Engine Make & Displacement	K & B .40
Tank Size Used	8 Oz.
Weight, Ready to Fly:	56 oz.
Wing Loading:	12.4 oz./sq. ft.

SUMMARY

WE LIKED THE:

Included wing jig. Six pages of construction photos included with instruction manual.

WE DIDN'T LIKE THE:

Leading edge sheeting cut 1/4" too narrow. Some soft balsa.

Do not be confused with the name of this plane; the SST in front of the 40 has nothing to do with Super Sonic, it simply stands for Super Sunday Trainer. Even though this plane has dimensions that match a .40 intermediate aileron plane, it does not have the weight. As indicated on the plans, the plane is for engines from .30 to .40. The balsa seems to have been selected with lightness in mind and you should have a care when constructing the model. If you are used to working with the lighter stock, then you will have no real problem. On the other hand if you are used to grabbing and squeezing as we are, then you are going to have to be careful that you don't poke your fumble thumb through the wing sheeting or crush a rib.

Do not throw away the top when you open the box to start your construction, the only picture of the whole plane is there in full color. The sheeting is packed flush on the bottom of the box, the landing gear and nose gear are wrapped with tissue to prevent them from destroying the kit while in shipment. All long wood stock is rubberbanded together at each end which prevents warping. The hardware, as well as all sawn pieces of the kit, are packaged separately in plastic.

The most unusual gadget found in the kit was the Champ Wing Jig. It consists of two pieces of angled aluminum sheet with two sets of holes in each piece. Also included were two 1/4" glass arrow shafts, which later become rudder and elevator pushrods. We looked forward to using this jig for building the symmetrical wing.

Construction:

We found that construction was generally straightforward, something an intermediate builder would find a joy. The formers were cut so they matched the fuselage sides quite well and assembling the box-like fuselage presented no problems. We especially liked the manner in which the tail end of the fuselage was doubled with 3/16" stock to give a firm resting place for the elevator. Before adding the 1/4" ply firewall, you should make a decision as to the location of the nosewheel tiller. The plans show it on the back side of the firewall, the RCM prototype had the tiller as shown on the plans but any adjustments cannot be made unless the fuel tank is removed. We think you should seriously consider drilling the included engine mount and place the tiller under the engine on the outside.

For those of you who have never built a wing on a wing jig, the included jig makes the work something you will really enjoy. We mounted the aluminum angle pieces on a 10" x 36" x 3/4" piece of fir plywood. The previously drilled ribs are strung on the arrow shafts above the plans which are folded and placed between the angle pieces. Even though the wing ribs are symmetrical and equally spaced, it is recommended that you intentionally build a left and right half wing. Place the hard balsa ribs inboard and

to page 120

BY DAVE HERBERT

RADIO CONTROL NIGHT FLYING

BELIEVE IT OR NOT

Photos By Ed Sommer and Wayne Trimble

What could be more fun than flying an R/C aircraft on a Sunday afternoon? How about flying on a Sunday night? Radio control night flying is an incredible amount of fun. I've been advocating this for about 3 years now, however, most of the people that I tell this to think I'm crazy. Maybe I am, but there are certain advantages to R/C night flying that may or may not pertain to you or your club.

In the club I belong to, the Sky-Nauts of Saddleback Valley, we take R/C night flying seriously. Our club has lost its flying site to the dread of all R/C pilots: heavy urban growth, a problem particularly prevalent in Southern California. In Orange County, California, land is unavailable, consequently, we have been forced to seek alternate flying sites. We have found and have been flying for the past 3 years on a three lane dead-end county road which is the access road to the Prima Descha Landfill. While the road is used heavily during the daylight hours, after 6 p.m. the landfill gates close and on Friday nights the flying begins. This is when our club really lights up and shines.

Keeping track of the airplanes in the dark is easy. Believe it or not, we actually have less crashes or incidents at night than we do during the day. One reason is this . . . during the day, you can see the ground and runway. During landings, you are compensating constantly to the landing strip approaching the airplane and vice versa. Sometimes you give too much flare, sometimes not enough, bouncing landings on blacktop runways are common. But at night, you cannot see the runway, so you simply set up a good angle of attack and sink rate and wait. Perfect landings every time. So you're saying to yourself, "Now that guy is really crazy." Believe me, once you try it, you'll be quite impressed with how smooth your landings are. Our night flying members are better at landing at night than by day.

The heart of successful night flying is the airborne lights aboard the aircraft. The airplanes we fly are illuminated by four military 5 volt #327 bulbs which survive the most devasting crashes and continue to operate, making the location of the airplane easy to find. We have had few night crashes, but of the ones we have had, the lights have continued to function, and to date all planes have been recovered.

The lights on the wings are the most important ones. Red on the left and green on the right. When I begin training a person to be a night flier, I have him or her fly a left hand pattern. This keeps the left wing inboard and the red light in plain (plane) sight. During the development of the night flying sport, it was found that the outboard wing light from your position must also be seen no matter what attitude the plane is in in order to stay oriented! The small lights can be seen no matter how high you dare to fly in the 300 foot limit, however, certain attitudes tended to hide the lights. To counteract this problem and to generally improve the lighting efficiency of the tiny bulbs, I developed a kind of fiber optic extension which I attached to each wing tip over the light lens. As shown in the illustration, I use a piece of solid

to page 120

Good shot of all lights — note belly strobe and wing tip skids.

Dave Herbert taxiing for take-off.

Dave with F-15 Eagle does a full power overhead spin followed by 2 turn slow spin pull out.

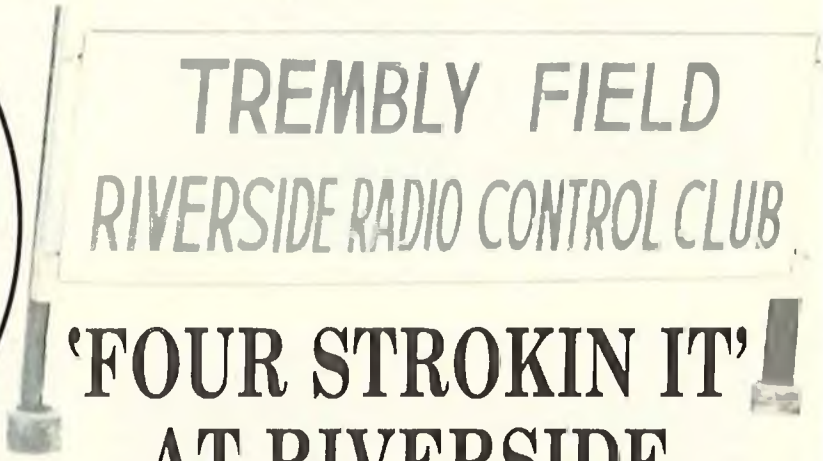
An entire flight done with time exposure. Follow the streak of light for the take-off, overhead circling and landing. Note runway lights.

Dave Herbert does an "emergency field repair!"

Author Dave Herbert's F-15 Eagle (Circus Hobbies kit).

George Caldwell's F-15 Eagle (Circus Hobbies kit).

George Caldwell on left with camouflaged F-15 and Dave Herbert under full moon conditions — red wing tip lights make for the red faces.



'FOUR STROKIN IT' AT RIVERSIDE

By Steve Schaffer

Well it's Sunday, June 27. The big day is finally here. After about an hour on the freeway, two wrong exits and a well meaning security guard full of wrong turn info we finally arrived at Riverside International Raceway. The raceway is home to a variety of races and racing people, but off in one corner is a great little flying site known as Trembly Field, home of the Riverside R/C Club.

The reason we're here is to take part in a most unusual event, the first of its kind in the U.S.A. The Riverside R/C Club and Hobby Shack (a name we're all familiar with) teamed up to put on a Stand-Off Scale contest of the AMA variety with one novel exception. The exception being that all aircraft entered be powered by a four stroke engine. It didn't matter if you found it, built it, or bought it, just so long as the engine was a four stroke. Sounds different, huh? It did to me too, and my curiosity being what it is, I just had to go and see what would turn up.

Final Standings and Prizes:

1st — Rod Larson, Trophy and Saito FA-80.

2nd — Steve Pfister, Trophy and Cirrus 850XL 7.

3rd — Rod Wiser, Trophy, Saito FA-45, Pilot Decathlon.

4th — Gary Smith, Saito FA-45, Pilot Skyloop 404L.

5th — Forrest Edwards Sr., Saito FA-45.

6th — Mel Santmyers, Saito FA-30.

7th — David Johnson, Pilot Forster 56.

8th — Dick Skoglund, Thunder Tiger Tachometer.

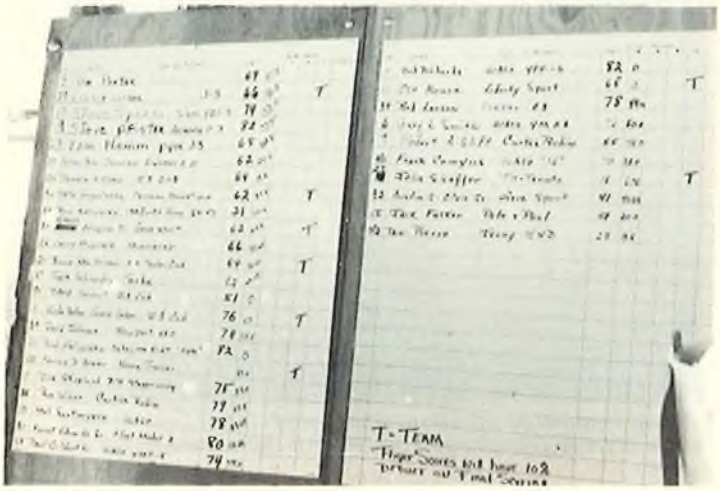
9th — Paul Gilbert Sr., Pilot SS-6 Starter.

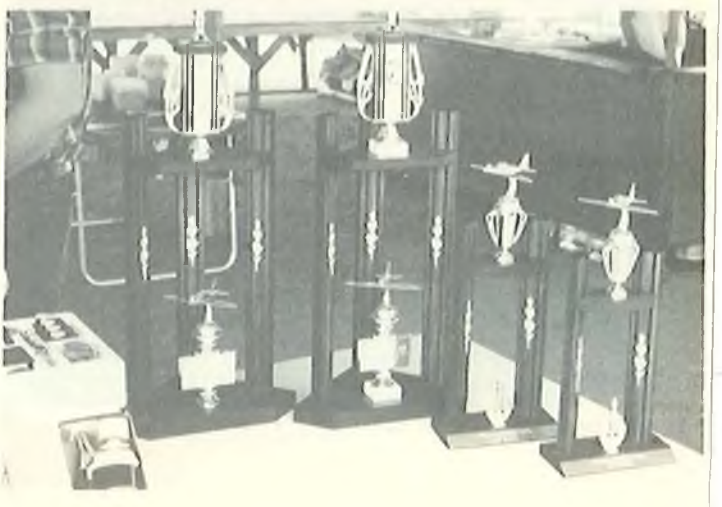
10th — Steve Spears, Pilot SS-4 Starter.

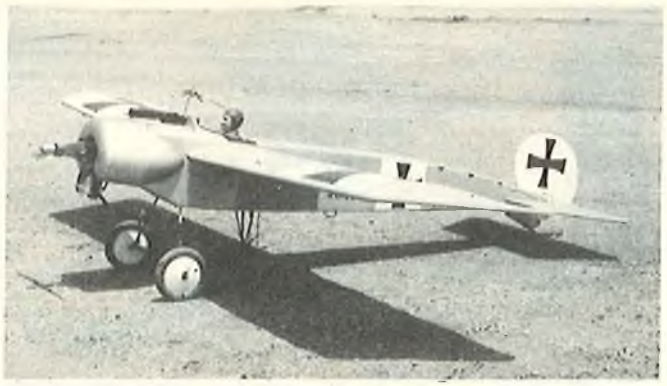
Best of Show: Chuck Maitre, Trophy and Saito FA-45.

Hobby Shack took care of the loot department. They chipped in a half a dozen or so of their fine Saito engines (four strokes of course), three or four of their Pilot kits, starters, a tachometer, and a Cirrus 850 XL 7 channel radio, plus 4 beautiful trophies. On top of all that every entrant would receive a half a dozen glow plugs, pint of Kwik Tak glue, glow clip with battery check, and a nifty 4 stroke contest cap. They have everything they need to put on a great contest. We made our final approach to the flying field (the right way finally), we came up over a small hill and lo and behold this must be the place, a huge tent with spectators all over the place and at final count forty three entrants. A terrific turnout for the first year as all who were there would agree. The weather was warm and the sun was shining, who could ask for a better Sunday?

Static judging was completed and flight lines were going by 9:30 in the morning, and the fun really began. There were quite a variety of aircraft







WW I Fokker EIII took 1st Place for Rod Larson, Saito .45.

Waco, Mel Santmeyer, O.S. .60.

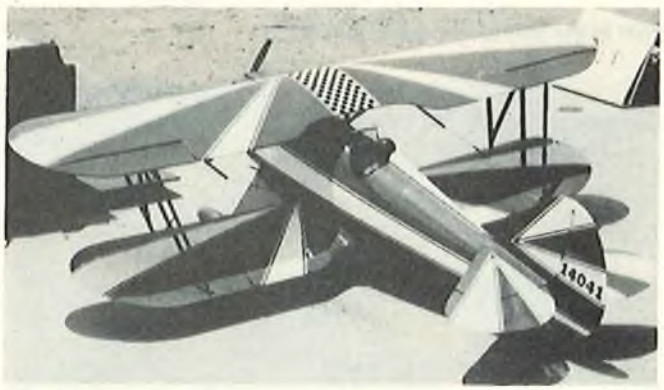
Taylor E-2 Cub, Charlie Strange, Saito .80.

Beechcraft Staggerwing, Dick Skoglund, O.S. .60.

Curtiss JN-4 Jenny, Don Pierro, O.S. .60.

Nieuport 28C, Dave Johnson, O.S. Gemini.

Fokker D-VII, Best of Show, Chuck Maitre, Webra .90.



Waco YMF-2, Gary Smith.

in attendance and no matter what you like, there probably was something that would have tickled your fancy. I couldn't pick a favorite but I've got to admit that Steve Pfisters' Aeronca C-3 Master sure caught my eye. Ron Wiser and Bob Sliff both flew very pretty Curtis Robins'. Ron's was scratch built and powered by an O.S. .40. Bob's was

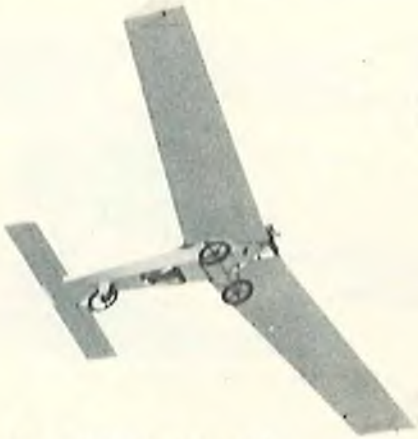
text to page 62

Moraine Solenair 230, Jack Cameron, O.S. .60.

Taube, Jack Schneider, Saito.

Liberty Sport, Cliff Bruce, O.S. .60.

Beachy, Bruce McAvinew, Saito .30.



What in the four stroke world is this?

Tin-Terato, Joe Schaffer, Saito .30.

Monoprep, Larry Maynard, O.S. .40.

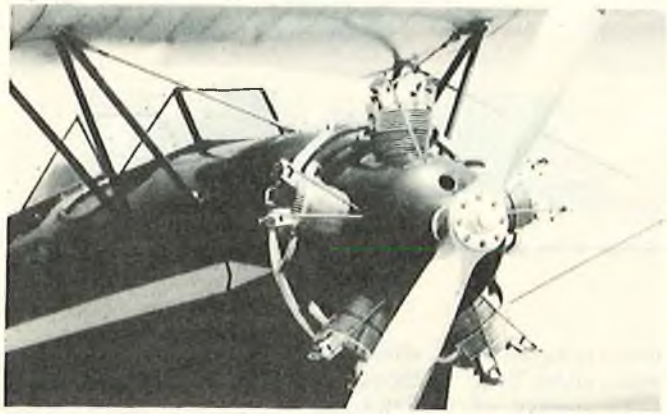
Pietenpol Aircamper, Jack Felker, O.S. .40.

Curtiss JN-4 Jenny, Don Pierro.

J-3 Cub, John Keller, O.S. .40.

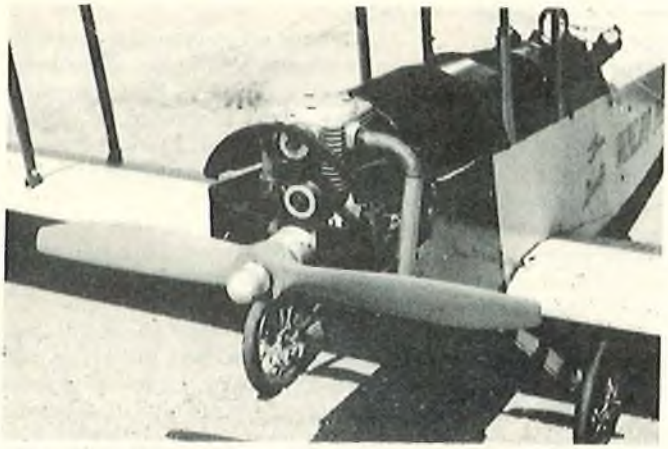
Gere Sport, Forrest Edwards, Jr., home-built 3 cyl. engine.

Fleet Trainer, Forrest Edwards, Sr., home-built 1/4 Scale Kinner.



Close-up of Forrest Edwards 1/4 Scale Kinner engine.

Forrest Edwards made this 3 cylinder engine from Saito .30 parts.



JN-4 Jenny "Waldo Pepper," Ron Karwacky, Webra .90.

Farman Moustique, Pete Sepulveda, O.S. .60.

Waco YPF-6, Bob Richards.

Aeronca C-3 Master, Steve Pfister, O.S. .40.

J-3 Cub, John Dolan, O.S. .40.

Curtiss Robin, Bob Sliff, Saito .30.

Gere Sport, Austin Cleis, Jr., O.S. Gemini.

Scene in the pit area.

built from original Berkley Plans and was powered by a Saito 30. Mel Santmeyer had a beautiful cream colored, O.S. .60 powered Waco Bipe that flew extremely well.

Forrest Edwards and Forrest Jr. were both there with two great planes. Forrest Sr. flew his 1/4 Scale Fleet Trainer powered by a hand built 1/4 Scale Kinner five cylinder radial engine that was incredible. The radial swings a 22/8 prop at better than 7000 rpm which really hauls the 22 pound Fleet around. Not bad, huh? Forrest Jr. flew a Gere Sport with another home brewed radial, this one a three cylinder made from Saito 30's. The Gere Sport was complete with metal cowl and rivets, and really looked good with that 3 cylinder radial.

There were some really neat Balsa USA planes there also. One was the Taube which I have seen before and find very appealing. The other was one of their newer kits, a 1915 WW I Eindecker by Bill Duncan powered by a Saito .45, a really great combo. Ever present, Ron Karwacky showed up with his JN-4 "Waldo Pepper" Jenny, it flys great with a Webra 90 four stroke. Chuck Maitre had a great looking 1/6 Scale, Webra .90 powered Fokker D7 that captured 'Best of Show' with the highest static score.

Most of the aircraft entered were vintage type, pre 1950's, and I have to say that these types of aircraft certainly lend themselves to the four stroke engines. The engines sound great and they turn large props with ease (Saito .45 turns a 14/4 at about 8000 rpm). At any rate, the flying style of the older birds and the realistic sound of the four stroke engines was a very pleasant change from the howl of some big two cycle tearing through the sky. Nice, relaxed cruisin' around on a Sunday afternoon, nothing to make you grow old fast. Indeed, that's how this whole affair impressed me. You would have thought this was just a casual Sunday flying session. No one suffered from the usual pressure symptoms and I don't think even one person got mad at a judge.

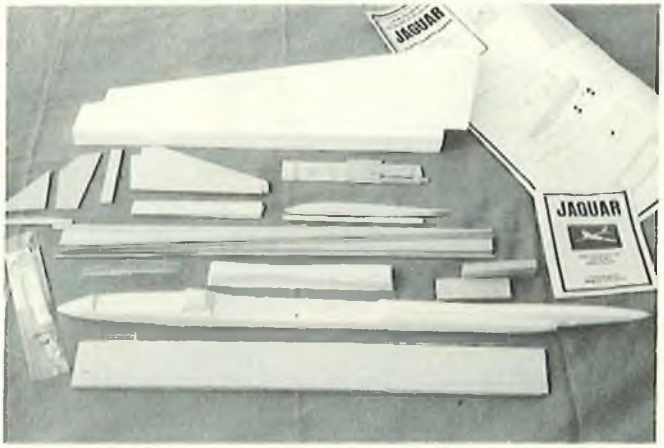
At any rate, second round flying was over by around 3:00 in the afternoon. Final tally showed Rod Larson, president of the Riverside R/C Club came up #1. Rod was flying a Fokker E3 from Balsa USA using an O.S. .60 four stroke for power.

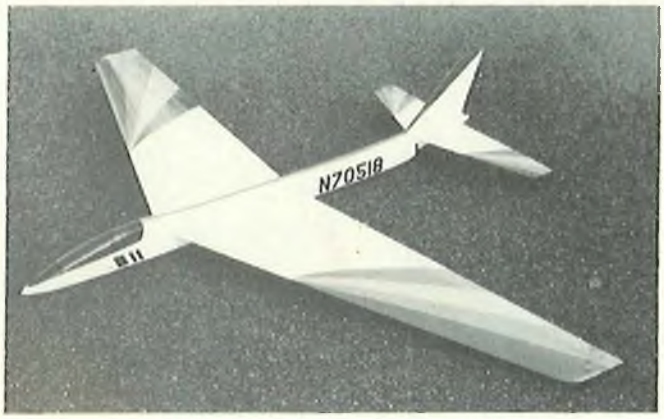
I must say that in this type of contest a lot a people with only average ability stand a chance of winning something.

I could write more about all the aircraft that were there but I'll let the photos tell the story. I know everyone present, contestants and spectators alike had a great time and that's what this hobby is all about. So here's hoping I see you next year, 'Four Strokin' It In Riverside. □

RCM PRODUCT REVIEW

Hargrave Enterprises JAGUAR





SPECIFICATIONS

Name	JAGUAR
Aircraft Type	Acrobatic Slope Sailplane
Manufactured by	Hargrave Enterprises
Marketed By	Bob Martin R/C Models, Inc.
	11178 Penrose St., Unit 4, Sun Valley, CA 91352
Mfg. Suggested Retail Price	$109.95
Available From	Bob Martin R/C Models, Inc.
Wingspan	69 Inches
Wing Chord (root)	13 Inches
Total Wing Area	625 Square Inches
Fuselage Length	47 Inches
Stabilizer Span	22 Inches
Total Stab Area	88 Square Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Recommended No. of Channels	2
Rec. Control Functions	Elevator & Ailerons
Basic Materials Used In Construction:	
Fuselage	Molded Dura-Lene Plastic
Wing	Balsa sheeting over foam core
Tail Surfaces	Balsa sheet
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (12 pages)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Futaba 6JN
Engine Make & Disp.	NA
Tank Size Used	NA
Weight, Ready to Fly	44 Ounces
Wing Loading	10 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Dura-Lene fuselage, graded quality wing skins, and jet-like appearance.

WE DIDN'T LIKE THE:

Lack of pre-cut plywood parts for canopy. Wing hold-down dowel installation.

Larry Hargrave advertises the Jaguar as an Advanced Acrobatic Slope Soaring Sailplane. This model is all of that, and then some. The fuselage has low frontal area with good blending of the canopy and wings to provide low drag. The wing airfoil, which appears to be similar to the very popular Eppler 205, combined with the swept and highly tapered wingplan provides a highly efficient lifting surface. These factors produce a clean, fast and aesthetic model on the slope. These same features and a wing loading 10 oz./sq. ft. also provide good performance off a winch or high start for thermal flying.

While this model can not be called a "scale model" of the British jet fighter Jaguar, it does bear a family resemblance. With the low drag simulated jet intakes and tailpipe, swept wings, anhedral horizontal tail surfaces, and clear canopy, it has well-proportioned Jet styling.

The 47" x 11" x 4" box provides a simple well-organized package which gives you the feeling of confidence that this is a well-engineered kit. Seven main items and packages are included: the guaranteed unbreakable Dura-Lene molded fuselage (a warranty return card is provided), the foam wing cores (still in the beds), the individually sealed plastic bags of goodies (hardwood, balsa and hardware), the balsa wing skins and, lastly, the canopy. With the small hardware and small pre-cut parts in sealed bags there is every likelihood that all the bits and pieces are provided and will be easy to locate.

Construction:

The full sized plans on one 33" x 50" sheet complements the 12 page 8½" x 11" instruction manual. You can follow the instructions blindly without reasoning how things will eventually go together, as I did. This would certainly have disclosed any errors in the instructions and eliminate subconscience attempts to do it another way. It worked, and no flaws were revealed.

The pre-cut parts were accurately and cleanly cut, except that the three canopy frame parts were not shaped from the 1/8" plywood. The balsa sheets for the wing skins were graded quality with harder sheets specified for the bottom and lighter sheets for the top. Foam cores were good quality and required only the usual fine sanding before the sub-leading edge, sub-trailing edge, root rib, and tip rib were glued into place. I found the use of tip and root ribs on the foam cores unusual. Once the tips are installed and the left and right wing panels joined the ribs are superfluous.

A possible advantage of the balsa ribs is that once the skins are attached, using the recommended Super-Tape, the foam is 100% enclosed in balsa and less likely to warp.

to page 118

PIT STOP

Gene Husting

The Ranch Pit Shop Raceway in Pomona, California, was the site of the 10th Annual McCoy race. 129 entries, including 10 from Japan, set a new record.

The starting line scene is always exciting to watch as 10 cars come screaming up to the first turn.

1/8 Scale 10th Annual McCoy Championships and 1/12 Scale Peppermill Classic, Reno, Nevada

We've got 2 big events for you this month. The 10th Annual McCoy race in Pomona, California, as well as the 1st Annual Peppermill Classic, held at the Peppermill Hotel and Casino in Reno, Nevada.

The McCoy race was held first, so we'll start with that. This Annual McCoy race, sponsored by the popular motor wizard, Dick McCoy, has grown to be one of the biggest and best 1/8 Scale races in this country. There were 129 entries for this race from all over the USA, as well as 10 drivers from Japan, including Katsonori Kondoh. You'll remember that Kondoh was the fastest qualifier at the 1981 World Championships in Indianapolis.

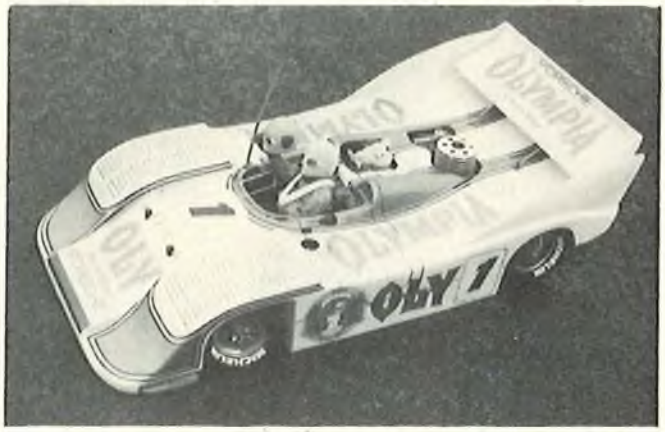
The McCoy race was held at the Ranch Pit Shop Raceway, 1655 E. Mission Blvd., Pomona, California 91766, with the race being expertly run by the Pro-Car Club. The Ranch Pit Shop Raceway is owned by Gil Losi and Gil has turned this track into the

With 129 entries, the pits were a little crowded, but everyone had enough room, as well as a lot of people to bench race with.

Bill Jianas was Top Qualifier driving an RC500 car built by Rick Davis. This is the 3rd year in a row that Bill has been TQ at the McCoy race.

Rick Davis built two RC500 cars. Rick qualified his car in 2nd spot. Two weeks earlier, he won the Detroit 6 Hour Enduro with the RC500.

Katsunori Kondoh (center) won the 10th Annual McCoy race with his 4-wheel drive Kyosho car. Rich Lee (left) was 2nd, with Dana Smeltzer 3rd.



Chuck August's incredible Olympia car won Concours. Chuck had to race the car and the body got destroyed.

most popular raceway in the USA. Weekly races for 1/8 gas cars, 1/12 electric cars, as well as 1/10 off-road cars are held. For this race Gil cleaned the track first and then applied liberal amounts of VHT for instant traction, and I must say the bite was better than its been for quite a few years.

There are a number of things that make this race so popular. It's in Southern California on a super track. The race is run very smoothly by the Pro Car Club. And most importantly, it's a week long event, so everybody gets all the practice they'll ever need, as well as 6 qualifying rounds, and with the ABC system, everybody gets to run in a Main event. And the 129 entries, which set a new high for the McCoy race, shows 1/8 Scale racing is still growing.

The question on a lot of people's minds was how well the independent suspension cars, such as the new Associated RC500, the Delta Eagle, and the PB cars would be able to do on a smooth, high bite track, compared to the flat pan chassis cars which love this kind of track. The Top Qualifier last year at the McCoy race was Bill Jianas who turned 12 laps in 4 minutes and 1 second.

In the middle of the first round, Rich Lee bettered the track record with a run of 13-4:17 with his flat pan chassied RC300 BD car. But in the last heat Curtis Husting turned 4:15 with his new RC500, which stood as fastest time at the end of the first round. What made this quite remarkable was that Curtis finished building the car on Wednesday and had only one day, Thursday, to practice with the car and then on Friday turns in the fastest time in the first round of qualifying. The car obviously worked quite well. But this was only the 1st round, there were 5 more to go.

Ralphie Burch Jr. turned the quickest time in the 2nd round with a 13-4:17 with his flat pan chassied RC300 BD car. Ralphie also had the quickest time in the 3rd round with a 13-4:08 with Arturo Carbonell right behind with a 13-4:09.

But in the 4th round Bill Jianas shattered the track record with a 13-4:01:64! Bill hasn't raced R/C cars since the 24 hour Enduro 6 months ago. But Rick Davis offered one of his two RC500 cars to Bill to drive for this race and Bill accepted. This same car had just won the Detroit 6 hour Enduro 2 weeks earlier. Rick was certainly happy to see Bill go so fast with Rick's car, but Rick certainly had to be pleased with his impressive 4th round qualifying effort which put him right behind Jianas with a 4:04:81. This stood as 2nd fastest time. After these two car's performance, it was clear that independent suspension cars are here to stay. The 4th round also had the fastest flat pan chassis time go to Ralphie Burch Jr. with a 4.07.29, which also held as fastest overall time, for a flat pan car. Jianas came back to turn a 13-4.05 which was fastest in the 5th round and then Bill turned a 13-4.02 in the last round. There was no question he had the fastest car on the track.

Sunday was Main event day. The "C" Main belonged to Tom Wong, who was chased around the track by Ken Campbell in 2nd with Ross Kloeber taking 3rd. The father and son team of Gary and Mike Buriani had some good close racing with Mike taking his father out a couple times during the race.

The "B" Main started with Gil Losi Jr., in the lead. Gil only missed the "A" Main by less than a second. I qualified less than a second behind Gil, and now I was again in 2nd chasing him around the track. But it didn't look like Gil wanted to give up 1st place. Then he ran out of fuel and I took over 1st. This only lasted a short time as Jerry Snow was closing in on me. In a short time he went on by. Then Joe Sullivan slowly closed in and Joe also passed me. The race ended with Snow Winning, Sullivan 2nd and myself 3rd, all on the same lap. Incidentally, every driver in the "B" Main broke last year's track record, so all these guys were moving pretty fast.

"A" Main event time. The cars were lined up and the green flag raised for the start of this 100 lap event. Arturo jumped in the lead with Jianas right behind. We were being treated with another one of those classic Arturo — Jianas duels. About 8 laps down Jianas caught and passed Arturo. Arturo tried to take the lead back in a tight corner. There wasn't quite enough room for passing however, so he hit Jianas, with Bill's car ending on its roof. This put Curtis Husting in 2nd now. Art pitted first and Curtis took over the lead for a few laps, until he pitted. Art had the lead again but Jianas was right on his tail. It wasn't long before Jianas passed him. Then another car hit Jianas in the rear and it bent the brake arm wire. The rear tire caught the wire and locked the brakes up. By the time they figured out what was wrong with the car Jianas was too far behind.

Rick Davis was now running right behind Arturo and Curtis, but before his second pit stop he ran out of fuel, losing 2 laps. Art made his 2nd pit stop and Curtis took the lead again. A couple cars later Curtis got nailed in the front by Chuck Phelps and it forced the front sway bar out of its mounts. By the time the sway bar could be re-mounted, he lost 8 laps.

Meanwhile Rich Lee had made a decision to run a smaller carb in an effort to get better fuel mileage and it was beginning to pay off. Art was pitting on 15 laps and Rich was pitting on 25. By Art's 3rd pit stop, Rich had taken the lead. Ralphie Burch Jr., never was in the race. He got hit on the 2nd lap and his car didn't want to turn left. Dana Smeltzer had gotten a bad start, but was now closing in on the leaders. Arturo had gambled on soft front tires to get enough bite on this track, and it looked by lap 75 that he wasn't getting any left steering either, because the tires were worn too much.

Katsonori Kondoh was also making 25 lap pit stops, and after his 3rd stop he was in 2nd place behind Rich Lee. He was about a half a lap down, but he was slowly closing on Rich. With 2 laps to go Rich still had the lead, but a

to page 68

McCOY RACE

"A MAIN"

Place	Name	Qual.	Laps	Car
1.	Katsunori Kondoh	13-4.11.30	100	Kyosho
2.	Rich Lee	13-4.08.52	100	Associated
3.	Dana Smeltzer	13-4.11.50	99	Associated
4.	Art Carbonell	13-4.09.72	98	Delta
5.	Rick Davis	13-4.04.81	97	Associated
6.	Ralph Burch Jr.	13-4.07.29	96	Associated
7.	Chuck Phelps	13-4.11.77	92	Associated
8.	Curtis Husting	13-4.12.77	92	Associated
9.	Jim Nelson	13-4.13.08	59	Associated
10.	Bill Jianas	13-4.01.64	50	Associated

"B' MAIN

1.	Jerry Snow	13-4.18.95	90
2.	Joe Sullivan	13-4.21.01	90
3.	Gene Husting	13-4.14.59	90
4.	Gil Losi Jr.	13-4.13.70	89
5.	John Thorp	13-4.19.41	88
6.	Mike Kimrey	12-4.00.01	85
7.	Bob Mathison	13-4.16.82	83
8.	Kenji Masuda	13-4.18.52	77
9.	Gary Kyes	13-4.17.77	74
10.	Randy Tentschert	12-4.00.00	57

"C" MAIN

1.	Tom Wong	12-4.05.06	80
2.	Ken Campbell	12-4.05.05	79
3.	Ross Kloeber	12-4.02.16	78
4.	Gary Buriani	12-4.03.59	78
5.	Joe Tassillo III	12-4.04.13	76
6.	Jim Adkins	12-4.02.73	75
7.	Tom Douglas	12-4.05.10	70
8.	Mike Buriani	12-4.01.43	49
9.	Jim Turner	12-4.05.54	2
10.	Chuck Moon	12-4.01.42	79

The starts of the 1/12 races are a lot quieter than the gas cars, but they're just as exciting as this action shows.

Ralphie Burch Jr. from Denton, Texas, was Top Qualifier with his JoMac Lightning 2000 car. You'll never believe it, but the moment this picture was taken, there was lightning on the mountain behind Ralphie!

Mike Lavacot (right) adds another big win to his long list by winning the Peppermill Classic race. Ralphie Burch Jr. (center) was 2nd, with Butch Berney taking 3rd.

half a lap later Kondoh took the lead and went on to take the checkered flag, with Rich right behind in 2nd and Dana Smeltzer 1 lap down in 3rd.

1/12 Peppermill Classic

The Sierra R/C Car Club in Reno, Nevada has been growing rapidly with the help and guidance of Sam Clarke of Clarkes Hobbies in Reno. So the club decided they'd like to run a big annual race in Reno for the 1/12 electric cars. They contacted the Peppermill Hotel and Casino, who offered the use of part of their parking lot for the event. Then the club started to personally contact as many of the teams as possible to see if they would come to Reno. The response was overwhelming as 8 teams and 122 drivers participated in this event. Only one class was run, Modified motors in Can Am class.

It was a 2 day event, with no additional practice days. Without the practice time it makes it very difficult for the average driver to be able to instantly adapt to a totally new track. Myself, I need the practice.

Saturday was one round of practice and then 2 qualifying rounds. The track had been cleaned off, but the traction was non-existant. Cars were spinning out everywhere. So for the next round, which was the first round of qualifying, a vote was taken, and the track was liberally sprayed with VHT by Bob Dewald. Presto — instant traction!

Butch Berney sure liked the new traction as he led the first round qualifiers with 37 laps in 8 min. 5 sec. and was the only one to break the 37 lap barrier. At the end of the 2nd round Butch Berney was still the fastest. David Johnson also got 37 laps in 8:14, in the 2nd round.

This was Saturday and Saturday night the Sierra Club had steak dinners for everyone in a large tent in the parking lot with a western band for entertainment. There was also an amusement arcade in the hotel for the younger racers, and for racers who thought that they had a lucky streak, the Peppermill Casino offered the answer. Actually, I never heard of so many people winning as there had been here. Somebody told me Mike Reedy won $600.00. Of course nobody ever tells you how much they lost. But who wants to remember that. We did get to see the Harrah's Automotive Museum and its just incredible. There are hundreds and hundreds of perfectly restored cars from day one to the present. It was a very interesting and informative museum. If you like cars, this is a must to see.

It rained Saturday night some, but Sunday the track was dry. There was one more round of qualifying left. All of the fast guys were well-qualified in the "A" Main, except for Mike Lavacot. Mike had a problem with his car, and by the time he figured out what was wrong, Saturday was gone. It seems he had lightened up his front "A" arms too much, and one of them got bent enough to throw the steering off. So Saturday night while everyone else was out having fun Mike was in his room trying to find the problem. He finally found it, fixed it, and he now had one more chance.

Mike Toland joined the 37 lap group, turning a super 37-8.12 and then the stage was set for the final heat. Mike Lavacot hadn't made the Main yet and he was going for it. The horn sounded and Lavacot and Ralphie Burch took off together. Lavacot slowly started pulling away. At the 6 minute mark Lavacot was still flying, but right after 7 minutes, his batteries dumped and he started slowing way down. Ralphie was about 1/2 a lap back and he was still flying. Within a lap Ralphie was right behind Lavacot, then he shot past Lavacot and went on to turn 37 in 8:02, which was good for Top Qualifying honors. Lavacot also got a 37 in 8:12.

The stage was now set for the A,B,C type Mains, except they didn't call the Mains A or B. They were given sponsor names instead. My Main was called the Parma Main and I'm not going to tell you how far down it was. I really miss the practice time.

Anyway, let's start with the Novak or "B" Main. These guys were all pretty evenly matched, except for one guy who belonged in the "A" Main. When the horn sounded, Jerry Case jumped in the lead with Jim Aguirre close behind. Within 2 laps Jim Aguirre had the lead. Joel Johnson was in 2nd with Bob Arwine in 3rd. But Jim Aguirre lapped the whole field and won with 37 laps.

The stage was now set for the Peppermill or "A" Main. The cars were lined up, the horn sounded and Ralphie Burch jumped in the lead with Butch Berney 2" behind. Lavacot got bumped around and was in dead last.

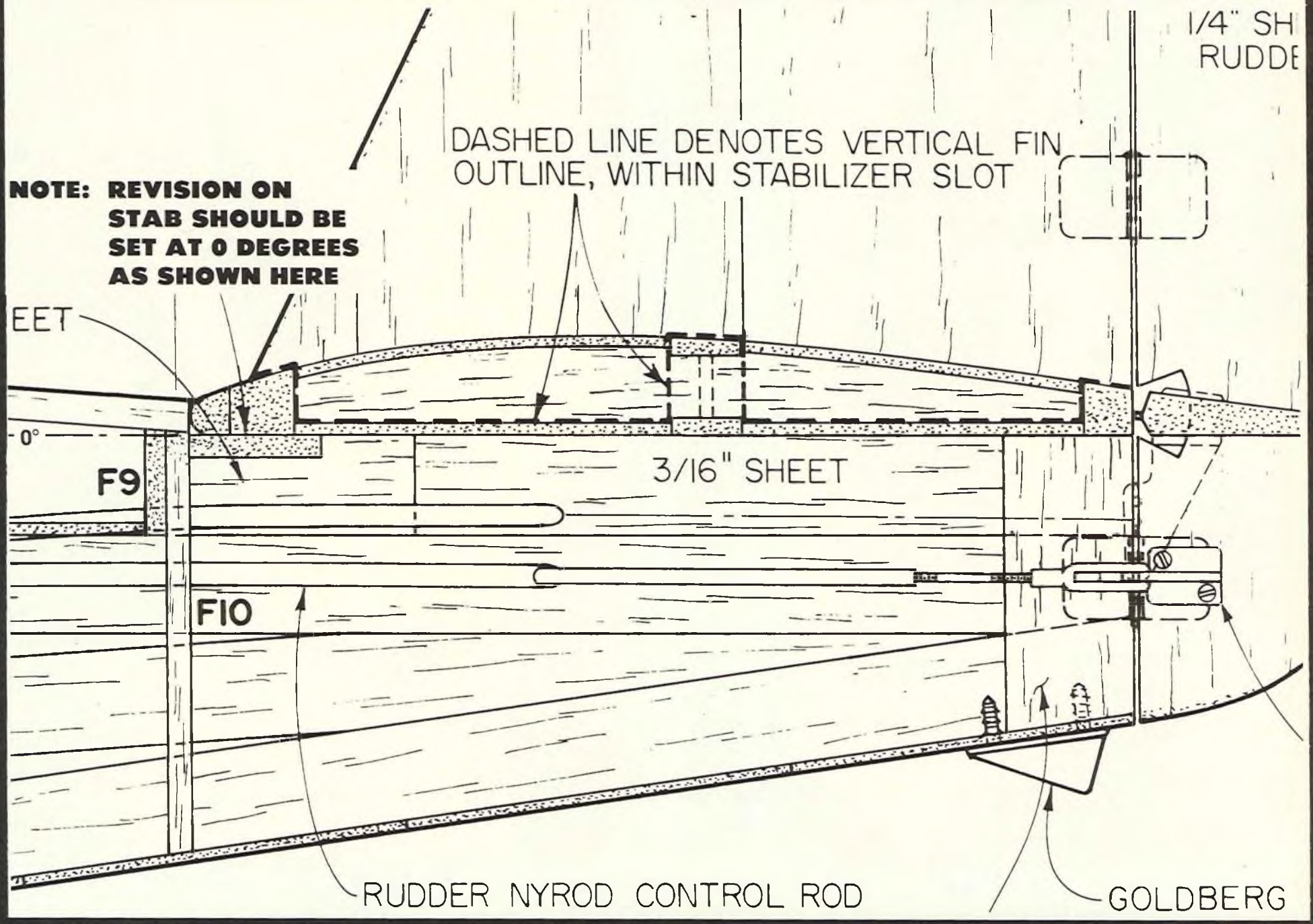
Burch and Berney were locked together, flying around the track. The

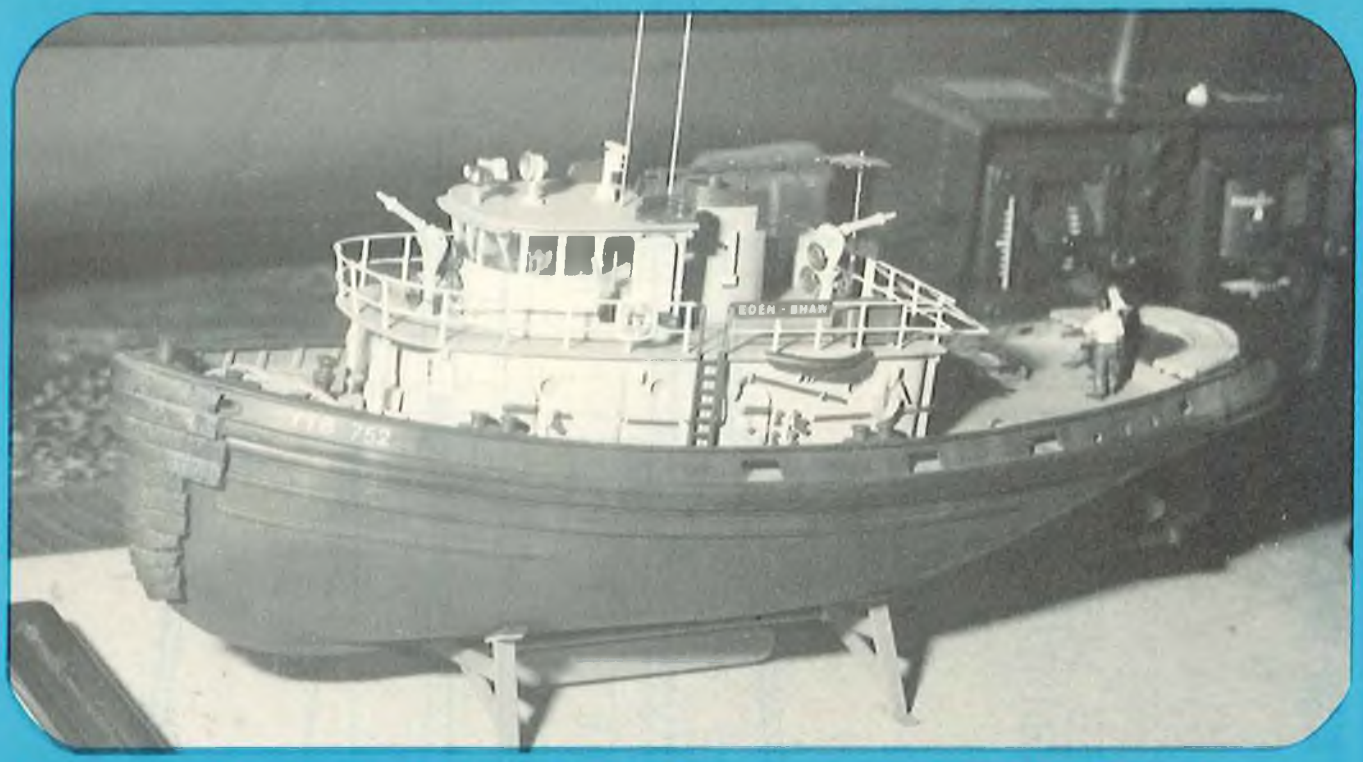
to page 118

PEPPERMILL CLASSIC

Place	Name	Qual.	"A" MAIN Laps	Car	"B" MAIN
1.	Mike Lavacot	37-8.12	37	Associated	1. Jim Aguirre
2.	Ralph Burch, Jr.	37-8.02	37	JoMac	2. Joel Johnson
3.	Butch Berney	37-8.05	37	Associated	3. Bob Arwine
4.	Mike Toland	37-8.12	35	Associated	4. Tony Ibison
5.	Doug Kott	36-8.03	35	JoMac	5. Carl Anderson
6.	David Johnson	37-8.14	35	JoMac	6. Jerry Case
7.	Eddie Janis	36-8.05	34	MRP	7. Larry Stevens
8.	Mike Hickman	36-8.01	34	JoMac	8. Bruce Hickman
9.	Kent Clausen	36-8.06	13	Associated	
10.	Gary Kyes	36-8.08	2	MRP	

CORRECTION TO RCM FUNSTER PLAN NO. 871

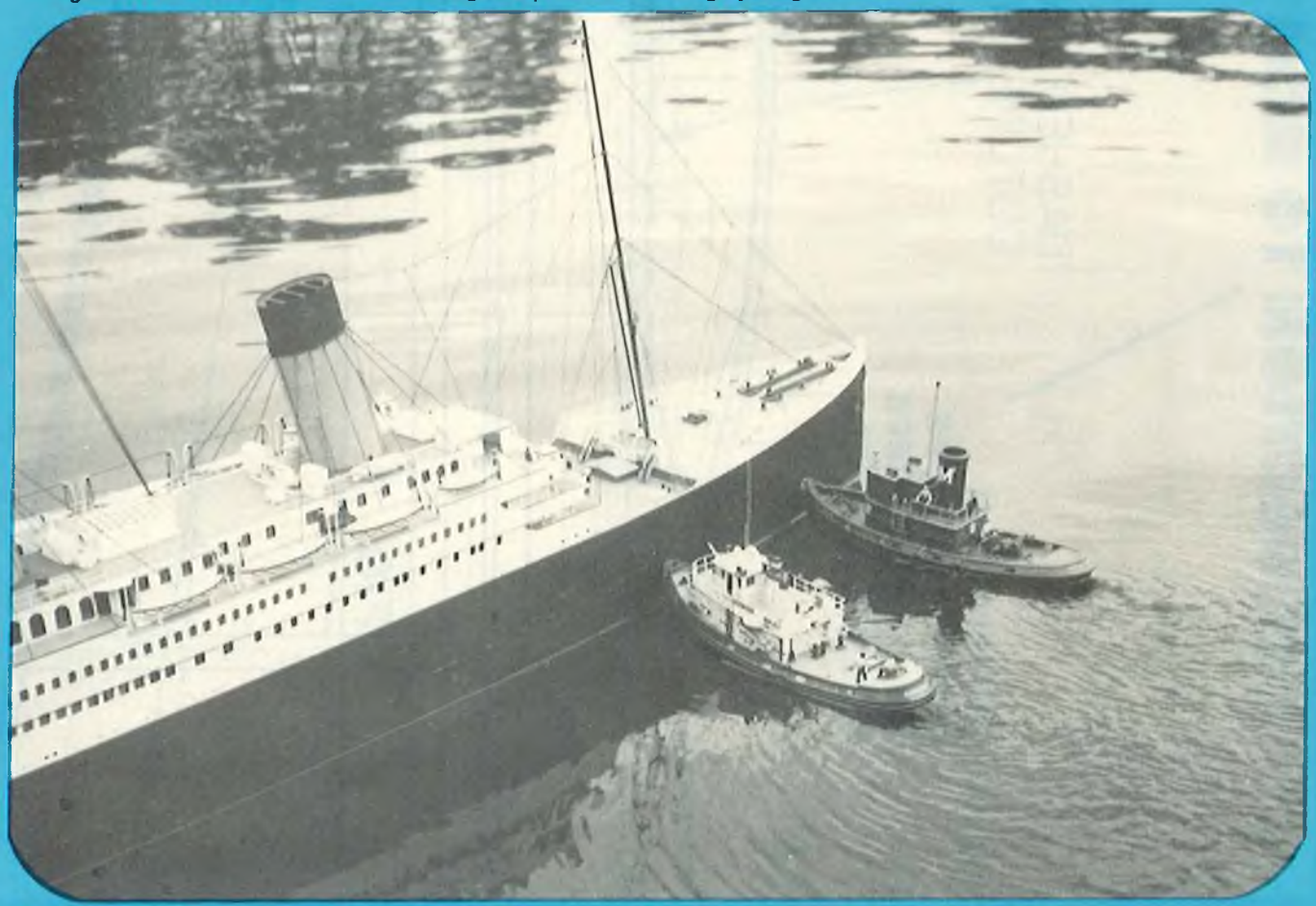


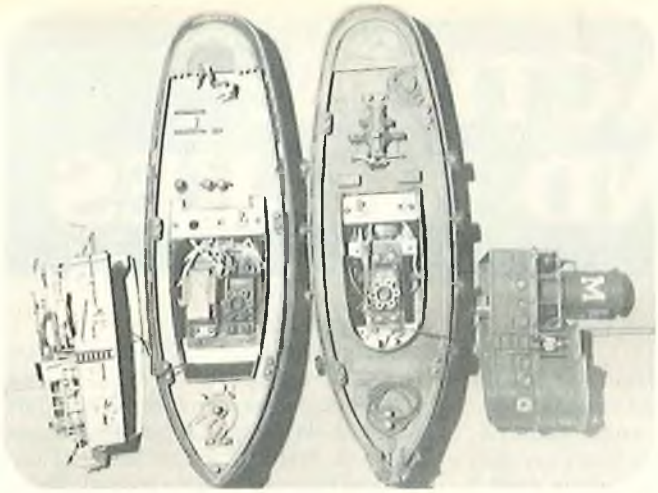


A 1/96 Scale R/C Model of the U.S. Navy tug "Eden-Shaw" (YTB-752) modified from the Lindberg plastic tugboat kit.

PEANUT SCALE MODEL SHIPS

A large radio controlled model of the Titanic gets a push from two Mighty Midgets.





The Eden-Shaw (left) shows the original R/C system using two servos, while the Dixie Moran (right) clearly shows the advantages to be gained in simplicity and ease of access by the addition of the Staubitz speed control described in the text.

The 1/96 Scale R/C Eden-Shaw (YTB-752) is dwarfed by Loren Perry's Navy issue shoes.

By Loren Perry, Jr.

Ever try to shove five pounds of "you know what" into a four pound sack? Well, if you have, and managed to succeed at it, then this project is right up your driveway.

My long-time hobby of building R/C scale model ships is becoming very interesting ever since I discovered the challenge of subminaturization in the design and construction of these models. Because I have chosen 1/96 Scale as my yardstick by which all my model ships and boats will be built, this has forced me to make some very small R/C models to complement my 7' and 8' long warships and liners. Tugboats to this scale come to about 1' in length while a fireboat is only 7" longer. To properly perform with the bigger models, these little guys had to have fully proportional steering as well as infinite speed control in forward and reverse. In the case of the fireboat, I also wanted an operating water pump and functional fire fighting nozzles (called monitors) and a solid state siren. Also, if possible, I wanted independent operation of the twin screws.

I decided to try to convert a standard plastic tugboat kit as my first step toward building the harbor fleet I envisioned. This was decided in order to speed up the construction process as well as to prevent the challenge from becoming a nightmare resulting from biting off more than I was capable of chewing. I chose a tug as my first model because, logically, I should be able to convert anything larger than a tug if I succeeded with that type of boat. Therefore, after a visit to the local hobby shop, I came home loaded down with a Lindberg plastic tugboat kit, a Cox/Sanwa 2 channel R/C system, a servo motor, a fistful of .600 mAh nicad cells, a charger, and lots of other good stuff. A letter to Mr. Glenn Staubitz of Buffalo, New York, provided me with a number of his miniature solid state speed controllers which are basically modified servo amplifiers. The drive train is actually little more than a servo with its gear train and case removed. By permanently centering the servo pot, the motor will then respond proportionally in both forward and reverse by moving the transmitter control stick in the appropriate direction. Once a propeller shaft and propeller are connected to the motor, a perfectly good propulsion system is created that can drive ultra-small R/C model boats. This was the system I wound up with in my tug after a brief period of fumbling with homemade switches, servos, and what-not. The system requires no servo to operate and plugs directly into the receiver.

In my tug, a standard Cox/Sanwa servo was used to turn the rudder. Four .600 mAh cells were wired into the circuit with two batteries being located on each side of the hull. The lone servo resided in the center with the drive motor aft and the receiver all the way forward. This last named item had to be removed from its case to fit the tight space in the bow.

With a phono jack for charging the battery and a subminiature toggle switch replacing the much larger original equipment slide switch, the internal equipment in this tug was

to page 117

The U.S.S. Long Beach is assisted by the tugs "Dixie Moran" and "Eden-Shaw" as she prepares for another deployment. All models are to 1/96 Scale (1/8" = 1').

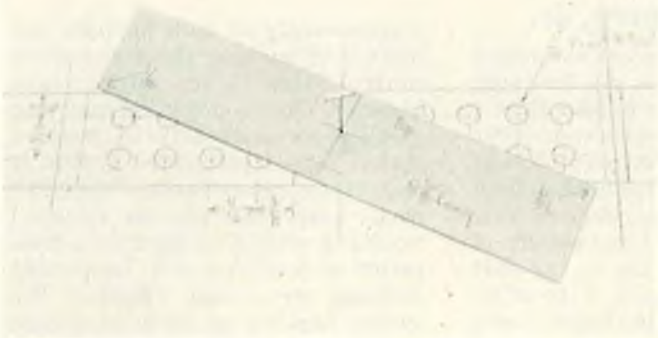
Tugs "Eden-Shaw" (left) and "Dixie Moran" (right) maneuver the huge liner "Titanic" out of its berth. "Titanic" model is to 1/128 Scale (3/32" = 1').

SINGLE ACTION: SPOILERS AND BRAKES

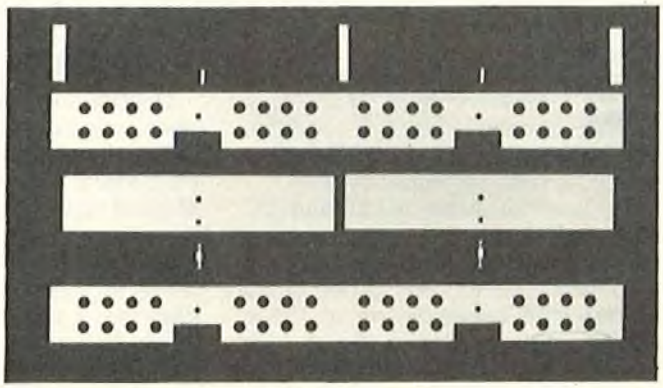
By Ernest J. Zahner

I fly at a field which is set aside by the county for sailplanes only. In the interest of safety, an individual must achieve Level I in the Soaring Accomplishments Program of The League of Silent Flight before he can fly without the supervision of a senior pilot. Now on a good day, I am sure that most fliers would agree that anything with a wing could be kept in the air for the 5 minute thermal task. The spot landing requirement, however, is not so easy. Since my ship lacked spoilers it took awhile until I mastered the knack of getting close enough to a designated spot to qualify for a Level I landing.

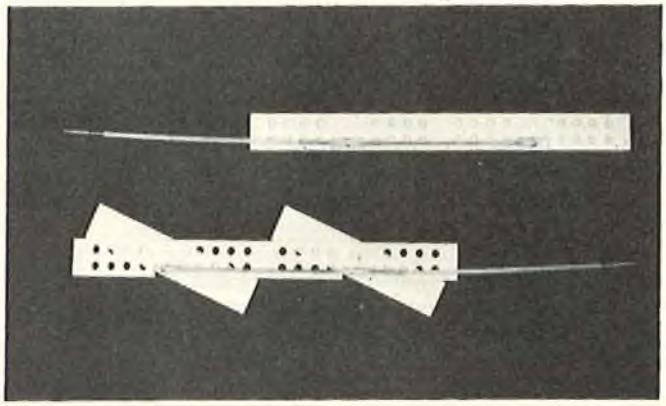
Although I eventually attained this level of competence I still had occasions where my landings left much to be desired. I became rather good at stalling a few feet off the ground followed by a cartwheel. These aerobatics invariably occurred when my approach was a little high and I



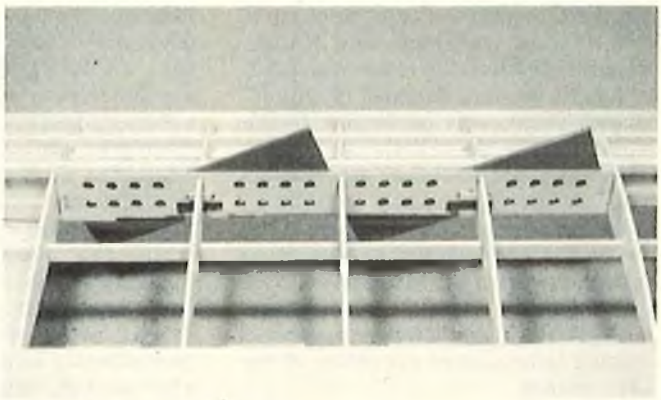
Idea transferred to paper.



Parts required for one spoiler-brake.

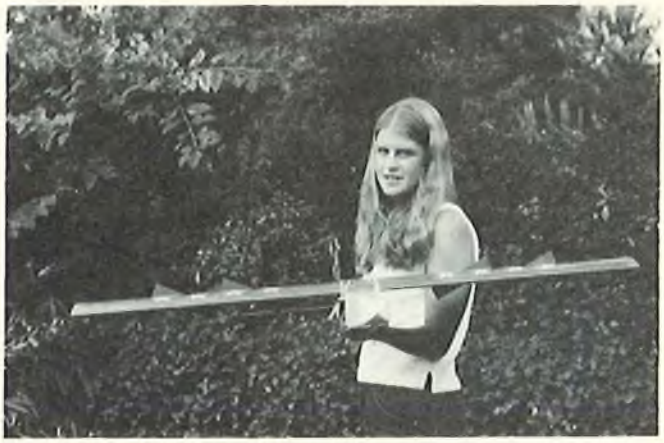


Assembled spoiler-brakes.



Spoiler-brake built into wing.

Bellcrank with links attached.



Front view showing spoiler-brakes deployed.

Final adjustment of rudder trim (photo by Brendan Zahner).

Approaching high (photo by Brendan Zahner).

thought another turn would do the trick.

Now I knew that spoilers would go a long way in solving my approach problems but I never liked the strings and hinged trailing edges in the wings used on virtually all models. What I did like was the way spoilers are deployed on full scale sailplanes: straight up. After a bit of thought, the mechanics involved in straight up deployment seemed too complicated. What I finally decided on was so simple that at first I did not believe it would work. Instead of going straight up, why not have the blade rotate out of the wing? This, of course, is not too new, but why not allow the blade to come out of the bottom of the wing as well? As I visualized the construction, Du-Bro ball links would be perfect to articulate the whole works. Best of all, the entire mechanism could be built without starting on a wing. If I lost interest, not too much time would be wasted. As it turned out, however, once I saw how nice the spoiler-brake worked on the bench, I became very enthusiastic about building a wing.

I decided to actuate the spoiler-brake using a bellcrank in the wing connected to a servo in the fuselage. Although this was more complicated than simply placing the servo in the wing, I felt at the time that any adjustments required would be easier. While true that a problem might arise if the wing and fuselage part company, a problem may also arise if you try flying through a tree. The fuselage used for the wing was from a scratch-built design that had withstood several impacts with a variety of objects (mostly the ground) without suffering irreparable damage.

The finished project did not look half bad; so with my 12 year old cameraman, Brendan Zahner, in tow I headed for the field. There were no obvious problems with the new wing since the ship went up nice and straight. The first few flights showed how set I had become in my ways. I never dared use the system since the ship was either too low or about right

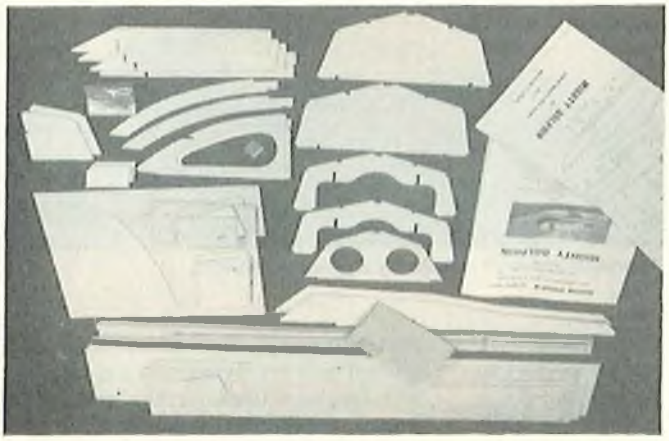
to page 117

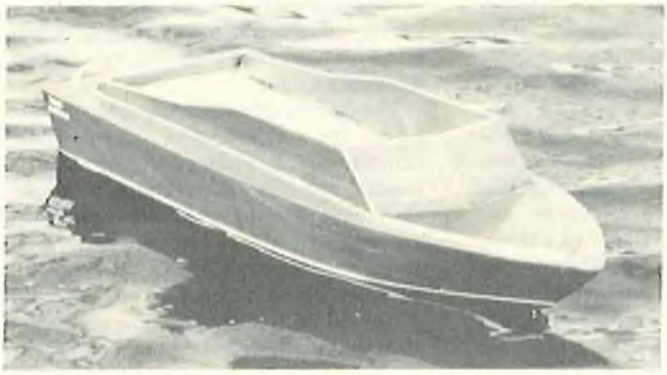
Spoiler-brakes deployed; almost down (photo by Brendan Zahner).

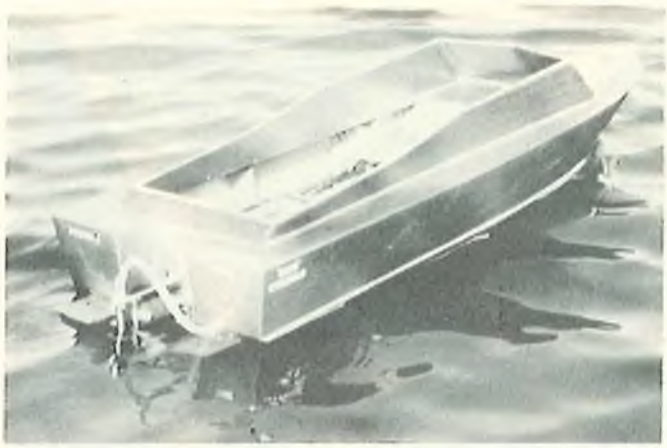
Finished product.

RCM PRODUCT REVIEW

Steve Muck's MIGHTY DOLPHIN







SPECIFICATIONS

Name	MIGHTY DOLPHIN
Boat Type	Deep Vee Day Cruiser
Manufactured By	Steve Mucks R/C Model Boats 6003 Daven Oaks Drive Dallas, Texas 75248
Mfg. Suggested Retail Price	$69.95
Available From	Both, Mfg. & Retail
Hull Length	36½ Inches
Hull Width	11 Inches
Recommended Engine Range	6.5 cc
Recommend Fuel Tank Size	12 Oz. Tank
Recommended No. of Channels	2
Rec. Control Functions	Rudder & Throttle
Basic Materials Used In Construction:	
Hull	Plywood & Spruce
Building Instructions	No
Instruction Manual	Yes (12 Pgs.)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba 3 Channel
Engine Make & Displacement	Enya .40 R/C Marine
Tank Size Used	Sullivan SS 12 Oz.

SUMMARY

WE LIKED THE:
Instruction booklet, plans for boat cradle.
WE DIDN'T LIKE THE:
No faults.

This kit which is put out by Steve Muck is a deep vee day cruiser which can be used for fun running or competition. It comes in a hard cardboard box, which measures 40" x 11½" x 2". Upon opening the box, all parts are loose and each part is numbered.

Construction:

A full size plan sheet is included in the kit. The plan sheet is used to place the frames on, also deck and water line chine molding and keel. A complete constuction booklet is included with actual pictures of the kit being built. Also is a complete list of tools and supplies needed to complete the model. The kit is made of quality aircraft plywood and mahogany. Parts are all die-cut and all parts fit together beautifully. Elmer's Professional Carpenter's Wood Glue was used to construct the kit. Additional tools required are X-Acto knives and saws along with screw type C-clamps and masking tape. Kit uses Steve Muck's hardware set No. 65 which is not included.

Covering:

The hull is covered with Boat Armor Iso-Resin and fiberglass cloth. The finish was accomplished with the following products: Ditzler's Light Gray Hot Rod Lacquer Primer and Ditzler's Acrylic Lacquer Paint. Nippon Suntron ZC-300 clear lacquer was sprayed over the two—tone green. Finish was done with a Badger #250 Mini Spray Gun.

Engine:

The power plant is an Enya 40 (6.5 cc) R/C Marine engine with stock muffler. It's bolted on an Octura Motor Mount. At the end of the muffler opening we clamped on a heat resistant rubber hose and at the other end of the hose, clamped on a brass tube, and ran it through the bottom of the hull. The fuel tank is a Sullivan 12 oz. slant tank. It's installed directly in front of the engine.

Radio:

My R/C unit is a Futaba 3 channel Nicad System. An R/C box and plexiglass lid comes with the kit. There's plenty of room in the box to mount the 2 servos and receiver. The box was screwed to the floor of the hull directly behind the engine.

Conclusion:

We were very satisfied with the boat's performance. She's a real pleasure to watch. Cost value from start to finish is approximately $440.00. A complete catalog of all of Steve's products is available for $1.00. Send to Steve Muck's R/C Model Boats, 6003 Daven Oaks Drive, Dallas, Texas, 75248. □

ENGINE CLINIC

Clarence Lee

The mail has been running heavy the last few months with letters and/or questions related to converting the glow engines to either spark ignition (so that gasoline fuel can be used) or diesel operation. In most cases, the fellows are looking for more power as well as lower fuel costs and want to know if converting to spark ignition or diesel operation will give them more power. The answer to this is both yes and no. It all depends on the particular application.

Many of the letters come from fellows with overweight pattern ships that want to get just a little bit more out of their Rossi, OPS, etc. Neither spark ignition or diesel conversion is going to be of any help here. Both spark ignition and diesel operation will allow an engine to develop more torque in the lower rpm range and, consequently, swing a larger prop. So, although the overall horsepower of the engine is not increased, the horsepower in the lower rpm range will be increased. This proves beneficial in the scale type aircraft, particularly biplanes, where larger propeller sizes are needed to overcome the extra drag.

Glow ignition engines are happiest when allowed to turn up and develop their maximum horsepower at higher rpm --- anywhere from 14,000 to 17,000 rpm with a pattern type engine and well above 20,000 with a racing engine. Some of your Formula I racing engines develop their maximum horsepower in the 26,000 range. As a result, most glow engines do not like to be lugged down with too much prop. Anything below 10,000 will start to cause heating problems — especially if the motor is enclosed in a scale type cowl without adequate cooling. Lugging the engine down in the 8,000-9,000 rpm range is asking for real problems. If it is always run on the rich side with adequate cooling you can get away with it. But one lean run or inadequate cooling and the engine will have a very short life expectancy. As many fellows have found out the hard way — the engine can be totaled in one flight.

By converting a glow engine to spark ignition or diesel operation that, in turn, improves the low end torque, the larger propeller sizes can be utilized with less tendency for overheating. In the case of spark ignition, the timing of the spark firing is controlled and pre-ignition eliminated which results in cooler running. That is provided, of course, that you do not start adding nitro propane or other additives that do increase the power and resulting heat. Generally speaking, diesel fuels are composed of a large percentage of ether that has considerable cooling effect and most diesel motors run very cool; there are, naturally, some exceptions.

Many fellows seem to think that converting a glow engine to spark ignition will result in a power increase due to gasoline having a higher BTU rating than alcohol. However, what is not taken into consideration is that the fuel/air mix with gasoline is approximately 14-15 parts air and 1 part gasoline. With methanol it is 6-7 parts air to 1 part methanol. So, in one revolution of the crankshaft over twice as much methanol is pumped through the engine and burned.

The addition of nitro methane to the glow fuel which burns at the rate of 2 parts air to 1 part nitro methane increases the amount of fuel being pumped through the engine. So the BTU rating of the fuel being used is not all indicative of the power potential of the fuel. The fuel/air ratio and how much fuel passes through the engine in a given time period also plays a big part in the power developed. However, the fact that it requires 1 part of methanol to 6 parts of air and only 1 part gasoline to 15 parts air to support combustion results in considerably less gasoline being used. This is the reason that a spark ignition motor run on gasoline will run over twice as long on the same amount of fuel. A spark ignition motor can also be run on methanol and fuel economy becomes the same as with a glow engine. A glow engine can also be run on gasoline if a small percentage of nitro propane is added, but the engine will not perform nearly as well as it does on methanol although economy will be increased considerably. Kerosene, the main ingredient in diesel fuel, has the same air/fuel ratio as gasoline — 15 parts air to 1 part kerosene. Again, this accounts for the increased fuel economy with diesel operation.

Many readers have wanted to know how they can go about converting their present glow engine to spark ignition and any problems involved. There are two directions that can be taken here. Either have your engine modified so that it can use conventional points or purchase one of the electronic ignition units on the market. Fabtronics markets an excellent unit that I have checked out and found to work extremely well. I received one of the Fabtronic units a little over a year ago but at that time machine work, beyond what the average modeler has available, was required. A mounting bracket for the light sensor had to be fabricated as well as a timing disc for triggering the light sensor. The front of the engine, in turn, had to be machined to accept the light sensor bracket. Just asking your local machinest to make the necessary parts and modify the engine is not all that easy. Most machine shops are involved in quantity produced items and do not want to bother with one of a kind type jobs. Or, if they do have a minimum charge, that would really put you in a state of shock. More recently, Fabtronics has made their conversion kit complete so that no parts need to be made and machining of the front of the engine is no longer necessary. A good step in the right direction. It should be pointed out that the "black box" only replaces the conventional mechanical points and condensor. A spark coil and batteries are still required.

An electric starter is also recommended when using the Fabtronic unit. Once the proper timing is set, the retaining ring that holds the light sensor is locked into place. This means that the engine must always be started with the spark timing in full advance. When hand starting it is very easy to get a mean "kick back." Everyone has experienced a "kick back" when starting a glow engine at some time but you "ain't seen nothin" until you have tried to start a spark ignition engine with the timing in full advance. With conventional mechanical points the spark timing can be retarded for starting and then advanced after the engine is running. Actually, no big problem here as the majority of modelers now use electric starters to start their engines anyhow.

Spark ignition can really play havoc

with radio systems — some far more than others. Some radios can get by with nothing more than a shielded high tension lead and 10K resistor. Other radios require more complicated isolation of the radio. There have been quite a few technical articles published on shielding your radio for the use of spark ignition so we will not go into that here.

There are several fellows offering glow engines converted to spark ignition using conventional mechanical points. However, the only one who I know of who consistently advertises and will convert your glow engine (regardless of make) to spark ignition is Otto Bernhardt of 77 Products. I have seen many engines converted by Otto and the conversion is first class. The address — 17119 So. Harvard Blvd., Gardena, California 90247. Write to Otto for prices.

When it comes to diesel conversion, Bob Davis is **the** man. Bob has done more in the past few years to advance diesel operation than has occurred in the past 20 years. Following WW II, there were quite a few diesels on the market — most of foreign manufacture and many of antiquated design. However, for a few years improvements were made and some really nice diesels in smaller displacement sizes were on the market. For the past few years, most manufacturers have devoted production to the glow engines that can be sold in much larger quantities. So the diesel situation sat pretty much dormant until Bob Davis got into the act. Now, just about any modern-day glow engine can be converted to diesel operation with one of Bob's conversion kits. He has them for engines from .049 displacement through the O.S. .90. One of these conversions will really bring a marginal powered .049 to life. I checked one out on a K & B 3.5 and was really impressed with the performance. The engine did not run as fast with smaller sizes of propellers, but would turn a 10/6 almost as fast with diesel as it would a 9/6 on glow with 15% nitro fuel. Quite impressive. In case you haven't seen his advertisement, the address is Davis Diesel Development, Box 141, Milford, Connecticut 06460.

Many fellows have considered converting to spark ignition or diesel operation strictly due to fuel costs. Gasoline base fuel is considerably cheaper than glow fuel, mainly due to the lack of nitro methane. Oil costs remain the same and gasoline is only about a dollar per gallon lower in cost than methanol. The main savings comes from the same amount of flying time on less fuel. Diesel fuels cost a little more than glow fuels but, again, the savings is in lower fuel consumption. The savings in cost is not nearly as much for diesel operation as it is with spark ignition. With spark ignition you also have the initial cost of the batteries and a spark plug.

Before closing this bit I would also like to point out that both gasoline and diesel fuels are far more dangerous to use and store than methanol. And both deteriorate with age whereas glow fuels gets better with age providing they are kept tightly capped and stored at a constant temperature. Fellows have a tendency to become rather complacent about handling glow fuel. A lot more care has to be taken when handling and storing gasoline fuel or diesel fuel. Leaving the fuel can in the trunk of the car between flying sessions should be avoided if you intend to keep your car any length of time --- especially with diesel fuel containing ether that has a very low boil point. Starting batteries should be kept separate from the fuel can so there is no chance of either tipping over and contact igniting the fuel. This is also true with glow fuels and there have been several instances of glow fuel blowing up if the metal can is brought into contact with the battery leads. Bob Smith, the noted Formula I flier, was badly burned when this happened several years ago. With gasoline or diesel fuel the chances are even greater, so far more caution has to be taken. Electric fuel pumps are also bad news with gasoline and diesel fuels. Only the hand crank type or fuel bulbs should be used.

So, before deciding on converting to spark ignition and gasoline fuel or diesel operation, weigh the advantages and disadvantages.

★

Mr. Lee,

I enjoy your column very much and I read it first every month. It's always nice to hear from an expert.

I have questions regarding helicopter engines. I'm very new to this phase of the hobby and most of what I know is what I've been told by others. I just ordered a new Heli-Boy and I want to buy an engine for it. The salesman told me no engine with a Perry carb would work in any helicopter. Why? Do you recommend any engine in particular for this type of use?

Also — one last question — I noticed a couple of months ago in your column you talked about thrust, prop size, and pitch. I noticed the more thrust, the less rpm. Is there any way of knowing when you overload the engine? Is there a minimum rpm? Are there some guidelines to follow?

This is my second helicopter. The one I have now uses a Fox 40 BBRC and seems to work fine, though I have nothing to compare it to. Is it necessary to buy an expensive motor or would a cheap one work as well?

This is my first year as a reader of RCM so I haven't seen this information before. Thank you very much for your time and trouble. I appreciate it very much.

Dan Kramer
Pullman, Washington

Dan, hundreds of guys are flying helicopters with engines using Perry carburetors with no problems. Evidently the hobby dealer you talked to must have had some bad luck with a Perry carburetor at some time and chose to "bad mouth" them. The new 80 series do have a steeper taper to the needle valve which makes them a little more sensitive to set. Some fellows have complained about loading through the mid-range right at the rpm that they want to run the engine. This, however, is usually a combination of fuel, glow plug, and tank position. The tendency is to run helicopter engines on the rich side. Some fellows overdo this and the excessively rich high speed results in loading through the mid-range.

As far as engine load — glow engines like to turn up to develop their power. Usually this is 11,000 or higher. 10,000 would be considered

loading the engine, and anything below this really lugging it down. This is true regardless of engine displacement.

I am sorry, but I do not recommend specific makes of engines. I have had this backfire in my face in year's past. If I recommend an engine and you have problems, then I get the blame. I had one character buy an engine on my recommendation and have problems. He then expected me to get the dealer to refund his money or reimburse him myself. So this is a decision **you** will have to make. Fox does put out a good line of engines at a reasonable cost. There is no need to purchase an expensive engine when just getting started in R/C until you are sure you intend to stay in the hobby.

Mr. Lee;

I would appreciate some information on the following problems:

I own a Taipan 2.5cc ball bearing engine. Because of poor storage procedures the rear bearing has corroded and is quite rough running. I attempted to remove the bearing by heating the assembly (crankcase and both bearings) first to 300°F and then to 500°F in the oven. Obviously no success or I wouldn't be writing you.

(1) How can I get the bearing(s) out?

(2) If there is no way, where can I obtain a new crankcase with bearings installed? Any idea of cost?

If you can help me I would be very grateful.

Thank you,
D. Marden
Redondo Beach, California

Although many engine authorities recommend heating the crankcase in the oven, I prefer a propane torch myself. If you heat both the case and the bearings in the oven, both come up to the temperature that is set. This should never be higher than 350°. Although the aluminum crankcase will expand more than the steel bearings the steel bearing has also expanded. By heating the case around the bearing area with a torch the aluminum expands while the bearing is cooler and removal is much easier. Repeated heating will naturally get the bearing hot so the trick is to quickly heat the case and then smack it hard on a piece of wood. The bearing will pop right out. Smacking it on the piece of wood is the trick that does it. Do no expect the bearing just to fall out unless it was a pretty loose fit to begin with. The front bearing can be pushed out with a wooden dowel, a piece of aluminum or brass, etc.

By heating the case to 500° you probably cooked the oil to a hard goo or varnish. Soak the bearing with Liquid

to page 116

5TH ANNUAL

By Dick Tichenor

STARS SPANGLED SCALE RALLY

For The Giant Scale Enthusiasts

RCM was privileged to attend what has become one of our nations most significant R/C events, the STARS Spangled Scale Rally held on the municipal airport at Olean, New York.

The STARS, a comparatively small R/C club of dedicated and energetic modelers, work closely with the Mayor of the City of Olean, New York, and the city's Common Council who not only allow the STARS to use the Olean municipal airport for this annual rally but go a step farther by closing the airport to full size aircraft. The airport is in a lush pastoral setting with the model flying area manicured like a golf green.

Supporting the STARS in this event is the Exchange Club of Olean, New York. The Exchange Club generously supplies manpower required for numerous chores mainly related to assisting several thousand spectators in parking and viewing the rally.

Advance promotion was arranged with the local newspapers and radio stations. The Buffalo ABC affiliate carried TV coverage on Sunday 6 o-clock Eyewitness News.

The STARS out-do themselves with the food and drink provisions which include delicious hot chicken dinners barbecued on the field. Considerations for the attendees continues on to a bon fire party on Saturday night with food and drinks, a superb slide show of last year's rally and the AMA film, Magnificent Miniatures.

The 1982 Rally was attended by modeling notables such as AMA President John Grigg, IMAA President Don Godfrey, MAN's Art Schroeder, Model Aviation Hall of Fame member Hal deBolt, and numerous others.

The keynote of the STARS Rally is **safety,** first, foremost, and final! The Rally was organized and conducted under safety standards second to none and exceeded all AMA requirements by a wide margin.

All of the foregoing reflects an admirable amount of unified spirit and effort within the STARS club to a degree that is most unusual. In fact, it was requested of this writer to avoid the mention of individual names, if anything was worthy of mention it should be in the name of the STARS.

If the success of an endeavor can be measured by response, then the STARS Spangled Rally did real good. There were 138 models registered with owners coming from 11 states. This does not include quite a few that were only set out for display and those left in the cars. That many giant models cover a lot of real estate.

In addition to the aircraft shown in our photos we would like to mention some of the wide variety of model types: Dick Layton's JN-4 Jenny, Duane Campbell's Pober Pixie, Nick Ziroli's Fokker Triplane, James Dillabough's RV3, George Privateer's DH-2, Hal deBolt's RV-4, Wendell Hostetler's P-6E Hawk, Dick Brook's Bucker Jungman and F-16, Roy Abbott's Laser 200, John Lopessti's Heinschel, John Opsitnik's CAP 20.

Also, Charles Yaindl's Fock-Wulf FW 56 Stosser, Paul Weigand's PT-19, Jerry Piscitello's Piper Tri Pacer, Bob Campbell's Maxi Acro, Bruce Knox's Monocoupe, Edward Zinole's Kraft Super Fli, Ray Climenhaga's Smith Miniplane, George Tyson's Fly Baby, Chris Dascano's Super Stearman, Dick Nersesian's Beech Staggerwing, Robert Vomera's Cosmic Wind. Naturally there were multiple examples of Cubs, Fleet Trainers, Ercoupes, and Tomahawks.

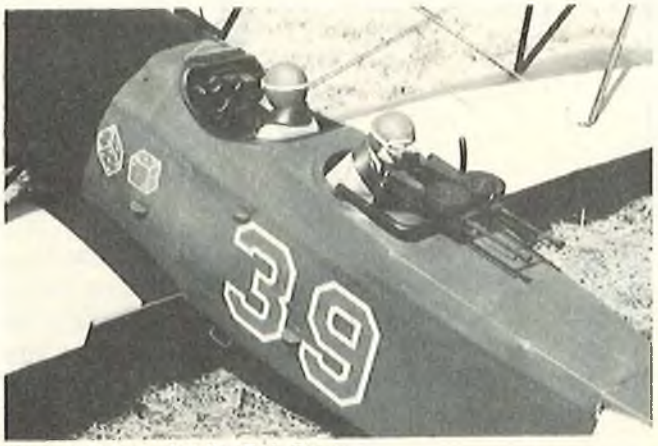
There was a lot of spectacular flying on Saturday within three designated areas of airspace. Sunday's activities were somewhat dampened by rain showers and a goodly number of attendees headed for home rather early. Even so, the Fifth Annual STARS Spangled Rally ranks among RCM's all time most enjoyable events.

For the giant scale enthusiasts, if you want a relaxed, enjoyable weekend of flying with no hassles, no judging, no entry fees, only a fantastic time, plan to attend the 1983 STARS Spangled Rally. □

Spirit of St. Louis, Hank Likes.

Famous 1/3 Scale J-3 Cub, Bob Nelitz.

T-6, Nick Ziroli.



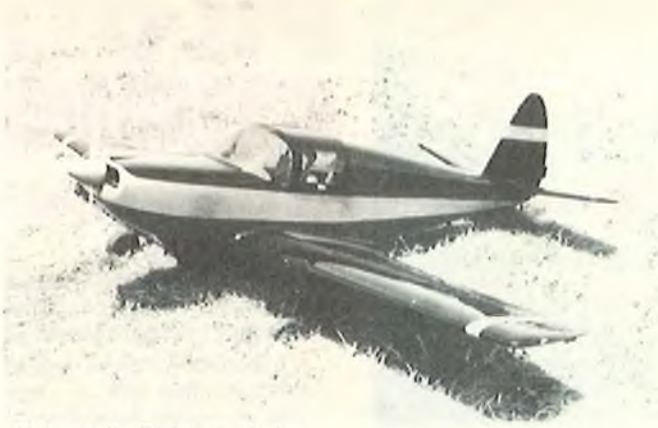
Curtiss Falcon details, Bob Dunn.

Druine D31, Doug MacBrien.

Ryan STA, Jack Munn.

Ercoupes, Ralph Cicerello, Jim Messer, Mike Orcutt.

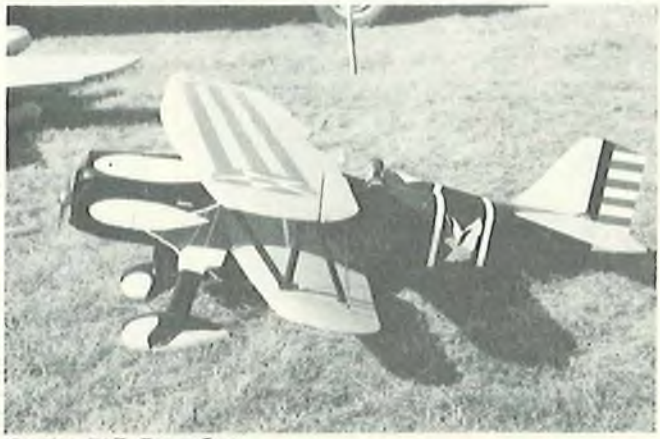
Krier Kraft, Ken Meller.



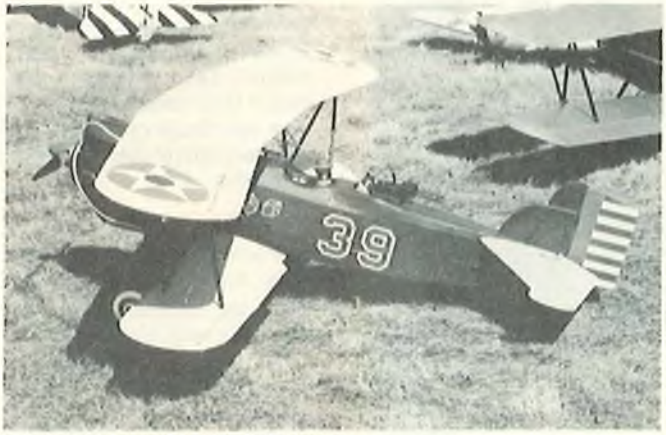
Globe Swift, Dick Trueshel.

Pit area scene.

Bellanca WB2, Steve Gray.



Curtiss P6E, Russ Gau.

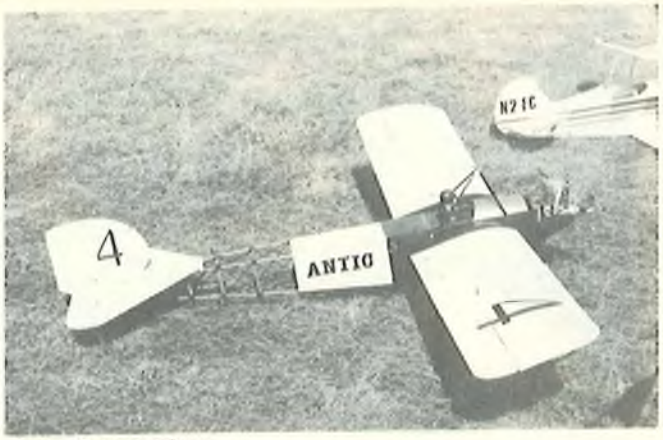


Curtiss Falcon A3B, Bob Dunn.

Bob Beckman's life-like pilot in Tomahawk.

One of several nice J-3 Cubs, no name.

Fokker D-8, Bob Dunn, Bernie Platt, Cliff Nix.

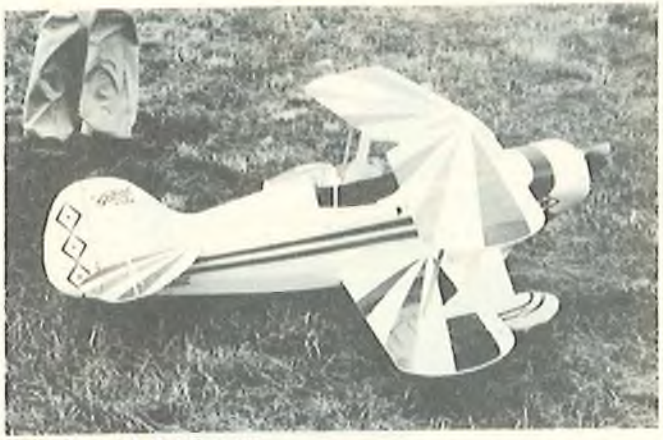


Antic, Grover Ritter.

Citabria, Russ Gau.

P-51 Mustang, Dick Parshall.

Citabria, Bud Crane.



Pitts Special, Art Everett.

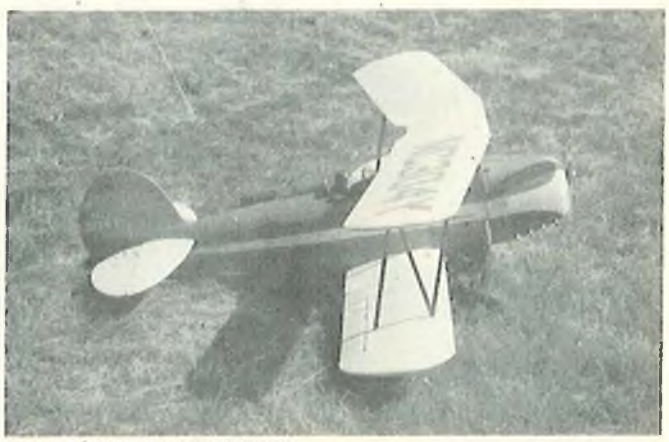
Mr. Mulligan, one of three at Rally, no name.

Bristol Scouts, Jim Messer, Ken Koeppel (he has two).

Volksplane, Charlie Nellis.

Info notes got wet and illegible, sorry.

Tomahawk, Jim Messer.



Great Lakes, George Woods.

Zero, Edwin Hall.

Super Cub, Charles Chomas.

Fleet Trainer, Robert Pickney.

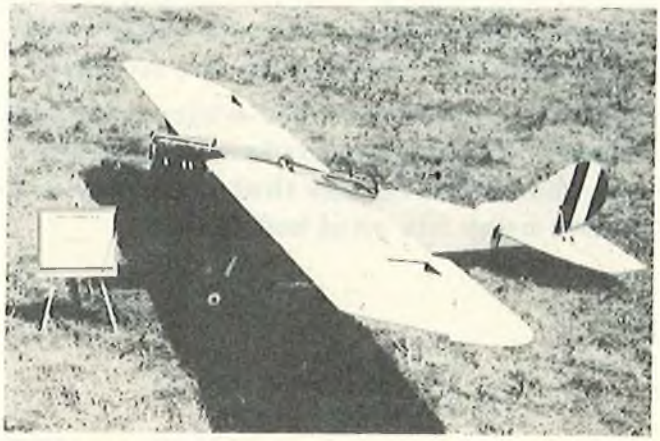
One of several Byron Pitts special.

Bucker Jungmeister, Doug Moore.

Snapper, Bob Johnson.

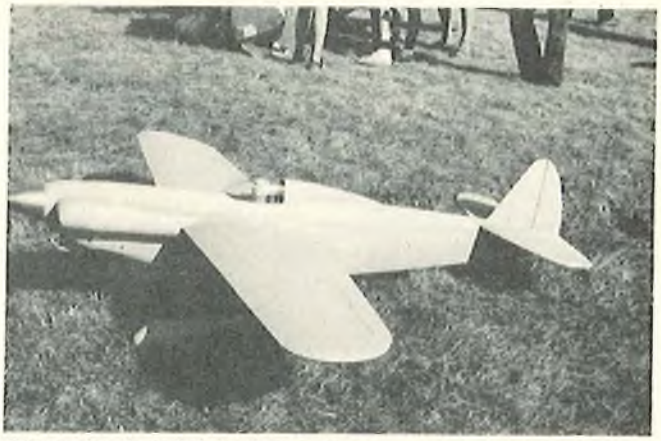
Navy 1929 Fleet Model 2, Ray Hinds.

Miss Vintage, Hank Likes.

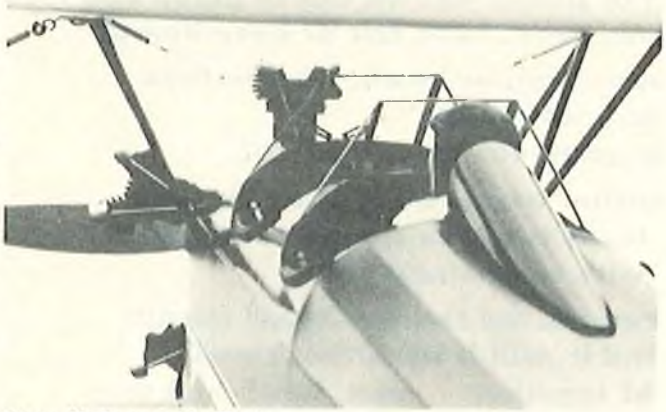


1918 Loening M-8, Dick Parshall.

Taylor E-2 Cub, Norm Orcutt.



Shoestring (not finished), Bud Crane.



Norm McCormack's Fleet.

Chow line for delicious barbecued chicken.

RIDGE FLIGHT

By D.P. Andersen

North country river bluffs he called his home
Where he hurled his sailplane high and aloof --- alone.
His only companion the red-tailed hawk
Taught him to circle, to hover, to stalk.

The lift over pines, rustle-whispered birch and asp
Untamed wilderness explored by radio's grasp.
He escaped the bonds that civilization tries
To hold back his soul but it rides.

A thermal sun-borne energy calling him home
Allemande 'round with brother hawk does he roam.
The unseen swirl of power known but to plane and bird
What few men have seen, have felt or have heard.

Do you understand, brother hawk, why he flies
Wings of wood and radio eyes
Emersed in the warmth of summer skies?

Do you know, brother hawk, what does he seek
As he dives and turns towards ridgecrest's peak
Seizes the earth with talons and beak?

Does he seek freedom, my red-feathered friend?
And if he shall find it, will it be without end?
By this brief flight together --- man, hawk and sun
Have tried to gain freedom --- and almost won.

FUN FLY IDEAS

This photo taken by Terry Miller, of Darrell Mullen during the limbo event at Klamath Falls, Oregon. Darrell is flying an Andrews Trainermaster, powered by a Fox .45 BB Schnuerle engine, and equipped with flaperons. The limbo ribbon is set at the 2' level in this shot. Incidentally, the vertical stabilizer did clear the ribbon.

By Robert Munn

Finding a way to bring the average sport participant in this hobby into the fun fly atmosphere, with the cameraderie engendered in sharing an interest with others, has to be one of the most satisfying thrills of model flying. Though the big city boys may feel that they've tried it all, there are many of us across the country who may still feel uncertain of our skills, or be unwilling to risk our one airplane in some dicey maneuvering just for the fun of it. Hopefully among the following ideas for events, materials and techniques there may be something you can use in your next get-together of this type. The events and their variations range from those suitable for the simple aircraft flown by the recently soloed pilot to some for the more accomplished hot rocks.

It is usually wise to divide competitors into experienced and novice categories. At most fields, this division is obvious and well-known, but should be confirmed by requiring each pilot to declare himself as being in one or the other category. Depending on the anticipated number of participants and their relative skills, a cross section of events can be selected to assure opportunities for each type of aircraft present. One possible leveling device is to announce specific events only just prior to holding them. Having limited each person to just one airplane, this can reduce the advantage which might otherwise be obtained by preparing special aircraft for certain events, or making adjustments with the particular competition in mind, Another fairly common approach is to establish a one-design class used for all events. One club I recall used the Falcon 56 with a 25 as its basic sport design. Simplicity, economy, and utility even for the beginner should guide selections in such a case. It can provide more fun than one might at first imagine: sport pylon racing without serious risk or danger can be a test of skill and a real crowd pleaser as well with the one-design approach, in addition to all of the following:

Glide and Spot: Launch, take-off and altitude obtained in any fashion. Timer announces **start** exactly 75 seconds following launch, at which time gliders must release from tow, or motors be shut-off or to lowest throttle. Any further use of throttle disqualifies. The object is to remain in motion for exactly two minutes after **start,** landing so that the aircraft comes to rest exactly on a marked spot. No coaching or time checks are allowed after **start** is announced. When the aircraft comes to rest, one point is awarded for each second either over or under the two minute mark, and one point for each foot or fraction thereof from the mark to the nearest point of the aircaft. Low score wins. Note that it is not the time and point of touchdown that counts, but rather the time and point of coming to a stop, providing the plane remains in flyable condition. These provisions tend to create a wider spread among pilots than might otherwise be the case.

Variations: Allow the timer to give one or more additional time checks. Use the time and place of touchdown for scoring purposes.

Differential Speed: Using the timer/judge as one end of the course, and a reliable flagman at the other, each pilot flies two runs in the same direction which are timed. He flies as fast as possbile (diving is allowed before the timed run) on one run, and as slow as he dares on the second. His slow speed time is divided by his fast time to arrive at a factor. The pilot with the largest factor wins. Touching the ground or other fixed object disqualifies. The timer/judge may require the pilot to make additional runs if he flies too high to be timed accurately, or if he fails to fly a direct course between flagman and timer/judge.

Spot Landings: Mark circles of about 2, 6 and 12 meters in diameter around a common center, assigning values say of 10, 6 and 3 points respectively, with none given for a touchdown outside the larger circle. Allow aircraft or gliders to make three to five landing, totalling the points earned for a final score. Two judges stationed at differing points of perspective should be used for this. High score wins.

Variation: For powered aircraft and more highly skilled pilots, establish a time limit from take off to landing. He who earns the most points by making repeated accurate touchdowns within the allotted time wins. Deduct penalty points for each second of time overrun.

Loops, Spins and Rolls: Maneuver events usually favor specialized models, but if it is possible to group similar aircraft together to allow more equal competition, scoring the maximum number of maneuvers accomplished within a specified time can be quite exciting. One can also require half of the maneuvers to be done in one direction and the balance in the other, or to mix maneuvers in equal numbers, disallowing any uneven numbers that may be done and thus introducing a judgemental factor which can help to even things out.

Bomb Drop: A special rack or cup

with a suitable "bomb" is rubberbanded to the aircraft as the pilot may desire. He is then allowed a fixed number of attempts to take off (without losing the bomb), position his aircraft and drop the bomb on a marked target. The point at which the bomb stops bouncing is taken as the spot for measurement from the center marker. Smallest distance wins. Add together the distances for all three drops if you have very skilled pilots.

Materials: One can use small foam cups with a stirring stick run crosswise through the bottom to secure rubberbands running around the fuselage, plus any uniform and suitable "bomb" for this event. These cups, however, tend to have quite disturbing aerodynamic effects particularly on small, lightweight, or rudder only models. Though it is a little more work, make your club a set of several pin type racks and doughnut bombs. A 3/8" dowel about 2" long, glued at right angles in the center of a 1" x 4" piece of 1/4" plywood with thin foam pad on the bottom, makes a good rack. Make a number of brightly colored bombs from 3/8" thick soft pine cut into 2½" squares. Round all edges slightly and drill a 5/8" hole in the center. Smaller holes are too difficult to shake loose from a 3/8" dowel. Pine provides a medium yet relatively safe weight bomb which will tumble through the air, not roll too far, and be fairly durable in repeated use.

Variations: You can make this event considerably more exciting by setting a time limit for the three attempts and putting several pilots in the air simultaneously, provided you have brave souls to mark the drops and have the spectators well away from the target.

Hot Rock: An event known by many names, but basically consisting of taking off, performing three or four designated maneuvers and landing without damage in the shortest possible time. It will be essential to have the maneuvers of approximately equal duration in terms of the time required to perform them. The following list has been used successfully with a wide variety of aircraft:

Three loops; wingover or stall turn; any figure eight; avalanche (loop with a snap roll at the top; one turn spin (falling vertical snap is allowable too). Three rolls; 30 meters inverted; Immelman followed by split S.

For additional elements of chance or skill, one or more of the following can be introduced as well:

a. Short foot race to the aircraft, plus starting the motor.

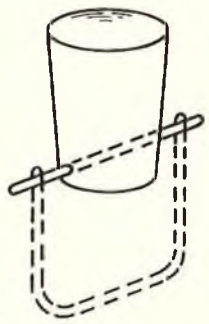
b. Carry an egg in a spoon, or balance the dismounted propeller on the head, while running the above race.

c. Oblige pilots to fuel the aircraft and/or mount the propeller as a part of the race. An alternative is to have a mechanic run the race, do the fueling and mounting of propeller, and starting of engine, without allowing the pilot to touch the airplane.

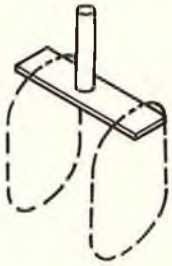
d. Draw the maneuvers from a hat rather than allowing the pilots to select them (if all aircraft are roughly comparable in capabilities).

e. Throw dice for a pass, craps, or a point before, after, or both with respect to the flight itself, timing all of

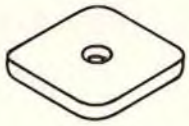
FUN FLY MATERIALS



FOAM CUP BOMB RACK

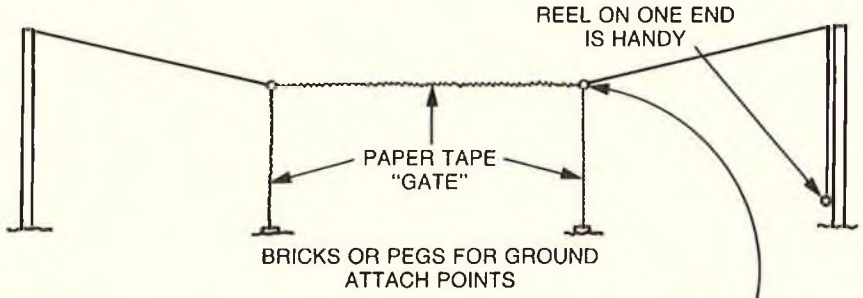


DOWEL AND PLATE BOMB RACK

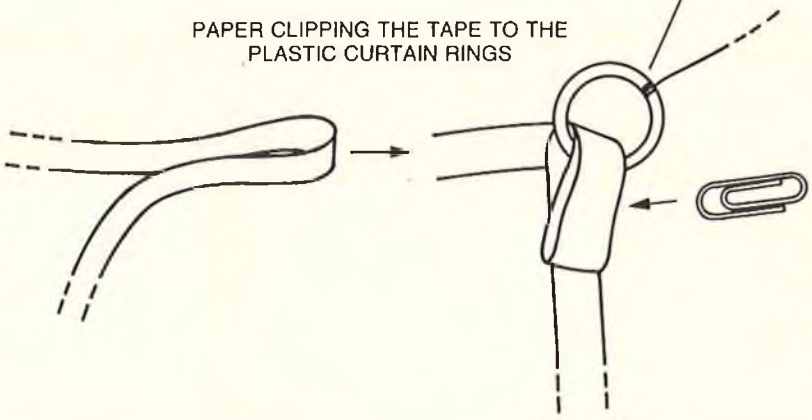


SOFT PINE DOUGHNUT BOMB

LIMBO SUPPORTING POLES ABOUT 50 FEET APART, WITH 12-15 FT. FISHLINE EXTENSIONS ATTACHED



PAPER CLIPPING THE TAPE TO THE PLASTIC CURTAIN RINGS



this.

f. Throw darts at a target marked with the maneuvers to determine what the pilot must do while in the air. Begin timing with the first throw of the darts, ending with touchdown of the aircraft.

g. Having several competitors doing any of these combinations simultaneously can make it more of a challenge.

Streamer Cutting: This is not as risky as it sounds if the aircraft are well matched and the pilots skilled. Tie about 30' of paper tape to 10' of fish line attached to the aircraft. The brave soul who cuts the streamers of the most competitors wins. If you want to spice it up a bit, make it simply he who cuts the streamer shortest wins. Fix a specified time period for the attempts.

Materials: One of the major problems with this event has always been the material selected for tape. Crepe is too heavy and shreds quickly if the aircraft is fast. Few other types of paper will stand the buffeting. The best material I have seen used is the rather hard finish, medium weight yellow paper used in teletype machines for punched message tapes. It is not too heavy, adds very little drag, and will not shred even at considerable speed, yet will break if hit solidly.

Variation: Attach one end of the tape to a point on the ground or near it, and the other end to the longest fishing pole you can find, allowing about 30' between attach points. The most cuts made during a fixed number of attempts wins. Almost any kind of aircraft can compete safely in this kind of streamer cutting, and having the tape on an angle rather than horizontal makes it somewhat easier to break.

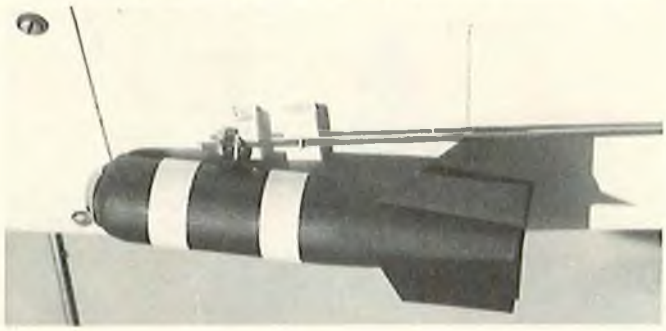
Limbo: Flying an airplane under a progressively lower barrier is sometimes a time-consuming competition but always thrilling if you can keep several planes in the air at once. Give each man two attempts to go cleanly under the tape without touching it or the ground. Start at about 8' to 10' high, and lower the tape 2' after each of the first and second rounds, then 1' next, then 6". I recall seeing Hank Walker fly an 11" high model successfully under a 14" high tape on one occasion. Let the experts do it inverted, and through a progressively narrower as well as lower "gate" for a real test of skill.

Arrangements: Most neophytes are wary of enjoying this real test of nerve and precision control by the spectre of sudden disaster at the poles.

to page 116

SWEEPINGS FROM THE balsa dust factory

By Paul Denson



Bomb Drop

Most of the Bomb Drop ideas seen here in RCM, and elsewhere, necessitate an extra servo just for this purpose. For the fellow with the three channel outfit, being able to have a throttle is a luxury --- just how does he get in on the fun at the club's fun flys? Even though there are other events at our monthly fun fly, the C.D. always manages to get in a Bomb Drop.

Before getting into the subject, I will digress slightly and bring your attention to that other way, "Instant Destruct Bomb Drop Mechanism." "Attach a plastic cup to the top of . . ." I can think of no quicker way to destroy an airplane than that. Of course you can hiccup the bomb out of the cup, but the first thought is, "Well, I have to be upside down over the target and let the bomb fall out." So, Mr. Sunday Flier plans his strategy by roll or by loop and there he is upside down watching to see if the bomb falls free and while his gaze is hypnotically fixed on that bomb, he just naturally follows it to the ground while his fellow (?) antagonists take bets as to which will get to the ground first, the bomb or the upside down airplane. Will they bring his attention back to the plane? Well, that depends upon how close they think he is to the target; the closer he is, the longer they wait.

From the household scrap box or down at the local hardware, pick up one of the smallest screw-eyes you can find, a section of outer Gold-N'Rod or NyRod and a few scraps of wood, that's all it takes to make this mechanism.

Usually, the bottom of most sport R/C planes is sheeted 1/8" balsa and this may be doubled to 1/4" thick where the mechanism will be located. Screw the screw-eye in until it is flush, shim a piece of 1/16" up with balsa wood until it will pass through the center of the screw-eye. Epoxy the wood in place. Bend a hold-down from 1/32" wire and epoxy into the wood making sure the wire passes through freely. It will act as a guide after release so the control wire doesn't hit the edge of the screw-eye and cause you to be stuck in a full up elevator attitude which is disconcerting to say the least — kinda instant dethermalization.

Using the outermost hole in the elevator horn, which you don't use anyhow, rig the 1/16" wire along the outside bottom of the fuselage through the guide then through the screw-eye. Allow the end of the wire to stick through the screw-eye a half inch or so; it will be trimmed later.

Most any type of attachment to the elevator horn is okay, from a 'Z' bend in the wire to a fully adjustable clevis. Cut a piece of the outer NyRod or Gold-N'Rod to match the length of travel over the bottom of the fuselage. Slide it on the wire, insert the wire through the guide, then the screw-eye, and attach the clevis to the elevator horn.

Turn on the transmitter and give the elevator full up. Make a mark on the wire at the edge of the release block which, by the way, could be another screw-eye. Remove all again and cut the wire to length or do it on the plane if you think you can.

Refinish Your Spinner

Occasionally, and much beyond your control, the earth will rise up and re-kit your plane. Should enough of your pride and joy survive and you can rebuild it, the spinner invariably has a few gashes caused by gravel (what we call dirt here in Southern California) making it unacceptable for use on the new Mod. II.

Or, perhaps, your starter has made a few rubber or melted plastic rings around the spinner which no known solvent will remove. **Don't chuck it,** chuck it in your electric drill and rejuvinate the messy looking beastie.

Find a short stove bolt, threaded all the way to the head, that will fit the hole in the backplate, lock it in place with a couple of washers and a nut. Snap the spinner in place and chuck the whole apparatus into your electric drill. You will need various grades of wet sandpaper from 320 to 600. Dip the sandpaper in water, hold it lightly around the spinner and backplate as the drill does all the rotary work. As soon as the scars are gone, shift to successively finer grades of sandpaper. After the 600 wet sandpaper has done its thing, it will be necessary to bring the luster back with white rubbing compound. Wax and buff and Carl Goldberg couldn't tell it from a new one. Not only that, but, as one of my flying buddies innocently commented, it will probably balance the spinner.

Remember, safety first, make sure the drill is electrically grounded and you use the water from a plastic bowl and work far away from the sink or other natural ground. It is bad for your anatomy and physiology to ground the drill yourself. □

KOUGAR COUNTRY

By
Kathleen M. Burroughs

It all started out with a gleam in the old man's eye one lovely summer day when we decided to stop and watch a group of RC'ers at a public field.

"Doesn't that look fun, honey!"

"Yah, great."

"I'd sure like to try that sometime. What a fantastic looking sport! Wow, just look at those beauties! Just look at that guy doing those loops! Fantastic, isn't it, hon!"

"Yah, great," as I stifle a yawn and start to head toward our car. Not far did I get, however. Hubby is already on his way toward the benches and the local fly boys. I started to head toward them when natural instincts told me to back off. I'd noticed the somewhat irritated looks on the fliers faces given to the casual onlookers standing on the sidelines. I figured it was in response to several jeers from the bystanders.

"How do they fly --- with rubberbands?"

"Do you get AM & FM on those radios?"

"Will they come back on their own when their wings get tired?" --- followed by bursts of laughter.

I went to the car instead and started it, figuring my husband would be along shortly. Two hours and several hundred yawns and honks later, a creature I hardly recognized came striding toward the car. The look on his face and the friendly waves back to the bench told me he had been initiated into the "World of R/C." There was a certain awe in his voice as he told me of his new found friends. There was "Shorts" so nicknamed because his landings always seemed to just miss the runway. There was "Buzz" and "Crash," "Looper" and "Speed."

"Don't any of them have normal names?" I asked, feeling somewhat left out of this "fraternity of fliers."

Our trip home was detoured by several stops to various hobby shops to pick up just "a few odds and ends." Three hours and $489.50 later we finally arrived home. For the next 2½ months, I saw my husband only at meals. Our garage was turned into a veritable construction site. As the weather started to cool, my kitchen counter became "Construction Site Numeral Uno." I got very adept at

scraping epoxy off my counter tops. Unexpected company was always a challenge. Have you ever tried to clean up bits and pieces of balsa wood, containers of glue, MonoKote in assorted colors, tubing, wheels, wings with a 5' span, etc., etc., in the 30 seconds it takes your unannounced friends to get out of the car and up to the front door? I lost 15 lbs. and I wasn't even dieting while my husband was building his Kougar. My acrobatics in cleaning up in 60 seconds or less really kept me trim.

Another trick I learned during the construction stage was never to ask, "How's it going?" This always encouraged my husband to give me a crash course in model building. Trying to appear interested lest I hurt his feelings, should have won me an Oscar. As we went into the details of how to apply MonoKote around corners, how to attach the wings to the fuselage, the fuel system, and the virtues of Hot Stuff, I would nod and smile, look amazed and in awe, all the while mentally making out my grocery list and deciding if the drapes needed dry cleaning. The only time I didn't fake it was at the completion of the "Kougar." My husband had really done a terrific job and I had to admit the plane was a beauty. I could easily relate to its graceful lines and vibrant colors. It had a sleek, sophisticated look and it was going to look great hanging in the garage.

"You're going to what!"

"I'm going to take it out for a test flight this afternoon. Want to come along?"

"You're not serious! You can't fly it yet. It's only a baby, just newly shaped from balsa wood and Hot Stuff. Its MonoKote hasn't even had time to age. How can you have such a thought! Why don't you let it hang around a little longer and get use to the altitude."

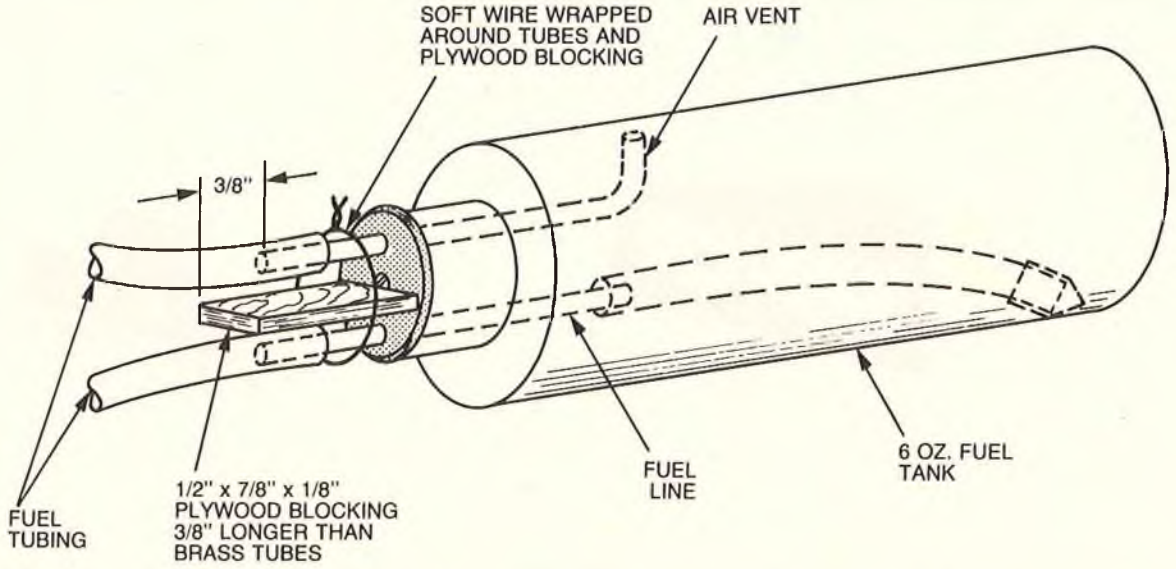
My consternation fell on deaf ears. Hubby was out the door and down the road on his way to the flying site and what I was sure would be the Kougar's doomsday. I tried to busy myself that afternoon and rehearsed numerous words of comfort I could tell hubby when he came home with less of a plane than he started out with. Much to my amazement, the Kougar came back with all its virtues still intact and hubby was wearing a delighted grin.

"It flew like a dream. Soared like an eagle. Best doggone looking plane on the bench. You should've seen her, hon!"

The following weekend, I accompanied my flier out to the field, and much to my surprise enjoyed watching him put the Kougar through its paces. I shared in his pride as he maneuvered the Kougar adeptly across the skies, its lovely white wings contrasting against the blue of the sky; its slim body, looking like a sleek eagle soaring toward the clouds. The afternoon drifted by. My spirit had been touched by the magic of R/C flight. At last I could understand the feeling of freedom and expression that R/C flying gave my husband. He, the pilot, I the attendant, flying the skies through our Kougar.

Several weeks later, however, I shared with him the other depth of emotion --- complete bodily shock, total disbelief, and partial paralysis as we watched our beautiful Kougar give one final belch and make a straight line dive for old mother earth. What can I say? As we walked away from the field, I shed a tear for the beautiful Kougar that I had at one time cursed for covering my counters. As I glanced at my husband, expecting the sobs to begin at any time, I could have sworn the gleam in his eye had a reflection of a "Grumman Wildcat 4F4!" □

FOR WHAT IT'S WORTH



From the workshop of Paul Trendley, St. Charles, Missouri, the following handy hints were received:

While installing a round 6 oz. tank in a very tight installation, Paul was having a very hard time with the lines pinching against the bulkhead. So this is the way he solved the problem. See sketch.

Years ago Paul read (in RCM) about a formula for a cleaner to use when cleaning up your airplanes after a day of flying. He's used it ever since and found it to be both effective and very economical, so he thought he would pass this on to you. Generally, at the beginning of each flying season, Paul mixes up 2 gallons at a time and has a year's supply:

3 oz. of alcohol (rubbing alcohol is fine).

1 oz. of liquid soap detergent (he uses Joy or Lux).

1 qt. of water.

Duie Matenkosky of Murrysville, Pennsylvania, submits his method of soldering music wire together that is reinforced with copper wire bindings. Duie says you'll make a **better** solder joint that'll also solder easier if you use Radio Shack Cat. No. 278-1341, 24 gauge tinned copper wire to wrap music wire. This wire is sold as buss wire for electronics work, but Duie says it sure is easier to use than the more commonly used plain copper wire.

This cost saver was submitted by Whitney Alexander of Cottondale, Alabama. To help keep your modeling costs low try Sig's "Koverall" covering material. After trying wet glue or dope to tack the "Koverall" to all surfaces, Whitney discovered another product which he "robbed" from his wife's sewing chest which enables you to use "Koverall" as a total iron-on product. This material is called "Stitch-Witchery" and is manufactured by several companies and is available in 1" x 15 yard rolls or 36" wide by almost any length. Whitney's process for using this is to cut it in narrow strips, about 1" wide, and using a sealing iron setting on about 3. Stretch the "Stitch-Witchery" along the leading edge and all surfaces the "Koverall" must stick to and tack in place with the iron. Then take "Koverall" and use as you would any other iron-on type covering. Sometimes another layer of Stitch-Witchery is needed to take care of the overlaps.

Recently he tried this same method of applying fiberglass cloth on an R/C boat. It held the cloth in place while rosin was applied and really made a neat job of it. No one that Whitney knows of is using this method and it really gets rid of the mess of glue and dope and all those pin holes.

J.T. Murphy of Boxboro, Massachusetts, tells of his method of wiring his starter to battery. To ensure good contact between your starter and battery, wire a three prong female plug to the battery and coat the battery terminal with grease to prevent corrosion and wire a three prong male connector onto the starter. By using a three prong set-up and ignoring all connections to the ground terminals, this will ensure the right polarity all the time. Also by installing a male plug on the car battery you can plug your motorcycle battery into your car's charging system and charge your battery when it starts to run down.

Jerry Marler of Poplar Bluff, Missouri, tells how he handles an aggravating chore. The sometimes hard job of cutting fiberglass cloth without getting all of the ravelings at the edges can be made simple by using a pair of electric scissors. Simply draw your lines on the cloth using a ruler and ballpoint pen and then run the scissors up the line. If your wife doesn't have a pair, they can be purchased very inexpensively anywhere that sewing supplies are sold. You will find that the electric scissors will make a very neat line without the ravelings.

Here's how Ed Loft of Ludington, Michigan, tints his canopies. Have you ever tried to tint a clear plastic canopy with "Rit" dye and found that the plastic refused to accept the dye? Ed had this trouble with an Akromaster canopy but solved the problem by applying an even coat or two of Coverite's Glaskote to the

inside of the canopy. After the Glaskote is completely dry, mix up your favorite color dye solution and dye as usual. Be sure to get a good cover with the Glaskote, as the dye won't adhere to any naked plastic the same as to the Glaskoted plastic. You may be surprised at the beautiful results, and light colors, such as yellow, etc., tint just as well as the darker colors. Also, because the dye is on the inside of the canopy, it can't get scratched or rubbed off and your clear, tinted canopy stays good looking virtually forever.

TSgt. Howard Boyer of Sawyer AFB, Michigan, sent in this money saving idea. A handy item to bring along to the field in your flight box is one of the 8 ounce plastic "throw away" juice bottles. Howard is referring to the square sided plastic ones that contain the various flavored non-carbonated soft drinks. Before you stuff the bottle in your flight box, cut a hole in the bottle lid just large enough to fit the rubber stopper from a regular fuel tank. These bottles make a handy replacement tank should yours become damaged or spring an unexpected leak. Howard has used one of these homemade bottle tanks as the primary tank on his Balsa U.S.A. Swizzle Stick for the entire season and as of yet it has not leaked.

Just as an aside, don't make the mistake of trying to seal the lid of the bottle with epoxy. The epoxy won't hold and will deteriorate and get into the fuel system of the engine. When this happened in his case it took about two hours to figure out why a good running engine would run at low rpm but when the power was cranked in the engine would quit. Needless to say, it made for some very confusing times. Trust the seal on the bottle, it really does work and the price of a new bottle is "right." □

Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.

and little soldering or unsoldering is necessary due to the judicious use of small plugs and sockets in the wiring harness.

The water pump was fitted into the bow of the fireboat's hull with its water intake located on the right side below the waterline. A fine mesh brass screen on the intake opening serves as a filter. Water is divided into four separate flows via a four-way manifold built from various diameters of brass tubing soldered together and located adjacent to the pump's outlet fitting. Flexible vinyl "spaghetti" tubing and silicon rubber fuel tubing serve as hoses to route the water to the six working fire monitors. The monitors themselves were made from thin brass tubing with parts from the kit attached to give a scale appearance.

The siren was built from a drawing that appeared in an electronics hobbyist's "how to do it" magazine. The circuit board that makes up the heart of the siren measures only about 1" square and uses only a half dozen components or so. A 1" speaker located in the aft deckhouse provides the sound. This siren is the only electrical device in the model not drawing its power from the four "D" size nicads; it gets its juice from a 9-volt transistor battery located in the center of the hull between the bigger cells.

Access to the model's interior is through the two small rectangular openings in the deck located beneath the removable superstructure. To remove the propulsion motors and the water pump, which are located at the far extremes of the hull, I had to devise a system of tracks and carriages on which to mount these items. With a set of tracks mounted on the hull's bottom and with the motors and pumps attached to carriages that slide into the tracks, I am now able to easily reach these otherwise hard to get parts. All other units are installed in a more or less orthodox manner.

The first flotation tests were conducted in the highly sophisticated towing tank facility in my home. I also use this facility to bathe in from time to time. During the first series of tests involving the water pump, the internal plumbing sprung a leak at a defective solder joint and began to fill the hull. After a fifteen minute repair job back at the bench, tests were resumed and this time the pump began to earn its keep. All six working monitors started hosing down the bathroom walls with enthusiasm! With all monitors on the line, range was about 18" to 20" (one hundred sixty scale feet), but with only three nozzles firing, the increased pressure resulted in a range increase to almost 3' (about 300 scale feet) which ain't bad for government work.

The pump's motor is capable of producing more pressure but the use of capacitors and RF chokes to suppress radio interference causes the motor's rpm's to fall off.

Once the twin propulsion motors and the rudders had proven themselves reliable, and the siren able to sound off as advertised, then it was off to the local pond for her trial runs. In spite of its diminutive dimensions, the little Fire Fighter showed its spunk by virtually leaping forward when the throttles were opened all the way. At partial settings, performance was more sedate and graceful with the fireboat's bow making a nice bow wave. Maneuverability turned out to be outstanding as the independently controlled twin screws permitted turning the boat around in its own length. Turning with the rudders alone was very positive and it was a simple matter to trim the rudders to compensate for loss of thrust on one engine. One interesting phenomenon observed was the boat's tendency to back up when the pump was turned on with the propulsion motors off. A bit of forward thrust is now necessary to hold the boat stationary when the nozzles are pumping water.

Now that the fireboat has been commissioned into my fleet, I suppose the next step is to write to the Guinness Book of World Records to see if she is indeed the World's Smallest Fireboat. As of this writing, I have not heard of anyone building such a small boat with so many functions, but I have no doubt that sooner or later, someone will come up with something that blows the doors off the Fire Fighter. □

PIT STOP

from page 68/65

The Peppermill Classic 1/12 race was held on the parking lot of the Peppermill Hotel and Casino in Reno, Nevada.

track was outlined with wooden boards, but these two were cutting the corners with less than an inch to spare. Butch could run with Ralphie, but he couldn't quite get around him. But as fast as those two were going, there was a black car closing in on both of them. Lavacot was flying around the track. Soon he was right behind Berney and within a couple corners, Lavacot passed both Berney and Burch. Then Ralphie brushed the boards and Bernie shot past to take over second. Burch tried to pass Bernie in the next corner, but the two cars got tangled together and by the time a marshall could untangle them, Lavacot's lead increased. Although Bernie was leading Burch at the time, when the marshall untangled the two cars he put Burch in front of Bernie.

Lavacot's lead increased to about 1/2 a lap and then with one lap to go his batteries dumped again and Ralphie was getting closer and closer. Lavacot was going about 1/2 speed as he crossed the finish line for the win, with Ralphie 5' back in 2nd and Bernie taking 3rd. It was certainly a very exciting race to watch.

The club awarded beautiful trophies and lots of merchandise was awarded by all the major manufacturers. I'm sure everyone went home with something.

Most of you probably know Chuck Kimbrough. Chuck manufactures the 1/12 servo savers, tire horns, ball flags etc. For years, Chuck has been saying, we need an Over-The-Hill trophy. Well, Chuck finally did something about it and donated an Over-The-Hill trophy to the best driver over 40. Obviously Chuck is over 40. Guess who won it? Me. As bad as I did, I guess I was lucky to get any trophy for anything this day. Thank you Chuck, but how about raising the age limit to 55? You guys are all youngsters! □

JAGUAR

from page 63

.... It also prevents crushing of the foam core at the centerline especially at the front hold-down dowel. The instructions are unclear about whether the Super-Tape should extend over the balsa edges. Since no other adhesive was specified it must be that the tape is to be used. Normally, white glue or epoxy is specified for this application. A call to Larry Hargrave confirmed that indeed he intended that only the tape be used. His instructions were followed and the skins stuck down without difficulty.

Working with the Dura-Lene fuselage will be a new experience for many and additional instructions could have been included concerning methods of removing the flash from the seams and painting. Fortunately, a single edged razor blade was

effective in removing the flash from the fuselage with only a little damage to the finished surface. Your color scheme can be deliberately planned to cover the top seam just in case you botch the job.

Just a word of caution is in order about cutting out the various access holes in the fuselage. Large holes weaken the structure. Follow the plans precisely and use a large corner radius. Also, nothing really adheres well to Dura-Lene, so be sure to rough up the surfaces to be glued with very coarse sandpaper before joining. Micro-balloons mixed with epoxy works best, but the surfaces really has to be roughed up. The trick is to get a good mechanical bond because there is no chemical bond involved.

One final word about that unbreakable fuselage. There are rumors of one Jaguar that sustained an accordion pleated nose after a vertical dive onto a roadway, but it didn't **break!** It is tough. A MonoKote heat gun was carefully used to warm the bent area enough to stretch and push it back into shape.

The tail surfaces are conventional sheet balsa with hinged elevators. Ingeniously, to provide strength in the stab and fin attachment to the fuselage (remember nothing adheres), small holes are drilled in the fuselage where the balsa will be epoxied in place. The epoxy will extrude into the holes to form miniature rivets. Additionally, the stab and fin join on the centerline inside the fuselage to provide an excellent joint.

The use of anhedral in the stab necessitates a control horn on each elevator. This, in turn, dictates dual threaded control rods on the single elevator pushrod. A bend pattern is provided to assist in obtaining the correct shape, but fitting both rods through the aft fuselage holes proved to be difficult. This chore was simplified by first inserting two inner (yellow) Gold'N-Rods up the holes, back to front. The rods are screwed onto the threaded rod ends then the whole affair is pulled out the backend.

The canopy is one of the trickier jobs on the model. The plywood formers are not cut out and the ball latch took some fiddling and still is not working to our satisfaction. The clear plastic canopy was dyed, and we installed a painted military pilot and an instrument panel. If we tear into the canopy to replace the ball which was tightened excessively causing it to pull into the plywood base, it will get the canopy plastic covered with wood dust. So we'll just forget it.

Covering:

A trial final assembly revealed a Jaguar that was beginning to look really racy and more suited to the application, of an epoxy-painted finish over fiberglassed flight surfaces, ala Formula I racers. We settled for the recommended MonoKote finish using red, orange, yellow and metallic blue in a sunburst pattern on the wings and stabilizer. The red dorsal strip and black numbers are trim MonoKote which does stick nicely to the Dura-Lene.

There are no instructions for spray painting the Dura-Lene fuselage. A call to Bob Martin R/C Models who developed the molded fuselage and also distributes the Jaguar kit produced assurance that painting is feasible. A leaflet was mailed to me explaining the process. It consists of wiping down the surfaces to be painted with M.E.K. or acetone. This is followed with fine sanding, treatment with the flame of a propane torch until tap water flows smoothly over it without beading up like water on a waxed auto finish. Avoid touching to clean finish, mask and spray on an automotive lacquer primer, then spray on a flexible colored paint, such as Formula U. Painting the lower portion of the fuselage is discouraged because it will just get scuffed off on landings.

Radio:

A high performance model like the Jaguar deserves more than an average radio. There just happened to be a Futaba 6JN Competition Series radio available using the smooth S121 servos and a 500 mAh battery pack. There is more than enough space for the two channels needed. The big advantages of this radio are the servo-reversing and dual-rate features which are well-suited to this high performance model. Clever mounting of the elevator servo using two screws and a mounting plate of plywood permits the servo to lay on its side in the bottom of the fuselage which will permit most any servo to be accommodated. The dual-rate feature permits setting up the control throws for advanced acrobatic manuevers, but on dual-rate (low control throw) you can safely test fly and become accustomed to the fast response of Jaguar. The high rate is there when you are ready for it.

Flying:

Weight and balance came out exactly per the advertisement without the addition of ballast. The recommended Center of Gravity was calculated to be 22% of the mean aerodynamic chord. Ths is quite a bit forward of the location for the typical sailplane, but it is correct and should be used. Control surface travel of the ailerons and elevator were set up per the plans. The dual-rate travel was set about 2/3 that of the full travel.

First test flights were made on dual-rate to remove any tendency to over-control and it flew smooth as silk. However, because of the light slope lift, we quickly switched to full travel because at the slower speed we needed all the travel that we could get. This model does tip stall if it is slowed down excessively. It performs best with plenty of speed.

The next flying session was at a school athletic field using a 12 volt winch. Although advertised for High Start launch capability we found no recommendations for the tow hook location. We selected 30% of MAC which is 8" aft of the root leading edge to locate a simple screw hook with a piece of 1/4" plywood inside the fuselage. Jaguar goes up like a rocket on our 12 volt winch with the pedal nailed. If you haven't experienced the excitement of witnessing the zoom launch of a 2-Meter or F3B glider you have missed something! Come to think of it the 69" wing span does qualify for 2-Meter events; but we think the wing area is a little low for that. On the first two launches it did pop-off while climbing at a high angle. The tow hook was bent slightly to prevent premature line release. It sure does look spectacular going up the line, and it does a creditable job of soaring in good lift.

Meanwhile back at the slope, the wind finally came to just the right speed of 12 to 15 mph. Acrobatics are the name of the game! Our favorite maneuver is to gain plenty of height, then dive from high overhead, yell out, "Coming through," continue down below the rim of the slope and zoom up into a vertical roll. Sustained inverted flight is almost as good as normal flight. It easily performs slow rolls, 4 point rolls, loops, Cuban Eights . . . well, if you can control it, given good wind over the slope, Jaguar will execute it!

When it comes to landing, Jaguar slows down nicely. Good aileron control is maintained right down to the stall. But don't try any sharp turns at very slow speeds because those highly tapered and swept wings do have an abrupt tip-stall. You will suddenly see the wing drop quickly followed by a pitch down. It does take a little altitude to recover. It very realistically duplicates that event just like the full sized planes.

If you have never before flown an aileron-type model you will need help from a more advanced flier. Flying with ailerons, rather than rudder, for the first time will give some anxious moments. Rudder-type models have lots of dihedral and lots of stability. Aileron-type models have little or no dihedral and low stability. Executing turns with an aileron-type model will require more bank angle. This causes

the loss of lift, so, naturally, you have to feed in more up elevator. In a steep turn the elevator acts like rudder into the turn which can result in a spiral dive and pilot disorientation if corrective action is not immediate. Students are usually instructed to make shallow turns at first. Also, as the model is half way into the turn, you should start gradually rolling out of the turn using opposite aileron to what was used to get into the turn. Part of the problem of over-turning is due to the fact that the model is likely pretty far away down the ridge, and it is difficult to judge the exact bank angle with the wing tip pointed directly at you. But Jaguar is not unusual in the characteristic; it's just the nature of models without dihedral. An excessive nose heavy condition will make the situation worse.

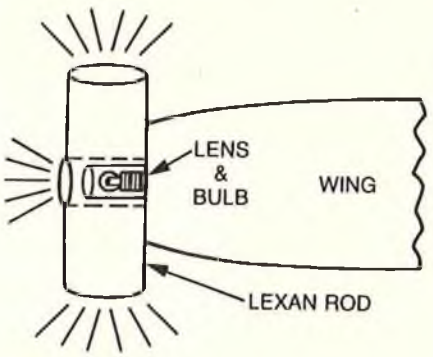
Conclusion:

While the Jaguar is not recommended for the novice or the first aileron slope soarer, a modeler with average building skills who can follow instructions will have very little trouble with construction of this kit. Some help with the radio installation might save a few profanities, specifically the elevator servo and pushrods. This is an excellent kit and flying model. The only reluctance one should have about purchasing it is the price tag. But that is no real deterent when you compare it to the other comparable kits. How many of them offer a guaranteed unbreakable molded fuselage? A friend's comment about his Jaguar sums up our feelings about as well as we could, "It's the best slope plane ever!" □

RC NIGHT FLYING

from page 56

Lexan tube with a hole drilled in the center to fit over the red or green lens and bulb. This extends the light past the top and bottom of the wing, making it more intense and visible at virtually any angle.



So this takes care of the wings. Now, you need a taillight. This needs no fiber optics as the red blinking light is atop the stabilizer and in sight constantly, especially when flying inverted. Yes, I said inverted. (A hint while flying inverted is that while aileron control on your transmitter and plane remain the same, the lights don't. We fly full AMA pattern in the dark.) After a while it will become as natural to you as though you were flying in full daylight.

Anyway, back to the taillight! We use a simple circuit that flashes the red taillight. It also strobes the belly light, which has a clear lens and strobes about every two to three seconds. This completes the lights on the airplane, four of them: Red taillight (flashing), white belly light (strobing), and wing tip lights (red on the left, green on the right). When learning, I remembered that port wine is red. Port means left, so the left wing is always red.

The complete light circuit consisting of four bulbs, four lenses, wire, assembled circuit board, and switch is available from Dynamic Engineering, 15701 Tustin Village #B3, Tustin, California, 92680. Price is $20.00.

Some hints while night flying that I've come up with are:

(1) Don't test fly your first flight in the dark.

(2) Learn on a foam airplane. The Cox Cessna Centurians, Sure Flite 150's or 182's are great. Minor and sometimes major repairs are easily fixed at the flying site with 5-minute epoxy.

(3) Rechargeable soldering irons are a nice addition to your flight box along with a spare bulb and wire.

(4) The two channel airplane can use the same 500 mAh battery pack for the lights, receiver and servos for about 20 flights. Four channel airplanes require an extra battery pack to run the lights.

(5) An airborne pack field charger or an extra charged battery pack can increase your flying time greatly.

(6) Car headlights can ruin your night vision — just like flying into the sun during the day. Also flying during a full moon is not advised as the moon is bright enough to ruin your night vision. The darker it is, the easier it is to fly.

(7) You must undo what you did last.

(8) And as always --- if in doubt, roll out.

All the technical information aside, it's time to talk about the "real" fun of night flying. Acrobatics are great. Full power-on snaps and spins are easily controlled, but to the spectator are a jumble of lights. Deadstick landings are a sight (and sound) to believe. When the engine quits on a pitch dark night, only the sound of the air rushing across the wings, and the streak of colored lights reveal the plane's whereabouts. It is just one of the incredible experiences which goes along with night flying, and is a show for the spectators and pilot alike.

Last year we had a night pylon race. Remember all airplanes look the same in the dark — just four lights. You must know which is your airplane in this type of contest. During the pylon race, all planes looked the same, and all were in the air at the same time. Believe it or not we had no crashes. The crowd went wild. The pylons were lit with lights, and we also laid down 50 grain of wheat bulbs on each side of the runway at 5' intervals all connected to a 12 volt car battery. This many bulbs connected together makes a very dim bulb that does not ruin night vision but defines the runway quite well. We also have a strobe light set up just like real airports. I can't begin to tell you how excited you can get after you try night flying, you just have to experience it.

Recently on a Friday night, we had at least 30 Sky-Nauts out to watch. John Simone, Jr. (American R/C Helicopters, who by the way is working on a night flying Mantis helicopter), George Caldwell, Lowell Draper and myself flew our new night fliers — they are the I.M. Products (Circus Hobbies) F-15 Eagle. Powered with K & B 3.5's, we flew formation demonstrations. These planes look outstanding in the daytime, but in the dark with two tails and two red blinking taillights, they are a sight to behold.

Radio control night flying . . . who'd believe it! Most people don't, but most who try it are easily hooked. Well why not? There is no sun in your eyes, no sunburn, no wind. It's great! The best advice I have is to try it — you'll love it! □

SST 40

from page 55

. . . . pencil an up arrow on the inboard rib to help you keep track. Due to the weight of the balsa pieces, the arrow shafts tend to bow downward. To correct this and wind up with a straight wing, put the bottom spar in place without glue then space it up from the building board with scrap until the top spar is level when checked with a metal straight-edge. Of course, if you want more dihedral, just let them sag and it is built in. Don't, however, let the wing get turned over, anhedral looks funny.

to page 122

SST 40

from page 120/55

Another thing, do not apply all the top sheeting, then wait until next week to put on the bottom sheeting --- you will get a bowed wing that nothing will solve short of dipping it into the swimming pool and weighting it until it dries. As soon as you can, turn the wing over and apply the bottom sheeting.

All of the leading edge sheeting was cut 1/4" too narrow and will not reach from the leading edge back to the spar. The manufacturer has been advised of this discrepancy and assures us the situation will be remedied. We edge glued a 1/2" strip to each piece of sheeting and light sanding makes the addition invisible. The triangular braces for the wing tips were also omitted from the kit; small scraps of 3/16" sheet balsa may be substituted.

Covering:

The RCM prototype was covered with white Super MonoKote and trimmed with red and black Super MonoKote stripes.

Engine:

We used a K & B .40 with a Murphy muffler. We installed the engine 90° to the right; this puts the muffler down and the exhaust gases and oil exit below the plane rather than all over the wing, side and tail. The Sullivan SS8 8 oz. tank is located in the compartment just behind the firewall. Make sure you have the nose gear tiller adjusted and tightened because the tank must be pulled to readjust. A small amount of the balsa doubler around the opening to the fuel tank compartment will have to be trimmed away to allow the tank to slide down into place.

Radio:

We used the Kraft KP6C Gold Spectrum radio with four KPS 24 servos. There is more than enough room in the large radio compartment for all the flight pack. It is not necessary to locate the battery under the fuel tank as is sometimes done.

Flight:

The SST 40 has very pleasing flight characteristics. A .40 engine was not necessary — a .30 or .35 would have been sufficient for the intermediate flier. The symmetrical airfoil should cause no problems for the novice flier, especially if a little more dihedral is added when joining the wing. We put a full inch of dihedral under each wing tip rather than the 1/2" called for in the instruction book. There were no bad traits observed. With the K & B .40, she had spirit.

Conclusion:

The SST 40 would be a good transition plane, for a beginner with some 3 channel experience, to an intermediate aileron trainer. The excellent instruction manual with its 6 pages of construction photos would really help the novice builder on his way to becoming an expert builder. We were impressed with the quality of the instruction manual and accompanying photos. The SST 40 is a nice neat plane, one you will enjoy building and have a ball flying. □

POWER BOATING

from page 54/53

carb. This carb seems to work very well but has a tendency to load up with fuel at very low speeds. Adjust the carb barrel stop screw (on the beach) inward until the motor runs at its slowest speed without stopping. The high speed needle is then set for best rpm with the barrel completely open (the boat should be in the water running when the high speed needle is set). Try the low speed setting again and readjust if necessary after the high speed jet is at the right setting. The motor should not stop anymore. Be sure to use fuel pressure by connecting a piece of fuel tubing from the pressure fitting to the vent of the fuel tank. The fuel tank pickup tube is connected to the carb fuel nipple. Be sure to check the fuel tank and all its connections so that there are no leaks in the system. We have had very good luck with this carb but a more complex carb with idle mixture adjustment would possibly give better results. Remember that if you replace the stock carb you will have modified your engine so that it will not qualify as a stock engine for competition.

Tunnel hulls very often show a tendency to blow off the water at high speeds or in windy conditions. I suggest that you either add weight (6 to 12 ounces) to the left front sponson, increase engine downthrust, or add adjustable cavitation plates to the rear of the sponsons to try to control the ride attitude. An inverted airfoil can also be mounted between the sponsons at the bow to produce downforce on the front of the hull that increases as boat speed increases. Only experimentation with one or a combination of these techniques will result in a more stable running hull.

The Dumas Pay-N-Pak runs very well with the hardware and prop recommended on the plans. The OPS 3.5 runs very happily on fuel with 25% to 50% nitro content. Build the boat as light as possible without sacrificing strength. Be sure to seal the whole interior of the boat with clear epoxy paint so that when the inside gets wet, the wood will not absorb water. Build the boat according to the plans and you will be very satisfied with the boats' performance.

Dear Howard:

I really enjoy your column. Maybe you can help this beginner.

From what I can gather from your article and various catalogs the general rule is for deep vees to be powered by inboard marine engines. My question: Why not use an outboard? It seems that a clamp-on would be so much easier. No hardware to mess with, etc. It's obvious to me that the radio would have to be moved forward to offset the rear mounted engine but would there be other problems?

I prefer the deep vee to the tunnel because of better handling in rougher water or is this a myth? Any help you can give me to clear up this deep vee vs. tunnel confusion would help.

Thanks,
Phil Mayne
Sugar City, Indiana

There is no reason, Phil, not to use an outboard on a deep vee hull. In fact this type of boat makes for a great sport boat. It does have its disadvantages in competition, however. The outboard engine does not produce as much power as a tuned piped inboard engine. As a result the top speed of most inboard deep vees is higher than one powered by an outboard. The outboard powered hull will also have a higher Center-of-Gravity location so that it will not corner as well as an inboard boat. A third disadvantage is that since the propeller changes position relative to the hulls' planing orientation, a nose down pitching force is developed when the outboard motor is turned. This nose down force sometimes tends to trip the hull in a turn. The best outboard deep vee designs are those which take this trim change into account. Deep vees difinitely are able to handle rougher water conditions and are capable of speeds that are only a little bit slower than a tunnel hull.

Mr. Power:

As a long time reader of RCM I know that you can answer my questions. I'm just getting into R/C boats after a very long time in R/C aircraft. What I need to know is how do I get in touch with the NAMBA or whatever organization I need for boat racing in and around this area. I can't find any information at local hobby shops. Thank you sincerely for any help.

Edison S. Berry
Montclair, California

There are two national power boat racing organizations in the U.S. They are:

IMPBA, Pat Bridge, Secretary, 24310 Prairie Lane, Warren, Michigan 48089 (303) 779-0338.

NAMBA, Myrtle Coad, Secretary, 6073 Sunrise Dr, Lower Lake, California 95457 (207) 994-6643.

In California you probably will want to join NAMBA because most of the racing is sanctioned by this organization. If you live north of Fresno you are in NAMBA District Nine. The District Nine Director is Howard Power, 766 Broadway, Seaside, California 93955 (408) 394-1200. If you live south of Fresno you should contact the NAMBA District 19 Director, Wally Stewart, 347 Cypress Street, Bakersfield, California 93304 (805) 322-6972. These people will help you get started racing your toy boats.

Well, that about does it for another month. Send your questions, comments, race results, etc., to the address at the end of this column. If you desire an answer before magazine publication, enclose a stamped, self-addressed envelope so I may answer your letter by return mail.

Howard Power, Hobbies Unlimited, 766 Broadway, Seaside, California 93955 (408) 394-1200. □

SCALE VIEWS

from page 47/46

drawings against your scale data (even for Stand-Off!). You may find some interesting dimensional changes that could affect your static scores!

While we're building our modified model, with all of the new "bumps" and external detail changes, there are a couple of other considerations. A lot of kits on the market today are considerably "over-designed." So, while we're sticking things together, it's a good time to "build-in some lightness," particularly amongst the tail feathers. Most kit and magazine articles stress, "keep the tail surfaces light" — and then proceed to show you a rudder and elevator made out of 3/8" thick, rock-hard balsa! It'll take you about 5 minutes to draw-in a leading and trailing edge, some spars and some ribs — and maybe a half-hour to build a set of stick-and-rib tail surfaces. The ribs, themselves, can be simple rectangles of sheet balsa that are easily **sanded** to the proper airfoil cross section as soon as the Hot Stuff or Super T has set. Even if you have to sheet the tail surfaces to duplicate the metal of the "real airplane," they'll still be lighter than originally designed. And — consider laminated tail surface outlines for those craft that have beautifully curved rudders and stabs. It takes a bit longer — but, who has ever seen a nose-heavy scale R/C model?

"Kit-bashing" for R/C airplane models — an easy way to develop a **unique** model, and add variety to your Club's flight line. And, if you've a couple/three scale models under your belt, it's almost a foolproof way to produce a model that's "different," yet firmly based on a reliable, flyable design. I took a quick "trip" through the back of a recent issue of RCM, just to see which of the scale kits advertised would be amenable to the techniques we've described. A partial list — and what could be done to each of them — is given here for your consideration:

Hobby Shack's Cessna 150 to a Cessna 172 — mostly pants and paint work.

Proctor's Nieuport 11 to a two-place Nieuport 16.

Sig's Cub to an early Super-Cub — by subtle cowling changes and adding a four-wheel, twin-tandem wheeled landing gear.

Top Flite's P-39 to a P-63 — by modifying the tail feathers and the wing shape.

Flyline's Great Lakes Trainer — by cowling changes to duplicate an earlier version.

Top Flite's Zero to the slightly-clipped-wing "Hamp."

Pica's T-28B (Navy) to an USAF T-28A (7-cyl. engine, two-bladed prop and an aluminum paint job).

Jemco's (Mark's Models) AT-6 to the Ranger-engined AT-6E (mostly cowl work).

Stafford's B-24D to the later "J" model — mostly turret work.

Royal's Messerschmitt 109E to an "F" — with a bigger spinner, some cowl contour changes and rounded wing tips.

Pilot's Fairchild PT-19 — add a canopy and convert it to a PT-26, either U.S., or with a yellow paint job, Canadian.

Royal or Top Flite's Grumman Bearcat F8F — leave off the guns and bombs and paint it orange, white and blue a-la Al Williams' Gulfhawk IV (as Nick Ziroli did with his big 'un).

Practically anybody's P-51B Mustang to produce Bill Odom's "Beguine" racer or today's flaming red, Griffon-engine powered "Red Baron."

Of course, we have to add a CYA statement even though the kinds of changes we're advocating probably won't affect the flying characteristics of the models we're "improving." Because the kit manufacturers and/or magazines may claim that we've "goofed" the orginal design, they **can't** be called to stand behind their statements about the flying qualities of the "new" models we'll produce. And — that's only fair and reasonable! But, we all take a chance when we fly **any** new R/C model for the first time. Even built "box-stock," the simplest trainer's first flight is a time for concern and careful attention. The same holds true for a "kit-bashed" scale model. Logic is on the positive side, however. Make your changes with care, maintain the forces and aerodynamics, and you'll probably be rewarded with a unique scale model that's **truly** yours! □

FLY BABY

from page 42

.... gusseted for extra strength. Once we got the fuselage completed, the structure was so strong that we decided the change to spruce wasn't really needed but it won't hurt anything and will be a little stronger.

The wing ribs and most other parts are die-cut; out of all the pieces only a couple needed to be coaxed with a razor blade and that includes the plywood parts. A few of the strips of wing sheeting in our kit were slightly warped and these were trued up with a straight-edge; only trim one side and put this in on the wing. It is pretty rare to find a long piece of sheet stock that is perfectly straight so truing will probably be required but don't cut any more than absolutely necessary. Except for being big, the wing construction holds no surprises. Once the panels are complete they are joined to the center section with several dihedral braces. We put one whole wing together in an evening using Carl Goldberg's Super Jet for everything but the center.

Wires for the cabane struts and landing gear are pre-formed and quite accurate. The normal wrap and solder methods are used and while this can be done with an iron, we really recommend a propane torch with a good grade of silver solder.

Some of the early plan sheets had the cabane brace drawn the wrong way — ours did — but a note was included telling of the correction. Check your plans, the brace should go from the top forward to the bottom rear strut. This gets a little confusing since the "N" strut braces go the other way. If you aren't sure, check the three-view drawing included in the kit. As designed, the cabanes are permanently mounted with the ends epoxied between two pieces of plywood. Every time we've glued in cabanes it seems to guarantee they will get bent, requiring major surgery to repair. We made ours removable by using "J" bolts in the plywood to hold the ends in place. Removable cabanes

also makes covering easier.

It is a good idea to install the control system before starting to cover. We made up the rudder and elevator rods from fiberglass shafts and put several anti-flex cross braces in the aft end of the fuselage. Du-Bro heavy duty pushrod ends were used and bends were kept to a minimum; this makes for a solid linkage. Normally the elevators are connected by a 3/8" dowel but we've been partial to split elevators and went that route with the Fly Baby — no real reason, just preference. It does mean that you have to put two pushrod ends in the elevator rod but then you can adjust each elevator separately.

Covering:

The Fly Baby is designed to be covered with one of the fabric materials and since we'd had good experiences with it before, we chose Top Flite's new FabriKote. The original was done in Cub Yellow and Durable Maroon. That made things easy — FabriKote yellow is a pretty close match to a true Cub Yellow. We had good success in painting the trim with Krylon spray paint but FabriKote will accept just about anything you can name. We'd suggest trying a small test piece first. The three-view drawing included in the kit is very helpful in locating the trim lines.

RCM's December 1981 issue has an article with a number of hints on using FabriKote. The only trouble we had was in making it stick to itself. A couple of things will help, first turn the iron down a bit, FabriKote doesn't need a lot of heat to work; in fact, too hot an iron will make it very hard to handle. The other thing we did was to run a bead of Hot Stuff along the seam lines; wipe off any excess immediately or you will end up with shiny spots. Overall we are very pleased with the FabriKote finish and it will shrink to fit almost any shape without wrinkles.

Engine:

The choice of engine for the Fly Baby was easy; it is designed for the Quadra engine with the factory mount. Other engines in the size category could be used but some changes to the firewall would probably be needed. We had an older Quadra but as a treat we ordered a new one from Dario Brisighella of U.S. Quadra. The engine is available in a package deal with his "over balanced" flywheel, mount, and either a 16 oz. or 32 oz. fuel tank. After trying both engines, we're convinced that the special flywheel is a definite improvement. If you already own an engine, Dario can modify the flywheel for a reasonable price.

The Quadra is mounted inverted and tipped just a bit off vertical so that the carb is flush against the cowl. It tucks in underneath the dummy cylinders and the hole isn't very noticeable. With a Top Flite 20/6 prop installed, the engine runs very nicely with a healthy amount of power. We originally used a 32 oz. tank but changed to a 16 oz; after all, over half an hour on a tankful is plenty.

Radio:

The usual talk about fitting the radio gear gets a little silly when dealing with an airplane of this size. The biggest problem is deciding where you want it. We ended up with fairly normal locations and most of the servos are in the cockpit area. Just remember this is a big bird so make certain the mounts are up to the task. We mounted the heavy duty Futaba S-7 elevator and rudder servos on 3/4" x 3/8" spruce rails. Two standard servos were used for the ailerons, one for each side. These were installed in the center section of the wing and drive the ailerons via bellcranks. We've used several different control systems from cables to mounting the servo at the control surface, all with good success. A C.B. Associates heavy duty tail wheel assembly was used on the Fly Baby. Not only does it look scale, but the spring linkage helps to protect the rudder servo.

A 1200 mA battery pack was wrapped in foam and held in place with rubberbands. We definitely recommend a large capacity battery, the extra control loads will make short work of a standard pack. The receiver was also packaged in foam and stuck to the fuselage side with rubberbands. That's one disadvantage of the big beasties, you can't wedge anything in place — it all has to be held down.

With all the wires and cables running around in the Fly Baby, a check for radio interference is in order. We started the engine and tried it at all throttle settings, even with the transmitter off. Our Futaba 6 channel had no problems. Most of the modern radios won't have any trouble, but the time required to make sure is well worth the peace of mind.

Flying:

We spent quite a bit of time on the initial set up of the Fly Baby and most of it was in adjusting the rigging wire. There are twelve of them and all should be at about the same tension; be sure to check that you haven't pulled any twists into the wings. We did, and had to adjust one side twice. Once that was done, subsequent field assembly only takes a few minutes. The C.G. came out as indicated on the plans. It can be shifted a little bit by moving the battery but, if you haven't gotten too carried away with paint, the C.G. should be pretty close. With ailerons only on the lower wing, we figured that the roll response would be on the slow side so we used as much throw as was available. The elevator was set moderately with about 1½" up and down movement and about the same on the rudder.

Our first trip down the runway was intended to be just a taxi test but when the tail came up everything looked so right that we just let it lift off. The flat bottom airfoil, all 2,464 square inches of it, generates a lot of lift and the Fly Baby is airborne with no effort. On the ground, it looks very good, but in the air --- well we spent a lot of time just put-putting by and looking at it. The Fly Baby has a lot of drag with struts, wires, and other parts out in the breeze. It will slow down quite rapidly when you pull the power off, stalls are clean and not at all vicious; it just slows down and then tucks the nose. We'd suggest you spend a little time at altitude getting used to the effect of the throttle. Landings are very nice. We usually bring it in fairly low and level with a little power on. At the edge of the field, power is cut and the Fly Baby just settles in. The 6" Du-Bro Big Wheels absorb most of the landing effort and will roll over almost anything.

Like most of the large scale airplanes, the Fly Baby turns best with a little coordinated rudder; it isn't absolutely necessary but it sure looks better. The ad says the Fly Baby Bipe is "extremely aerobatic" and that's a matter of definition. We tend to think of Pitts Specials as extremely aerobatic and the Fly Baby isn't in that category, but then neither was the original. It will do loops, hammerheads, spins, and the most beautiful slow rolls.

Conclusion:

Balsa U.S.A. has several nice kits available and the Fly Baby Biplane has to rate as one of the best. Parts fit and quality was very good, and the plans are excellent. We has no major problems and while we made a couple of minor changes, they weren't necessary, just personal preference. The landing gear is a little awkward since it is attached to the lower wing and has to be moved for assembly, but it is scale and we couldn't figure out a better way. Probably one of the best compliments came when we landed and someone who had seen the full size Fly Baby pointed to the model and said, "That's it, that's a Fly Baby."

We haven't figured out how Balsa U.S.A. does it but at a price of $105.99 the Fly Baby is one of the all time bargains. By the way, the price includes freight so give the neighbors something to talk about --- have a **big** plain brown box delivered to your door. □

When writing to RCM for answers to your questions, please send a self addressed stamped envelope for a prompt reply.

FLYING LOWE

from page 40

while I coached the fliers and we went sightseeing. I will now confuse you by saying Salisbury no longer exists; it is now called "Harare." While we were there the government changed the name of many cities and towns to celebrate the second anniversary of its independence. To many long time residents of Harare it will always be "Salisbury." Whatever its name, it is a beautiful, bustling city with wide avenues, beautiful trees and flowering shrubs, nearly perfect weather, and very friendly people. Since we were on the other side of the Equator it was fall; so, at 5000' altitude the days were mild — low 70's, and the nights were cool.

All the modelers lived in beautiful homes with lovely gardens (labor there is cheap). There is no central heating in their homes; when the weather is chilly they simply slip on a "jersey" (sweater) and, maybe, have a fire in the fireplace. They love fresh air; so even when the weather is chilly, their windows and doors are wide open!

to page 130

FLYING LOWE

from page 128/40

The cost of living in Zimbabwe is generally lower than in the States, except for petrol. Homes cost about half what they sell for here. All isn't rosy, however, since the Zimbabweian Government is seeking to maintain a balance of trade and has established import priorities necessary to a developing country. This means that imports of luxury items are considerably restricted, including modeling equipment.

For you T.V. nuts, there is **one** T.V. station (black and white) in the country, which features a lot of old U.S. show reruns. This is a blessing in disguise, however, since it leaves more time for family communication and for modeling.

Modelers in Zimbabwe are like modelers around the world --- very friendly and enthusiastic. They subsist primarily on the extensive line of kits manufactured by Dennis, plus the imported engines, radios, and equipment that he is able to get for them. He always has a long waiting list for radios and engines. In spite of shortages, however, modeling is of very high quality with activity in control line, free flight, and all categories of R/C. Model competition is primarily centered around R/C, with racing, pattern, soaring, and scale events. In fact, their Nationals were held during the time we were at the South African Nationals. The Zimbabweian feature a pattern category breakdown which is very similar to ours and that of So. Africa. In fact, Zimbabwe and South Africa modeling has been strongly intertwined over the years, but is now estranged for political reasons.

While in Zimbabwe I believe that I met almost every R/C modeler, since we traveled the length and breadth of the country, visiting every model club. I flew demonstrations, coached and counciled in at least six different cities. Every club had a fine flying site --- always paved and the Salisbury (Harare) club site is one of the best that I have seen **anywhere**! It is located on the outskirts of the city and features two wide, long, paved runways, very generous surrounding green areas, a large sun shelter and a club house. They also have a **full time** caretaker who cuts the grass and tends to their needs, including afternoon tea! Most clubs had similar facilities. When one speaks of going to the model flying field, he says, "I'm going to the **club**!"

to page 133

FLYING LOWE

from page 130/40

An almost yearly tradition in Salisbury is a model show or flying circus to which the public is invited. It features R/C models of every kind, including pattern, scale, racing, limbo, flying witches, saucers, etc. This year I was able to participate and had a ball! Extensive publicity in the form of 300 posters, made by Ann Stern, Gill Glyn-Jones and others; radio, newspaper and T.V. ads brought out literally thousands of people. I was flabbergasted at the huge turnout for the pre-programmed shows, morning and afternoon. The final tally showed over 3000 paid admissions! Now how many model shows have drawn that many people here? What makes this even more incredible is the relatively small number of medium income people in Zimbabwe. A majority of their 8 million people live off the land or on very low incomes; the minimum wage is about $70.00 U.S. per month!

At the show I was able to contribute my pattern and aresti demonstrations. I also introduced some U.S. acts, such as clowns and the flying flat iron. The most enjoyable strange aircraft to me, however, were the two flying witches, who flew on their broom sticks and dangled their legs; one would even loop and roll!

After our first week in Salisbury we traveled south to Hartley and stayed overnight with Billy and Trish Edwards on their huge commercial farm. Then it was on to Ratcliff for lunch at Graham Leathes (Chairman of the Phoenix M.A.C.) with other club members and their wives. After demonstrations and coaching, along with afternoon tea, we were taken to Gwelo, where we spent two days with Rob and Christine Wilson (Rob is

Chairman of the Eagles M.A.C.). Ken and Sue Dat held a braai (Bar-b-que) in our honor with all the members of the surrounding clubs attending. Thanks to Ken, Clara now has some great new recipes!

Following the usual demonstrations and coaching we were taken to Bulawayo for more flying, a braai with all fliers attending, and an overnight stay with Arthur and Eileen Halgreen. In the morning their daughter took us to the Matapos, a high point on huge rocks where you get a "World View," according to Cecil Rhodes who requested burial up there. We also saw cave paintings. That afternoon the Halgreens took us to the Wankie game reserve. From there we spent the night and next day in the company of Eric and Una Bowker. They drove us to the beautiful Victoria Falls. The park's uncommercialized natural beauty is refreshing. After a relaxing stay overnight at the Victoria Falls Hotel we caught a plane back to Harare for a week of preparations for the air show previously described. When the air show was over we were driven north to Sinoia for a braai at the home of our hosts, Mike and Dian Plumb, attended by the Sinoia club members. We had a day of rest with these delightful people before going with them to Lake Kariba, a beautiful man-made resort lake area. Lake Kariba is over 100 miles long and we saw most of it by boat or from the air. There is beauty everywhere and abundant animal life. Believe me, there is nothing like seeing wild lions and elephants close up!

Back in Harare I spent some time in Dennis Hunt's model airplane factory. Dennis produces a unique, high quality line of prefabricated models, ranging from control line for beginners, to a 1/4 Scale Laser 200. His models feature prefabricated

to page 138

FLYING LOWE

from page 134/40

fuselages, either glass or balsa, and presheeted wings and tails. Dennis cuts his own wood and also fabricates most of the items included in his kits. I think that I must have looked at a hundred presheeted wings and never saw a crooked one! I liked the kits so well that I brought back a couple of Panzer D-20's (sport aerobatic kits) to play with. While in Zimbabwe I flew Barry Hunt's D-20 maybe 50 times and found it to be ideal for the new "turnaround" pattern. I also flew Dennis Hunt's .40 size "Capricorn" through FAI and turnaround patterns and found it to be excellent. Most of Dennis' production is exported to South Africa, but he also supplies the local modelers.

While in Zimbabwe I spent considerable time coaching modelers in pattern flying and demonstrating same. I flew many models of all breeds --- generally the light ships flew best at the high altitudes. Zimbabwe has several modelers of international competition quality and I certainly hope that they field a team for the '83 World Championships. It would be great to feel that I had a small part in this endeavor! I was especially impressed with young Chris Halgreen, flying his gorgeous --- what else? --- Phoenix 8. I worked quite a bit with Chris and was very impressed with his response to coaching. I watched Chris put in several flights that would give our best fliers a run for their money!

It is impossible for me, in this short report, to adequately cover this tremendous experience or to express my sincere appreciation to all who showed such fine hospitality to Clara and myself. You can be assured, however, that we consider this an experience of a lifetime and never to be forgotten. Our thanks to Dennis and Margaret Hunt and all the modelers of Zimbabwe. Zimbabwe is a beautiful country with much to offer visitors from around the world. □

BIG IS BEAUTIFUL

from page 39/38

The Noise Trap consists of a circuit board, an IC (or chip, if you prefer), six feet of servo lead and solder and heat shrink to complete. No connectors are included with any of the kits mentioned so you'll have to supply your own ends. The neat thing about the Noise Trap is that you can have one input and two outputs which is great if you have a situation where you wish to drive two servos on one channel, as might be the case with two aileron servos driving from one channel, or two elevator servos each driving half of the elevator. Nice idea --- very practical.

All of the Ace items come with complete instructions, including the assembly instructions even on those which are assembled, and, even better, the sheets are standard three ring binder size and are punched to fit a three ring binder. Great idea --- I have sheets and sheets of instructions and servicing data stuffed into a drawer in my shop and I am going to hunt up a three ring binder and put all that good information in it where I'll be able to find it when I need it instead of having to paw through pages of material trying to find the one I want. Thanks Ace, for a good idea!

To sum up — while I am no electronic expert, I feel sure the items mentioned have considerable value and I have come to the conclusion that I am not going to fly anything big any more without a 2 x 5 Redundant Power Source and, if I use long servo leads, one of Ace's Noise Traps will be right in there in the long leads.

to page 142

from page 138/38

With my rather limited knowledge, I can't tell you much more, but I'm sure a SASE to Ace will get you all the information you could want. Drop Tom a line at P.O. Box 511, Higginsville, Missouri 64037, or give the guys at Ace a call at (816) 584-7121.

Prices of the items mentioned are very reasonable, with the Mixer at $29.95, the Noise Trap going for $3.95, and the Redundant Power Source priced at $19.95 assembled, or $12.50 in kit form. Let me tell you, there is no better insurance around at a better price than that!

Wendell Hostetler's new Art Chester "Jeep" plan is now available from Wendell (1041 Heatherwood Lane, Orrville, Ohio 44667). The span of the Jeep is 84", fuselage is 75½" long and the weight should come out between 19 and 24 pounds. Wing loading is 35 oz./sq. ft. and power can be anything from 2 to 4 c.i. The plan is on two large sheets and includes all the information you need to construct this 30's era racer. On four cubes, it should be a barn burner!

Wendell's philosophy has changed a bit since he got started in this plans thing. He tells me that he is now concentrating on keeping wing loadings in the 30 to 40 oz./sq. ft. range. He feels that the larger model, at that wing loading and with **adequate power** will fly better than the same model built lighter and lower powered. The exception, of course, is such models as the J-3 and others of similar design; they should be floaters and they look right when they are. He says he is at a loss to explain the effects, but that at these loadings and adequate power, the models seem to fly more prototypically. That may be a bit subjective and my philosophy is this, if it pleases you, and you're the guy who built it, then that's all that's needed. Judging is pretty subjective anyway when it comes to so-called "scale speed." If you asked a dozen people, you'd probably get a dozen opinions. Wendell concluded his letter to me with this phrase, ". . . and that's what it's all about — fun and enjoyment!" I couldn't agree more!

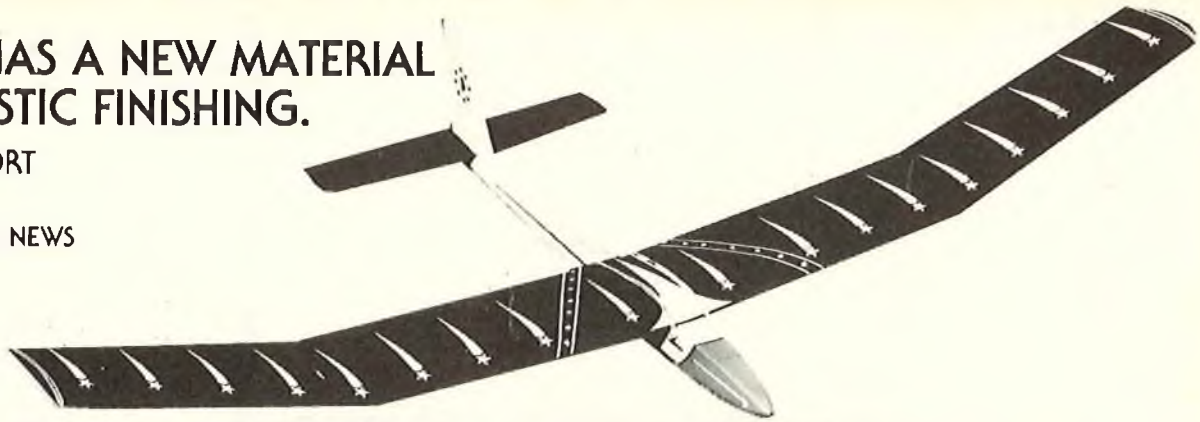
Dario Brisighella's Waco ARE plan arrived a few days ago, a new plan I mentioned a couple of months ago. Those of you who are regular readers will know that I am a Waco addict and have a special regard for the ARE model. This is a cabin bipe with a wide chord top wing and a narrow chord

to page 144

COVERITE HAS A NEW MATERIAL FOR FANTASTIC FINISHING.

A PRODUCT REPORT

by Frank Tiano
OF MODEL AIRPLANE NEWS



COVERITE'S AMAZING MICAFILM

MANUFACTURERS in the modeling world are always coming out with new and improved model building materials. The Black Baron at Coverite has just put on the market a new covering material that is truly amazing. It's called "Micafilm," and it's the best of two worlds. It's fantastically light and unbelievably tough. Where previous covering materials were either film or fabric products, Micafilm puts the two together, as it combines the ultra lightness of a film with the reinforcement of extremely thin, very tough mica fibers. The resulting product is a covering material that is 40%-70% lighter than any previous covering, yet in scientific testing, has proven to be 700% tougher. The mica fibers give the material tremendous resistance to tearing, which has been a big drawback of other film products.

Micafilm is particularly useful in the covering of lighter models, such as gliders and old time free flights. Coverite developed this material specifically for its lightness and toughness, but several other advantages surfaced in their exclusive test program. Sample swatches were sent to all magazines and to the best known glider and free flight modelers to try out. Response from these people was fantastic and they came up with unforeseen benefits, in addition to the lightness and strength. Glider fliers reported tremendous torsional rigidity, and free flighters were highly impressed by the looks of the material. It gave their models the realistic appearance of the old time models that were covered with silkspan and clear dope.

Micafilm has no adhesive and is applied to a model by coating the structure with Balsarite. Only the parts of the structure that are going to be covered should be coated with Balsarite. I was warned to note in the directions that Micafilm needs a lower application temperature than other coverings, because too high of a heat will cause problems in adhesion. The best temperature for application is given at 240°.

I prepared the structure according to the instructions on the Micafilm box. I applied a liberal coat of Balsarite and then started covering. After cutting material for the bottom of the wing, I ironed it on at the designated setting. The material went on very easily and no application problems were encountered.

The material shrinks well at the same low temperature used for application. Where stubborn wrinkles persisted, I found that increased iron temperature (as suggested in the directions) took care of it. I attached the covering to the tip of the wing and after sealing down the rest of the material, I returned to the tip. I increased the temperature to 300° (again suggested in the directions) and found that by pulling and moving the material at the tip, a very smooth wrinkle-free covering was possible without the need for using a separate piece of material, as is often the case with wing tips.

Next I worked on the top surface of the wing. I cut out the material and applied it at the 240° temperature as before.

When trimming away the excess material, I left about a ¼ in. overlap. Using a narrow brush, I gave the overlap a coat of Balsarite, allowed it to dry a few minutes and then ironed it down. It left a nearly invisible seam.

I was very impressed with the material and the way it handled, and proceeded to cover the rest of the model. The fuselage was a solid balsa structure and I had no trouble covering the sheeted surface using the iron temperature of 240°. As I worked from the center of the material out toward the edges, the Micafilm went on very smoothly, just as it had on the other surfaces.

I trimmed my test model with some of the pressure sensitive trim sheets, but it can be trimmed with any other iron-on material as well. Iron-on films and Coverite's Permagloss have been used to trim Micafilm with excellent results.

Micafilm comes in 3 translucent colors (red, yellow and blue), a pearl white and a super clear light. I used the white and translucent red. The white, which is called "Pearly White," is exactly that and is quite unlike anything else available as a model covering. It has a beautiful pearlescence to it and when trimmed with colors, makes a very attractive combination. I used red and blue stars and striping material on my test ship, which gave a very patriotic appearance to the model. The translucent red is a different looking material from what is available in other coverings. It is not completely transparent because of the reinforcing mica fibers, but it does look like the clear doped silkspan used on old timer models. I can readily see why the builders of this type of model were so excited over the look of the Micafilm when they tested it.

A coat of Balsarite brushed on model only where Micafilm is to adhere.

I flew one of my test gliders extensively and I could tell that the covering was very durable. A nice-looking finish after repeated landings in less than ideal conditions (including a flight without the radio turned on) showed that Micafilm has great resistance to the elements. It would appear from the experience I've had with the material, as well as the reports from those involved in Coverite's test program, that we will all benefit from the introduction of a long-needed, super light and super strong covering material.

from page 142/38

bottom wing. In its day it was compared to the Beechcraft Staggerwing (anothor favorite) and was a pretty classy chariot.

Dario's plan does full justice to the original and is well-suited to the 35cc Quadra engine. Plan is on three well-drawn sheets, complete with a good deal of detailing. The span of the model is 87.25", fuselage length is 70" and finished weight should come out in the 20-24 pound range, well-within the capabilities of the smaller Quadra. The scale is not quite quarter, being 21% of the original.

If you like biplanes or Wacos, or just like great plans, add a set of these ARE plans to your collection, you won't long be able to resist starting construction.

I don't have a price as this is written, but if you drop Dario a note at US Quadra, he'll give you the details. There will be a cowl and wheel pants available for the model so ask about them as well. If you decide to order anyway, Dario always makes change if you send too much, rather than putting a credit on file for you.

Currently on the building board in my shop is Balsa USA's Mono Fly Baby which I brought back from Toledo with me. Despite some very minor inconsistencies in the fit of some of the parts (and they are minor), it is going together very well. The wood in the kit is a bit light for my preference (I am a notoriously heavy-handed builder) but it is very well-engineered and will have quite adequate strength when completed. The folding wing arrangement on the full scale is shown and it would not take a great deal of ingenuity to do the same thing with the model. The full scale Fly Baby was also flown on floats and there are some pictures with the kit of the float equipped version, making it easy to go that route, should the builder choose to do so.

The kit is very complete with an excellent hardware kit included and, at 1/3 Scale, is fairly large. Very straightforward construction is what you'd expect from Balsa USA and that's exactly what you get. A good kit at a very attractive price (under $100.00) and should make a fine flying model on the small Quadra. I'm looking forward to having mine in the air later this season and will comment further on it at that time.

That's it for this month, hope to have you all back again next month for more good stuff for **big** birds. □

from page 27/20

leading edge down and build up a generous fillet of epoxy between the brass tube and the W-11 ply web. It isn't necessary to fill the cavity between the spars, but make sure the entire tube is covered and that the tube is well-bonded to the ply web. Epoxy the tip joiner tube in the same manner, then stand both the center and tip panels on their leading edges until the epoxy sets.

(7) When the epoxy has cured, use the 5/32" joiner to rejoin the tip and center panels. Clamp the two panels together so that the trailing edges are aligned, and check to see that the holes for the 3/16" alignment dowel line up. If they don't, use a small rat-tail file to open the hole in the tip panel until the holes do line up. Round the ends of the alignment dowel slightly, then push it through both W-3 ribs. Check to make sure the trailing edges are still aligned, then epoxy the alignment dowel into the tip panel only. Be very careful not to epoxy the dowel into the center panel or glue the two panels together. When the epoxy has set, remove the tip panel and repeat steps 1-7 for the other tip dihedral joint.

(8) Cut 3 pieces of 1/16" x 3" x 3½" long sheet and cut to fit the top center section with the grain running span-wise. Use masking tape or pins to hold the sheet in position until dry. Notch the center section of the wing to accept the 1/8" x 1/4" x 3⅛" spruce reinforcement and use 5-minute epoxy to glue it in place. When the epoxy has cured use a razor plane to taper the reinforcement to match the trailing edge. Don't omit the reinforcement as it prevents the wing hold-down bands from crushing the trailing edge.

(9) Use contact or rubber cement to bond a piece of No. 120 or No. 180 sandpaper to a hardwood block at least 3" wide by 11" long. Be sure that the sandpaper is tight against the surface of the block as, otherwise, you will sand hollows into the flat bottom surface of the wing. Now block sand the entire lower surface keeping the block in contact with the leading and trailing edges at all times. Be sure that all seams and joints are flush and smooth as any high or low spots will show as flaws when you cover. Hold the block at 10°-20° angle to avoid breaking the ribs while sanding.

to page 152

MONARCH 05

from page 150/20

When you are satisfied with the bottom, sand the top contour being very careful not to change the shape of the ribs. Be sure that all ribs are flush with the leading and trailing edges. Use your fingertips to check the surface by touch if you can't tell by looking at the joints.

(10) Use a small plane, or sharp knife, to carve the leading edge to contour. If the spruce tends to split, reverse the direction of carving. Try to get the shape shown on the plan and be sure that the contour is the same on all three panels. Finish off with the sanding block working carefully. Resand the entire wing with No. 220 or No. 240 sandpaper on your block. Assemble the completed wing and check the span-wise balance. Add weight to the light tip, if necessary, until the wing balances on the center rib. The wing is now complete and ready to cover.

Fuselage Sub-Assembly

(1) Pin the 1/8" air-ply right fuselage side in place over the side view of the fuselage with the best face against the work surface. Using the reference marks on the plans, draw the former locations on the side. Using the side internal detail cut two sets of spruce stiffeners. Glue all of the stiffeners in place using F-2 as a spacer between the two stiffeners. Trim 1/8" from the rear edge of one of the 1/8" air-ply nose doublers, and install the doubler with the rear edge aligned with the mark for F-2 and 1/8" from the bottom edge. Cut the lower 1/4" triangle stock to length and glue in place 1/8" from the bottom edge.

(2) Pin the left ply fuselage side in place and assemble as per Step 1. Note: **do not** trim 1/8" from the nose

to page 156

from page 152/20

doubler. The left side doubler is installed with the rear edge aligned with the forward face of F-2. The difference in the sides is to ensure the model will have built-in right thrust. Install the 3/16" x 1/4" balsa tail post and skid mount on the left side, recessed 1/4" from the aft end of the side, and 3/32" from the bottom of the side. Allow both sides to dry thoroughly before removing from the work surface, then cut the slots for the pushrod exits.

(3) Pin the 1/8" air-ply forward floor and floor in place over the top view, using the two landing gear wires to space them 1/4" apart. Make sure that the front edge of the forward floor is angled to give **right** thrust. Use 5-minute epoxy or aliphatic to install the 1/8" birch ply gear mount. Join the 3/32" balsa aft bottom to the floor assembly. Pin the aft bottom to hold it firmly against the work surface. Use the alignment guides on the plan to accurately draw lines across the bottom to locate the formers.

(4) Install formers F-2 and F-3 with 5-minute epoxy or Jet. Use a small square or triangle to be sure that the formers are perpendicular to the bottom and check that the edges of the bottom and the formers are aligned. Glue the 1/4" triangle stock reinforcement behind F-3. Let this assembly dry completely before proceeding.

(5) Using the template on the plans, lay out and drill the holes in F-1 for the engine mounting blind nuts. Install the blind nuts and secure each of them with a small dab of epoxy, being extremely careful not to get any epoxy in the threads of the nut.

Fuselage Assembly:

(1) Remove both sides from the work surface and apply glue to the face of the 3/16" x 1/4" tailpost on the left side assembly. Align the aft end and bottom edge of the sides carefully and join the sides at the tailpost. Pin through the sides or use a small clamp to hold this joint secure.

(2) Lower the sides over the bottom assembly pinned to the work surface and check that the sides fit properly. Correct any problems before continuing. Now you are ready to glue the sides to the bottom, thus ensuring a perfectly aligned fuselage. Because of the length of the joint involved, the choice of adhesive for this step is very important, and we recommend only slow drying epoxy or alpha cyanoacrylate adhesives.

to page 158

from page 156/20

Method A: Slow-Dry Epoxy: Mix a generous supply of epoxy so that you don't run out in the middle of this step. Apply epoxy to the edges of F-2 and F-3. Apply epoxy to the bottom face of the 1/4" triangle stock and to the inside face of each side along the lower 1/8" from the edge. Separate the sides at the nose and drop into place outside the bottom assembly using the alignment marks for fore and aft position. Be sure that the sides are properly aligned and pin the section between F-3 and the tailpost tightly against the 3/32" balsa bottom. Apply masking tape across the top of the former F-3 to clamp the sides tightly against the former edges. Next, pin and tape the sides against the ply forward floor and the edges of F-2. Apply epoxy to the side and bottom edges, and the outermost 1/8" along the sides on the rear of F-1 and install between the sides. Make sure that the former is tight against the sides and floor, and that the rear face of the former is snug against the nose doublers. When satisfied with the alignment of F-1, use clamps or masking tape to hold everything securely in place while the glue sets.

Method B: Alpha-Cyanoacrylate Adhesive: Position the sides over the bottom using the side alignment marks for fore and aft location. Apply glue from the inside of the fuselage starting at the tailpost first on one seam and then on the other. Do 4" to 6" at a time and hold the sides firmly in place until the glue sets. This technique relies on capillary action to wick the adhesive into the joint so be sure to use enough adhesive. Hold the sides against F-3 and run a bead along the side-former joints. Pull the sides together and apply adhesive from the inside, gluing the side/floor and former joints as you move forward. Install F-1 in the same manner as outlined in Method A, using either epoxy or Super Jet.

(3) When the basic fuselage assembly is dry, use a sanding block with coarse paper to sand the sides and bottom flush with F-1.

(4) If the radio you are using does not have servo reversing switches, check the direction of servo travel and make sure that the servo movement drives the pushrods in the proper direction. An up elevator command must push the pushrod back. Right rudder must push the pushrod back. If this action is not correct, try crossing

to page 166

from page 158/20

the pushrods in the aft fuselage. If that doesn't work you will need a reverse rotation servo or you will have to relocate the front end of the pushrod to attach at the center of the fuselage. If you have not yet purchased your radio we suggest that you do not route the pushrods through former F-3 until you are sure that the action will be correct.

(5) Roughen one end of both outer pushrod tubes with coarse sandpaper and insert the other end through the fuselage slots near the tail. Fish the tubes through F-3 until approximately 1/2" protrudes outside the sides. Insert the inner tubing and check that they slide smoothly then glue the outer tubes in place with Hot Stuff or 5-minute epoxy, being careful to avoid getting any glue inside the tubing. Be sure that both ends of the outer tubing are secured. Remove the inner tubes and trim the aft end of the tubes flush with the fuselage sides.

(6) Install the 1/16" x 1/4" spruce stab leading edge stop using care not to distort the sides. Cut the cross-grain top sheet to size from 1/16" x 3" balsa sheet. Remove any pins between the sides in the aft bottom and install the top sheet. Install the 1/16" x 1/4" spruce trailing edge stop, aligning the forward edge with the front side of former F-3. Let this dry completely and remove the fuselage from the work surface. Trim the top sheet flush with the sides and sand the rear portion of the fuselage.

(7) Cut the forward hatch reinforcement from 1/16" x 1/4" spruce and install. Glue the 1/16" x 1/4" spruce aft reinforcement in place. Glue the reinforcement to the 1/4" x 1/2" balsa forward fairing, but don't install the fairing yet. Temporarily install the center panel of the wing on the fuselage tight against the trailing edge stop. Hold the hatch in place with a 1/64" space between the wing leading edge and the aft end of the hatch. Apply glue to the top of the nose block and forward top of the sides and install the fairing using the hatch as a spacer for proper location. Remove the hatch and wing. Glue the 1/4" x 1/4" hardwood hatch hold-down block to the forward face of F-2. Trim the 1/16" plywood forward hatch hold-down to fit snugly between the sides and glue to the bottom of the hatch.

(8) Drill the hole for the hatch eyelet and push the eyelet in place. Position the hatch on the fuselage and locate the hole in the hold-down block through the eyelet. Remove the hatch

and drill a 1/16" or 5/64" diameter hole in the hold-down block. Locate and drill the 3/16" diameter holes for the wing hold-down dowels. Add the 1/4" triangle stock reinforcements between the sides and the landing gear mount.

(9) Carve and coarse sand the nose area and hatch as shown on the plans. Use a small plane or knife to round the bottom corners of the fuselage from F-3 forward, and a sanding block to round the hatch and aft fuselage corners. Check the cross sections shown on the plans and be careful not to round the aft fuselage too much as this will weaken the corner joints. Block sand the rest of the fuselage, filling any dents or joint gaps with vinyl spackling compound or Hobbypoxy Stuff.

(10) Place the completed fuselage flat on a large flat surface and pin the stab in place. Measure the distance from each stab tip to the work surface to check that the stab is parallel to the bottom of the fuselage. Correct any misalignment by trimming the high side of the fuselage. Next, assemble the wing and place it on the fuselage. Check that both polyhedral joints are the same distance from the surface. Correct any problems. Finally, slip the fin in place and use a square or triangle to check that it is perpendicular to the stabilizer. Stand back and admire the structure. Construction is complete and you are now ready to cover your Monarch .05.

Covering:

We suggest that you finish the model with one of the iron-on plastic film coverings, as they provide a good looking finish with minimum weight. For the wings and the tail group, we recommend that you use Super MonoKote because it provides more stiffness than similar products. This is important if you get the airplane moving at high speed in a dive or during competition flying.

The fuselage can be finished with Solarfilm or one of the other low temperature films as stiffness is not a factor in this application. These films will cover the compound curves in the nose area more easily than MonoKote. There is no need to fiberglass the fuselage, as the structure is very strong and does not require additional reinforcement.

Use bright, high visibility colors such as orange, yellow, or red, so that you will be able to see the model when it is high above. Trim to suit your individual taste and add your AMA number.

Final Assembly:

(1) Remove any covering material from the fuselage stab-rest, bottom side of the stabilizer, and the top surface between the center ribs.

Remove the covering from the bottom of the fin and the fin trailing edge section that fits between the sides. Glue the fin into the stabilizer slot with 5-minute epoxy and lay the stab flat on your work surface with the fin trailing edge hanging over the edge. Check that the fin is perpendicular with the stab and let dry thoroughly.

(2) Install the elevator on the hinges and glue the hinges in place using Hot Stuff or 5-minute epoxy, then mount the control horn with No. 2-56 x 5/16" machine screws. Repeat for the rudder. Push a pin into the center of F-2 and tie a 4' length of cotton or rayon thread to the pin. Apply slow-drying epoxy to the surface of the stab-rest and in the notch in the aft end of the fuselage. Place the tail group in position, making sure that the fin trailing edge is seated against the tailpost and that the stab is firmly against the sides. Pull the thread tight and check the distance to one stab tip. Swing the thread to the other tip and compare the measurement. Adjust the position of the stab until both tips are equidistant from the towhook and pin the stab in place. Check alignment one more time and don't handle the fuselage until the epoxy is completely cured.

(3) Mount the engine to the firewall using four machine screws. Follow the instructions included with the engine for proper operation and break-in.

(4) Install your radio equipment, following the instructions provided by the manufacturer. Install the hardwood rails to suit your servos and wrap the battery and receiver in foam rubber for protection. Route the antenna through a hole in the side and down the side of the fuselage or insert a length of outer Nyrod tubing down the fuselage for an internal antenna installation. Thread the No. 2-56 studs into one end of the inner pushrod tube and then screw the clevis on to the stud. Slip the inner tubes through the outer and attach the clevises to the rudder and elevator control horns. Cut off the excess tubing and thread the Nyrod adaptors into the forward end of the tubes, then bend to correct length and connect to the servo arms. Adjust the length of the pushrods so that the elevator and rudder are both in neutral position when the servos are neutralized. Check that the control surfaces move in the proper direction and that there is no binding. Correct any problems now!

(5) Drill two 3/32" diameter holes in the aft fuselage bottom and epoxy the tail skid in place. Use two nylon L.G. straps and four #2 sheet metal screws to install the 1/8" music wire landing gear. Install the wing hold-down dowels and glue in place to the sides and formers. Epoxy the hatch eyelet in place and install the hatch.

(6) Assemble the wing and mount it on the fuselage using eight No. 32 rubberbands. Support the model with your fingertips at the Center of Gravity shown on the plans, which is the rear edge of the main spar. Add weight to the nose until the fuselage bottom hangs level with the floor. If the wings do not remain nearly level, add weight to the light tip. A slight tilt

to page 172

MONARCH 05

from page 168/20

is okay, but excessively out of balance wings will cause erratic turns. Be sure that any nose ballast is firmly secured and that it can't slip forward or backward.

Pre-Flight:

At this point you are ready to make the pre-flight checks before going flying. A few minutes spent now, will give you more confidence and help to eliminate any problems at the field.

(1) Inspect the model carefully. Wiggle the tail surfaces to make sure the joints are secure. Check that the radio equipment is securely mounted.

(2) Check that the surfaces are not twisted or warped. Correct any warps with low heat on the surface, while you twist in the opposite direction.

(3) Mount the wing, using four No. 32 bands on each side. Align the wing so that both tips are the same distance from the nose, and equidistant from the center of the fuselage. To check, tie a length of thread to the tail skid and use it to measure the distance to one tip at the trailing edge. Mark with your fingers and swing to the opposite tip. Adjust wing position until length is the same. We suggest you mark the lower surface of the wing on both sides of the fuselage to provide line-up marks for quick checking of wing alignment.

(4) Check the balance point. Add or remove weight from the nose until it's correct.

(5) Check the radio operation. Try all the control positions and make sure the controls move in the proper direction. Check that the surfaces are at neutral position when the transmitter trims are at neutral. Adjust clevises, if required.

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

Now let's go flying!

Flying:

Pick a large, grassy field, without obstructions if possible, for your first flights, even if you have to travel to find such a site. Since you are going to hand-launch the model, you don't need a paved strip or similar runway. If you can find a nearby R/C club, or someone in the area who knows how to fly R/C proficiently, by all means, seek help before going flying. We will assume that you are on your own, without experienced assistance.

Before going to the flying field, run the engine at home until you are able to start it and adjust the needle valve consistently. You should also be completely familiar with the operation of the transmitter sticks and trim levers, so that you can locate everything by touch without looking away from the model. A few evenings spent hangar flying in front of an old TV movie is time well spent. Check that controls move in proper direction, etc., before you go to the field.

Select a calm morning or evening when there is no more than a 5 mph breeze for the first flights. You will have enough trouble coping with the excitement and nervousness of your solo flights, without worrying about wind. Force yourself to wait for the right conditions!

Start the engine and adjust the needle valve until it's running smoothly. Point the nose straight up and make sure the engine doesn't quit. **Turn on the receiver and transmitter.** Develop the habit of operating the sticks and watching the control surfaces respond **before** releasing the model! Face directly into the breeze and release the model with the nose pointed directly at the horizon and the wings level. Don't throw the ship or just let it drop — just

push it forward and let it fly out of your hand. She should fly out straight and level in a slight climb.

If there is a slight turning tendency, don't worry about correcting it now. If a tight turn develops, move the stick in the opposite direction to correct. The angle of climb is controlled with the elevator and trim movement. If the model is hanging on the prop with the nose high, reduce the climb by trimming in down elevator. Try to keep the model upwind and flying away from you by making large, gentle S-turns. Face in the direction the model is flying at all times, even if this means looking back over your shoulder. You will find that it is easy to fly when the model is going away from you but very confusing if it is coming toward you, as the turning motions are reversed. Remember that if you do get confused with the model flying toward, push the stick toward the way the model is turning to stop the turn. Let the model climb all the time until the fuel runs out. Usually, the engine will burp a few times and run with more power as it runs out of fuel. This may cause the climb angle to steepen, so be prepared to add down elevator to stop the zoom.

The model should now be gliding and flying slower than when the engine was running. Try adding a little up trim to slow the glide even further. Make sure that you keep the model upwind as it glides and start to think about landing. Continue to let the model lose altitude until it is down to 40 or 50 foot altitude.

You should now have the model lined up with your landing path, and heading into the wind. Avoid making any tight turns and let the model fly toward the ground. Don't worry where it's going to land, as long as you won't hit something. When you get within 2' of the ground, hold slight up elevator to flare the glide path and let the model land. Don't give any commands after it contacts the ground. Don't feed in too much up elevator on the flare out as it may stall the model. The object is to land on the wheels with minimum forward speed. If you just fly into the ground without flaring, the model will bounce and the landing gear will probably need to be bent forward.

Now that you are back on the ground, pick up the model and turn off the radio. Take the wing off and inspect everything, including your radio installation, very carefully. Make sure the engine mounting screws are tight and wiggle the tail to make sure it's still attached to the fuselage. Put the wing back on, fill up the tank and you're on the way to another flight. Good Luck!

For more information on building and flying R/C model aircraft, we suggest you get a copy of "RCM Flight Training Course — Volume I." □

GIVE IT A WHIRL

from page 15

Since the news of various helicopter associations and groups has started to come in, it reminded me of our own group meetings which we hold in the San Fernando Valley in Los Angeles. I have mentioned in previous columns some of the activities of this group. It started off as a Saturday morning meeting in 1974 and has been going ever since. The initial group of people called themselves "Helicopters Anonymous" and the name, although it was never formalized, still seems to hang around us. It's a "help session." It's a place where fliers know they can come, have fun, watch other people fly and get help. It was originally held on Saturday morning because most people in those days wanted to fly their fixed wing 'things' on Sundays. It has stayed Saturday morning ever since. It starts at around 8 a.m. and

to page 178

from page 173/15

finishes around noon, mainly because of our California wind and hot sun which start around 10:30 — 11:00 a.m. Initially this meeting was sponsored by the Los Angeles Fire Department Helicopter center at Van Nuys airport and for many, many years the Saturday morning meetings were held at their heli-pad in the airport grounds (couldn't fly too high there). Our sponsor and good friend was Les Paetz who was one of the Fire Department's "crack" helicopter pilots. Talk about what you can do with a full sized helicopter! You should know that these Fire Department pilots have to achieve a very high level of skill in order to do some of the very dangerous work of helping to put out fires and rescue people in precarious situations. How about landing on the side of a hillside with just one of your skids resting on a rock while a victim is being transferred to your helicopter? And in gusty conditions which normally prevail when we have our fire season.

Well, we continued our meetings for well over 4 years at the Fire Department and they became known all over the world as the place to visit on Saturday if you were in Los Angeles and you wanted to see model 'choppers fly. Many notables in the industry, such as Ernie Huber, John Simone (Jr. and Sr.), Dieter Schluter, John Tucker, and many, many others have visited the site and flown there. I remember one occasion, while flying a model helicopter, hearing an English voice behind my shoulder saying "Hi, John, this is Dave Larkin. I timed free flight power for you in the British Nats in 1950 in Swansea, Wales. Nice to see you again." Well, I nearly crashed the helicopter in my surprise and, needless to say, David and I had a good reunion afterwards. I'm sure that people from almost every country in the world have visited our meetings from time to time. After about 4 good years we hit one of the fundamental problems that some of you must have all experienced at one time or another and that is the sudden loss of your flying site due to some selfish guys wanting the land to build houses on or other dumb things like that. In our case it was the city deciding to take over the whole area as a storage unit for the city equipment and machinery. So we finally lost our flying site after 4 years.

When this occurs the problem is not only to find another site but also to

communicate to people who thought they knew where you met that you have in fact changed your meeting place. Many ideas, such as signs nailed onto posts, word passed on through local hobby shops, etc., assist in this regard but you never really are sure that you get all the visitors back that you would have had if you had stayed where you were. By the way, we find, in California at least, that in order to get a really good meeting place there are five characteristics we must try to achieve: The first is that we want a good area of flat concrete or at least hard top for the beginners to be able to learn their hovering. Second, the flying site must be a reasonable distance from houses so that we don't get complaints about the noise of our engines. Then, there must be sufficient air space in for the people who can fly to be able to do their thing in forward flight and, in the case of us here in the San Fernando Valley, there must be shade 'cause it gets very hot during the day and you and/or your helicopters nearly melt. Certainly your blade covering (and sometimes your skin) blisters. And, finally, the most important thing — your site must be chosen very carefully so that you are at least a mile or more away from any other R/C site — that includes cars, boats, and of course airplanes.

Well, during the 8 years that we have been meeting, we've had about 5 different sites. Our current site we've had for more than a year. It's situated in the San Fedrnando Valley about 8 miles north of the Ventura Freeway just west of Canoga Avenue. A small street called "Gledhill" deadends into a large circle which, of course, is ideal for beginners and their hovering practice. Gledhill is situated between the "ITT" and "Kinney Shoe" factories. The nice large, flat and soft area which we have for forward flight is now being ominously plowed up by bulldozers and factory or housing foundations are now being laid. So it seems pretty certain that we'll lose this site within the next 6 months to a year. But at the moment we are still there so those of you who visit our city and who would like to visit us, be there on Saturday mornings, between 8 a.m. and noon, Gledhill Avenue, 2 blocks north of Nordhoff and 1/2 block west of Canoga Avenue in the San Fernando Valley. Last Saturday morning we had two visitors from the Philippines. One of them seemed to be knowledgeable so we let him hover several choppers which he did very well. Another young flier came from Mexico City. He'd had problems with his helicopter there so several of the guys were able to plan some

to page 182

GIVE IT A WHIRL

from page 179/15

Dave's original "Whirly-Bird" now hangs in the Washington D.C. Museum of Aviation. I have been doing some research recently on who was really first in flying R/C choppers and am finding that other Americans rebuilding for him so that when he returned home he could start to get some flying practice in. Visitors from other states and other countries frequently just 'drop in.' Anyway, if you're ever in the area drop in and see us and if we're not there anymore, look for a notice nailed on one of the poles! In any event, if you are in town and need information about our meetings call (213) 992-0256 so that we can let you know what's happening and where.

Finally, a historic touch — the picture is of Dave Gray with his "Whirly-Bird" R/C helicopter which was developed by Dave and kitted by Du-Bro in 1970. Dave was flying this "bird" in the U.S.A. early in 1970. His first flights were made late in 1969. Hat's off to Dave whose early development efforts in R/C choppers have long gone unsung. By the way,

may well have been flying R/C choppers as early as the late 1950's. Let you know what I find out. Before I write the next column I'll be off to the 'NATS.' May even enter scale myself — we'll see. □

SOARING

from page 13/12

scratches and small holes. I then sprayed on a final prime coat. This I sanded carefully to a point where only a thin film of primer remains. When you reach this point, the primer will have a greyish look as the fiberglass shows through. Keep sanding until this is consistent over the whole fuselage. For all spraying I use a Preval Sprayer, which is an aerosol bottle in which you use your own paint. It only costs a couple of bucks and works super. I mix the final Super Poxy 1 part catalyst, 1 paint, and 1 thinner. I then set the spray bottle in a pan of hot tap water to raise the temperature of the epoxy. This gives a good flow to the paint and results in a very smooth finish. I then shoot a thin coat, making sure there are no runs. This is then hung to dry for about 15 minutes. The final thin coat is then applied making sure the surface is wet-looking when viewed across the surface. It is then hung for 24 hours before further work.

And, for gosh sakes, **do not spray indoors** under any circumstances. Wear a good respirator and handle the materials as though they were rattlesnakes. I also wear thin rubber gloves (these only cost 25¢ a pair at paint stores) whenever I handle the stuff; I keep the gloves on from the time I open the cans until all equipment is cleaned and put away. These chemicals can be very dangerous as well as others used in paints and resins. When I use polyester resin, for instance, I not only wear rubber gloves but I also wear safety goggles **and work outside.** Anyway, the fuselage gained only 1 oz. during the painting.

I thought a lot about what covering to use on the wings and tail. I finally decided this would be a good time to try the new Micafilm, by Coverite. The principle reason for my choice was weight. Micafilm is about 60% the weight of MonoKote. At this point I'll go off on a bit of a tangent and tell you of my experience in using this covering for the first time. First, Micafilm is a tremendously tough material. Its tear strength is much higher than that of MonoKote. It is very hard to puncture. For that reason it seems that it would be excellent to use on a glider flown where there are weeds, or brush. It would also be ideal for a small glider where weight is a big factor. It shrinks well and seems to stay shrunk and goes around compound curves well. Micafilm does not have an integral adhesive, as MonoKote does. This is the reason for its lightness and apparent ability to stay wrinkle-free. In order to stick it to the surface one must coat that surface with Balsarite. This means that you must paint Balsarite around the edges of the wing bottom, let it dry for 10

minutes or so and cover the bottom. Then you must coat the Micafilm seam with Balsarite, let it dry and then cover the top. This process, however, is no big deal. I did find, though, that little short edges won't fold around the

William Stevens and his homebuilt version of the Davey Systems Corp. Winch Line Retrieval System. Works like gangbusters.

edge and stick as does MonoKote. I had trouble getting a really neat covering job.

Micafilm is a transparent material and comes in a limited number of colors. I used the 1.3 oz. white to cover the K-Minnow surfaces. Over the balsa sheeting it has a slight pinkish look. Because I always use black on the underside of the wings and tail, for visibility, I had to use MonoKote on the bottom. Anyway — I reckon I saved something over 1/2 oz. just using Micafilm on the upper surfaces. On a Paragon wing, Micafilm would save about 2 oz. My 687 sq. in. wings gained 2 oz. in the covering process and weighed in at 17 oz. with ailerons, flaps, and spoilers; which was 2 oz. less than the first K-Minnow wings.

One last comment on cost. I spent $11.96 at my friendly hobby shop to cover the top surfaces of the 2-Meter sailplane. Whilst the covering cost was $8.46 as compared with MonoKote at $9.45, I had to spend $3.50 for Balsarite which, of course, will last quite a while. MonoKote has more sq. in. on a roll, so on this basis, Micafilm is 8% cheaper. Also needed is Toluene or MEK to clean the Balsarite from the brush, although lacquer thinner does a marginal job of brush cleaning. In some circles, Toluene is considered a dangerous substance.

to page 186

SOARING

from page 184/12

Anyway — back to the K-Minnow. The finished weight without all the internal garbage was 32 oz. With a releasable towhook, radio and five servos, the all-up weight was 44 oz. including the 1/4 oz. of nose ballast it took to balance. One reason for the favorable balance; the new K-Minnow fuselage is about 3/8" wider than the old. This permitted mounting Airtronics' Mini Servos crosswise in the front of the fuselage instead of strung out.

So, I finally beat the manufacturer's prototype weight. If I subtract 1 oz. for the extra servo, I'm 1½ oz. under his weight. If I had a radio installation weighing less than 8 oz., I could even make the 40 oz. lower weight in the 40 to 45 oz. spec.

Now, does the K-Minnow fly better at 9 oz./sq. ft. as opposed to 10? It's really hard to tell, but when I ballast to 10, there is no discernible difference in flight characteristics. I have a vague feeling that the lighter one launches a little higher and does slightly better in very light thermals but I'd be hard pressed to prove it.

Is it worth the trouble to build a very light ship? Well, with a given design, one should not waste weight. In non-structural areas, light wood should be used and adhesives used sparingly. In structural areas, however, do not sacrifice strength to gain small bits of weight. In my experience, small differences in wing loading don't make a tiddle-de-darn. In fact, some ships, such as the Olympic II, fly better with a bit of ballast. It takes quite a change in wing loading to affect flight characteristics. When I hear some flier say he is going

to add an oz. or two of ballast in the wing, I say he may as well not bother. Going from a 9 oz. loading to a 10 oz. loading would result in a 5% increase in speed. Instead of flying at 25 mph the sailplane would zip along at 26 mph. I guess what I'm saying is that I was really engaged in an exercise in futility — but it was interesting.

Another lesson I learned from building this K-Minnow is something I suppose you knew all the time — all polyester resins are not the same. In the first contest I entered with the ship, I was making a landing in a circle located on an asphalt runway. In my boyish greed for more points I went for it and hit a tad hard; not all that bad, but in the process my canopy flew off and the front deck popped out along with all my landing points. The deck was fastened to the fiberglass fuselage with the polyester resin called for in the instructions. The ease with which the deck broke loose made me suspect that all was not right. I had used some resin left over from my daughter's college art class. I had phoned the company selling the resin, and asked if it could properly be used in fiberglass fabrication. They said yes, so I went ahead and used it to glue in all the reinforcing bits and pieces. A phone call to Bob Dodgson put it straight. What I had used was casting resin and it is designed for clarity, not strength. It is brittle as glass. Bob said to use nothing but Laminating Resin. This is a wax-free resin designed for primary lamination of fiberglass cloth. A trip to a large paint store revealed that in addition to Casting and Laminating, there is also Finishing Resin. This last one is designed to coat the laminated fiberglass and fill the weave. It contains waxes and is a hard finish. So, if you are working with a fiberglass fuselage which has been laid up using Polyester Resin, use

to page 191

SOARING

from page 187/12

Laminating Resin as adhesive. In making the repair to the front deck I also reinforced the joint with fiberglass as suggested on the drawing. I had omitted this as a weight saving thing, but better the fiberglass reinforcement than the 1/4 oz. of lead in the nose. Well, enough of my memoirs. Catch you next month, all being well. Howzat! □

SUNDAY FLIER

from page 8

well-known model designs use equal incidence in both wings (Chuck Cunningham's "Lazy Ace," Bill Northrop's "Big John," Sig's "Liberty Sport," your"Canonshot" etc.).

However, as you mention with your Figure 4, there are arguments for a higher incidence for the lower wing you discuss better "snap rolls" as an excuse for this setting. There is another reason: Because of the nature of interference between the two wings, lift will be more evenly distributed and the model a more efficient lifting machine with higher incidence in the lower wing. Some of those that build scale rubber powered models are doing it this way.

***Relationship of wing incidence to centerline of fusalage, your "reference line"** — Logically your 0°-0° incidence setting shown in Figure 2 seems reasonable. With equal area wings, lift and drag would be distributed more or less equally above and below the center of the fusealge. With a flat bottomed airfoil such as a Clark Y there is an argument for a couple of degrees negative incidence (See P.S. below). At the opposite extreme the full size Gruman Ag-Cat has the wings at plus 6° or so to the fusalage center line so the pilot can see better in front while spraying crops (see R/C Scale Model by Floyd Fitzgerald in Dec. '78 RCM).*

***Relationship of stab incidence to wing incidence** — This is a can of worms. With 0 - 0 - 0 incidence your Figure 2 configuration will fly **without** the elevators trimmed "at a slight upward angle to the reference line." This is because a biplane has a much stronger downwash effect than a monoplane (I can supply references). Thus, the stab is really flying at several degrees of negative incidence. Hal de Bolt in various columns has strongly recommended that the stab be set at 2° to 3° positive incidence based on*

experience, somewhat like your Figure 3 (and some reasoning I don't agree with . . . we've had some good letter arguments on this subject). I think Hal's setting makes a lot of sense but the only example in my files outside of his designs is "A Little Wooden Wren" by Norman Rosenston in the Dec. '76 Flying Models. There are, however, some kitted high wing monoplanes with this positive stab setting which is used to eliminate downthrust for the engine.

***Engine thrust line** — To simplify contruction one really would like the engine thrust line parallel to the centerline of the fuselage or "reference line." In actual practice, most R/C biplanes end up with some down thrust unless the stab has been set at a positive incidence. Obviously one adjusts the thrustline during flight tests and I note that you ended up with -2°for your "Sporty Forty" (Mar. '78 RCM).*

Sincerely,
Ted Off

P.S. With the above problem "all solved" in slightly more than 25 words, I now present the next "question" as promised above: Most low wing pattern R/C models with symmetrical sections have the wing, stab and engine all set at 0°to the centerline of the fusalage. The Clark Y airfoil has an angle of zero lift of -5°. Thus one would expect a pattern R/C model with a Clark Y type airfoil to have the wing set at say -3° to -5°. Dick Tichenor's "Wicked Wanda" in the same issue as your column on biplanes has his "Clark Y" set at 0° incidence. Why?

Ted brings up some controversial points. The most obvious one is his contention that a biplane which has wings of symmetrical section, set at zero-zero angle of incidence to a reference line, to which the stab is also set at zero --- and the thrust line as well, will still fly without the elevators trimmed slightly up. The reason he gives is that the downwash is causing the stab to fly at several degrees of negative incidence.

What downwash? I always thought that a symmetrical wing section, at zero incidence --- and in this case zero angle of attack --- provides no lift. And, if it provides no lift, it creates no downwash, the stab is at zero incidence, and the durn thing has to have some up elevator. Otherwise, if you go inverted, then no down elevator action is required to keep the nose up while inverted.

Who's right? Any of you experts out there got the answer?

But here's a novel idea, if any of you want to experiment. Instead of using symmetrical airfoils on a bipe, how about using semi-symmetrical sections, such as the NACA 2412, only

in this design, set them both at zero-zero incidence, but with the lower wing upside down. Sure, semi-symmetrical airfoils provide lift at zero incidence, so when the bipe is flying right side up, the downwash of the upper wing causes the stab to have negative incidence, and the elevators can trail at zero. Now turn the plane upside down; the bottom wing becomes the top wing, and its airfoil causes downwash on the stab, and the elevators can stay in trail at zero. Do you believe that? There's only one way to find out --- try it. You could start a whole new design theory for precision aerobatic models.

Finally, let's get to the "P.S." of Ted's letter. He asks why Dick Tichenor set his "Clark Y" type wing at zero degree on the Wicked Wanda. So, I asked Dick to explain. Here's what he said:

"Regarding Wicked Wanda, it was not presented as a pattern aircraft. W.W. is a 'sport plane with aerobatic capabilities.' The difference being a slower, more stable aircraft that will practically fly itself while still being able to perform loops, snap rolls, etc., in a reasonably sloppy manner. Don't expect it to perform precision maneuvers for high point scores.

"Those performance requirements resulted in the force arrangement shown on the plans. You will notice that, while using the top forward fuselage as a horizontal reference line, the engine has 4½° down thrust, the stab is 0°, and the flat bottom of the wing is 0°. The chord line of the Clark Y type section comes out approximately 3½°. That set-up gave us the performance that we wanted."

So there you have it. What's fact and what's theory? Even Webster has a hard time defining them.

As long as we're in this theorizing mode, how about this one? Recently I was out at the field and a fellow modeler was flying his powered glider. The engine was mounted in the nose, and the model really was struggling to gain altitude.

"Why don't you put the engine on a pylon over the wing?" I asked. "I think you'll find it makes quite a difference."

So he did, and the next time he flew it, he was amazed. It went up like it had twice as much thrust, yet he was using exactly the same engine and propeller combination.

"Why is that so?" he asked.

I told him that with the propeller up on a pylon, the full disc action of the propeller thrust is effective in translating the power of the engine into thrust, whereas with the prop on the nose, the thrust is partially interfered with by passing over the fuselage, thus decreasing the total thrust action.

SUNDAY FLIER

from page 195/8

to get it loose, or all your work will have been in vain.

Incidentally, this unit works well on the new Dragonfly .049 also, in case you happen to get one of the Dragonfly engines with the combined throttle and muffler so loose that the throttle speed is too high.

In any event, for you 1/2A fans, if you want to do aerobatics, get one of the new Dragonfly clunk tanks. It will fit on your Black Widow, and with a working throttle and clunk tank, you can do all the maneuvers, including extended inverted flight. Just like the biggies.

For a lot less money.

I like that.

Bet you do too.

Keep in touch. □

CUNNINGHAM ON R/C

from page 7/4

the pilots has improved a great deal. Heck, the aircraft doesn't have to be a scale one to have weight problems. Some modelers just seem to have a heavy hand when it comes to building anything. Some seem to use a paint roller and house paint when it comes to finishing. Did you ever watch a high jumper in action, sailing over the bar at around 7'? Ever see an overweight high jumper? I'm overweight and, believe me, I wouldn't even think of trying a high jump any more, nor many other jumping activities. I know pretty much just how much effort it takes to lift me off the ground. Perhaps this is the reason why I always tend to build light aircraft. The point being that in aircraft design and construction, keep it strong, but keep it light. What do you think makes the

new generation of fighter aircraft so good --- light weight (relative that is) coupled with lots of power. Modeling is exactly the same.

Too many builders and fliers like to add just too many touches that will make that airplane look even better. Sure, add the touches, but keep track of the total weight and wing loading as you go along. I have heard of lots of 30 (and more) pound aircraft since the move to large models got started. Most of these never really took to the air successfully. Sure, some were able to get off the ground, but only lumbered around, just barely flying. I remember when Formula One racers were just beginning. The only engines available were rather weak .35s. The aircraft usually weighed 6 to 7 lbs. (complete with reed radios and big batteries) and the wing area was a tiny 500 square inches. Many, many were lost on take-off. It didn't take the state of the art long to improve with high revving engines, smaller and lighter radios, and more cleanly designed aircraft. The same is true of the large aircraft movement. More engines, better aircraft and less over-design of structure. But even this doesn't prevent the modeler from adding just too many frills.

Perhaps the biggest mistake of all when moving into the larger models is picking out a scale subject. I really can't count the number of times over the years that I have heard people wanting to get into modeling, and to build a scale model of a fighting aircraft, complete with retract, bomb doors, rotating turrets, you name it. All of us have heard this from time to time. Generally a hobby shop will turn this beginner on to something simple until he learns to build and to fly, and most of the time that "real scale airplane" just remains a gleam in the modeler's eye. This isn't the case with the biggies. Most are being built by modelers who have some R/C experience, or who have some building experience. The emphasis has been pretty much on scale aircraft, and most big kits are purchased through the mail rather than from a hobby shop shelf, the inventory just being too much for the standard hobby shop to carry. No one can talk the modeler out of adding too much weight to the model until it is already done because the plane doesn't really see the light of day until it shows up at the field.

You have to police yourself. If you're going to build a large model, or even a small one, you really need to understand that flying is a function of the area of the wing, the weight of the model, and the available power of the engine. It is simple to figure out mathematically, except for engine power, and you can arrive at this by a bit of experimentation on your part. Wing loadings should not exceed 35 ounces per square foot unless your aircraft has lots of power, and you're a very experienced pilot. It is much better to keep the wing loading under 25 ounces, if at all possible. This will provide you with an aircraft that will lift off the ground easily, and come back to earth gently, rather than smacking the ground with a bone crunching landing.

To figure wing loading, you first convert the wing area to square feet. If the wing area is given in square inches (which is usually the case), you divide the area by 144 to give the square feet. Example: 1500 square inches divided by 144 yields a total wing area of 10.4 square feet. The formula to arrive at a wing loading of ounces/square foot is exactly that. Divide the weight of the aircraft in ounces by the area in square feet. Assume that our 1500 square inch model weighs 19 lbs. This then gives us 304 ounces/10.4 sq. ft. = 29 oz./sq. ft. wing loading. Suppose that you know how much wing area you have, but you want to build the aircraft so that the finished product will come out with a wing loading of not more than 25 ounces/sq. ft. You then take the wing area in square feet

and multiply it by the desired ounces per square foot to arrive at the total weight you must maintain. Using our example above we then have 10.4 x 25 which yields 260 ounces of total weight or 16.25 lbs. It's something that you have to consider.

Checking the engine that you're going to use is a matter of setting it up on a test bench, complete with the muffler system that you're going to use, then try out several props to see which seems to be the best. If your engine can swing a higher pitch prop than, say, a 6" pitch, great. But to really know what is going on you need a tachometer. I recommend the Accu-Tach by Nor Cal Avionics. Set your engine on the test stand, firmly anchor the test stand so that the engine can't yank it loose. By the way, I use a Black and Decker Workmate table with an engine holding rig made out of two by fours clamped into the jaws of the Workmate. The table is, in turn, tied to a tree so that it won't tip over when the engines are kicked up to high. The finish on the Workmate is not harmed by either glo fuel or gas and oil fuel.

Back to the test. Try several props. The highest pitch that you can turn at over 7000 rpm (we're talking about gas and oil engines now) will probably be the best for you to use. If your engine tachs out at less than 6000, chances are that your flights will be something less than successful. Even after bench testing, the real proof will come in flight tests and you may find that one prop does better in the air on your aircraft than it shows on the ground. If your ground test shows that the engine/prop/muffler combination is marginal, then you can be sure that it will be marginal in the air.

It's easier to test out prop/engine combinations in the air on most glo engines, but even this needs some experimentation. As an example, I have found that on my large glo powered engines a larger diameter, lower pitch prop works better than does a small, high pitch prop — within reason that is. An engine swinging a 12/6 in my 7' Miss Texas will fly much better than an 11/7.5 prop. The same is true on most large models. You need to experiment with props a bit to get optimum performance.

Remember, in building any model, keep it strong, but keep it light. Watch the wing loading, and don't get too carried away with the paint brush.□

FROM THE SHOP

from page 2

..... a brief biography from the author to be published with his first column. Such

was the case with John de Vries and Art Johnson who will be sharing the duties in Scale Views. John came through with a concise bio which was included with his first column but Art's resume was too lengthy to use as we had intended. Ordinarily we would edit it down to a more suitable size, however, becase it is so enjoyable, we decided to hold it and print it here in its entirety, including the personal comments (that's a dirty trick to pull on any author). Anyway, here it is.

Dear Don:

Sorry I missed your phone calls but while you were enjoying the California sunshine, I was up in the cold rainy Northeast trying to get some photos and info for RCM on the East Coast Scalemaster Qualifier. It was a good contest except for the lousy weather. I will have more on it later. This weekend I am going over to the Tampa area for the Southeastern contest, the King Orange.

I did not realize how unpopular my face was with RC photographers until I tried to find a recent photo of myself. I have lots from the old Air Force days but I am sending the only thing I could find of recent vintage. I will get something better for the next go around.

As for my infamous past, I recall building my first scale model from a California orange crate at the tender age of 8. It was a Fokker triplane and I think I painted it purple. It flew as far as you could throw it. San Diego was an interesting place to live in the late twenties and thirties. I remember visiting the old Ryan factory many times and still remember the welcome that Lindberg received on his return to San Diego after the Transatlantic flight.

It was Claude Ryan himself who recommended to me that I learn to fly instead of trying to become an aeronautical engineer. This was in 1938 and was the best advice I can remember. I would have made a lousy engineer. I took the advice to heart and got a pilot's license in 1939 through the CPTP program while attending college in San Diego. In July of 1941 I joined the Royal Canadian Air Force and was commissioned a Pilot Officer in April of 1942.

The RCAF put a temporary halt in my model building which had progressed to building many of the Cleveland rubber scale kits and flying gassies on Kearny Mesa. I never did get a Cleveland model to fly but they sure looked good.

In May of '42 I married a Canadian girl and was transferred the next day to the U.S. Army Air Force in Texas. The incidents were not related — she was not the Air Marchall's daughter! Actually, they gave us a choice of

Army, Navy or Marines. For me the choice was easy. I had flown nothing but twins after the Tiger Moth in primary, Cessna Cranes and Avro Ansons. The Army's P-38 sounded better than the Navy's PBY.

Naturally it did not work this way and I wound up instructing fighter tactics and gunnery in T-6s, P-36, P-40s and the P-43. You learned on the job in those days as the most experienced guys around only had a few hundred hours.

I found time even in those war days to crank out a few more Cleveland scale models and a solid model of the P-40. This model preserved the paint scheme for my recent RC effort on the P-40. Nothing like building a model while you are flying the same plane, to get it right.

My twin experience caught up with me when they looked for volunteers to fly the Martin B-26 in combat. This bird was a great plane but a little ahead of its time. Experience helps, however, and the guys who went over with me all had over a 1000 hours when they got in the 26. One reason the B-26 ended up with the lowest loss rate in Europe. After 65 combat missions in the B-26 I wound up back in Arizona flying the first operational mission in the RP-63 target plane and otherwise having fun flying the P-39, P-63, B-17, B-25, A-26 and assorted other tactical birds.

Of course I had to build the Cleveland model of the B-26 and parts of this model painted with O.D. from base supply are still in my possesion. Nothing like the original paint for your presentation.

After the wild blue yonder WW II years the Air Force got a little more scientific and I became involved with the A-bomb tests and the jet age. I still tell people that I am a little short of hair because of the radiation received while flying unpressurized jets through the clouds from nuclear test shots to collect radiation samples for Los Alamos Labs.

I did my first control line flying at Silver Springs, Maryland, while studying Nuclear Physics at the University of Maryland, AF program. Ignition engines at that time — later with glow engines when my two boys got old enough to fly.

Three years flying C-47s in Africa and I was back in jet fighters. This time as a fighter squadron commander in the 31st Fighter Wing, F-84Fs and then F-100s. Also got into RC at this time, 1955. First model was a converted Berkley Brigadier, free flight with a throttled Walker Fireball 1/2A engine. Deltron gas tuber and it flew well. I had built the Berkley Aerotrol RC gear back in 1950 but only ran it in a boat.

I stayed with RC through the rest of my Air Force career. I flew F-100s on the winning team in the first all supersonic fighter weapons meet ever held. While practicing five bombing and gunnery missions a day for this meet at George AFB, California, I built the Sterling PT-19 rudder RC scale plane in the BOQ at night. Relaxing after a hard days flying.

As a charter member of the RC Hawaii Club, I flew reeds for 4 years in the Islands. In my spare time I handled the operations plans for the Pacific Air Forces. I was a chicken Colonel by this time and in 1965 they shipped me for a tour in the Pentagon. The 3 years as Chief of Armament in Hqs USAF was the only period where I had to hang up the models completely. With the Vietnam war on and my responsibility for the smart bomb and maverick missile programs, there was no time for anything extra.

The last 3 of my 30 years in the Air Force was spent at TAC Hqs, Langley Field, Virginia. I did get back into RC at this time largely because one of my boys got me to help build a Heathkit proportional RC set.

I retired from the Air Force in 1971 by act of Congress. Thirty years commissioned is all you get. I moved to Florida (both my boys married East Coast girls or I would be in California) planning to fish and relax. Somehow, building and flying scale models turned out to be more fun or it had just become habit.

You probably know the rest. I have been CD of at least one scale contest a year for the Gold Coast Radio Controllers. I made my first NATS in 1977 where I flew the P-38 and I have only missed 2 since. (I will probably miss this year at Lincoln.) I organized the Florida Air Show Team six years ago and have managed it since. First NATS win was last year with the F-82 and the P-40 in Giant. I judged precision scale at 3 of the NATS while flying in sportscale.

Well, this is more garbage than I intended to write but as you can see I have had a heck of a lot of fun over the last 50 years with both big and little airplanes. I checked my Air Force logbook awhile back and counted 69 different planes that I have logged pilot time in. I sure won't live long enough to build a model of them all but my next one will be the Martin B-26. A sympathetic wife has helped. She still says the airplanes come first but then she is still around after 40 years so maybe it helps to get em young and bring 'em up right.

Sincerely,
Art Johnson

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Hey guys, gotta go play with those new Z bottles. See you next month.□