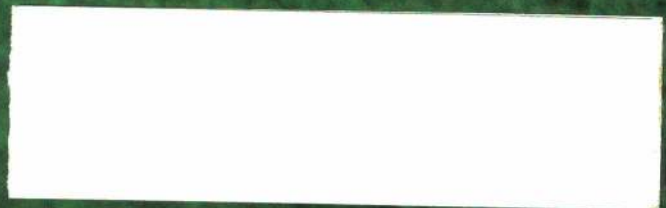


THE LARGEST MODEL HOBBY MAGAZINE IN THE WORLD

# AMERICAN aircraft modeler

U.S. ONE DOLLAR TWENTY FIVE CENTS

SEPTEMBER 1974





# Beginners Control



## Look like real planes!

Perfect for  
control-line  
beginners

solid balsa  
construction  
withstands  
hard landings  
time after time

### Scientific Beginner Models are better than profiles...here's why:

Most profile models have a plain, flat wing. Scientific's full-fuselage models have an extra-lift, one piece *air-foiled* solid balsa wing. Gives extra lift; makes flying and difficult maneuvers easy.

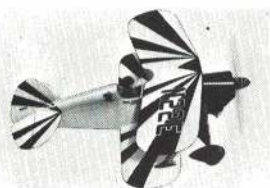
Scientific models have an exclusive pre-carved balsa body (not just a thin sheet of wood) which gives you a sturdier more realistic flying model.

You also get these other features:

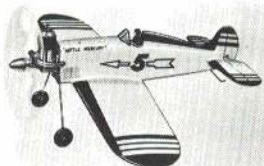
- Extra-strength plywood motor mount
- Strong, formed metal landing gear and wheels
- Complete colorful decals
- Complete control assembly including formed metal bellcrank, hardware, control rod and horn
- Tailwheel or metal skid assembly
- Elevator hinges
- Precision die-cut fin, rudder and elevator
- Plastic engine cowling, canopy and windshield (on most models)
- Complete step-by-step assembly instructions



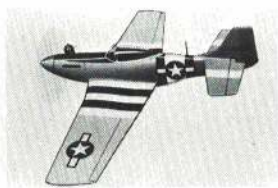
One look will tell you these Scientific kits are designed to get you flying F-A-S-T! Every kit is specially designed for engines .020 to .049. You're not limited to just one engine size. And they're just as easy to build as profile kits... but look like a real airplane. Whether you're a beginner or a pro, Scientific flying models are your best buy!



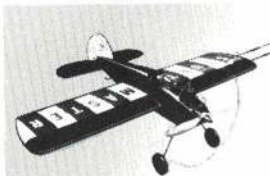
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Kit 26 LITTLE MERCURY, 18". Easy to build and fly.



Kit 70 F-51 MUSTANG, 21". Famous WW II fighter.



Kit 72 SUPER STUNTMASER 20". A built-up wing stunt sensation.



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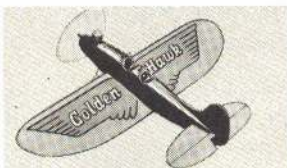
Photos of actual models



Kit 60 STUKA DIVE BOMBER 18"  
Scale model of W.W. II fighter



Kit 95 PIPER CUB TRAINER 18"  
Famous private trainer



Kit 48 GOLDEN HAWK 18". A great  
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Kit 25 STUNT MASTER 18" One of  
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Kit 30 RED DEVIL 18" Great train-  
ing model for beginners



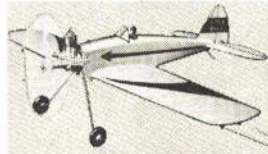
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# AMERICAN aircraft modeler

VOLUME 78, NUMBER 9

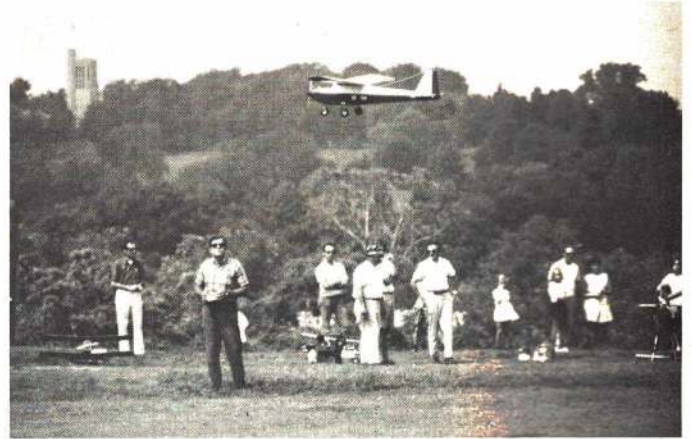
SEPTEMBER 1974

## COVER STORY

Floyd Carter's Lepere is a striking example of scale fidelity. The model is the subject of a double feature article beginning on page 18.



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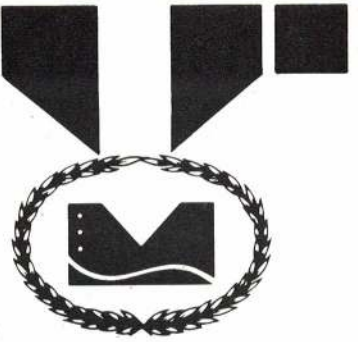
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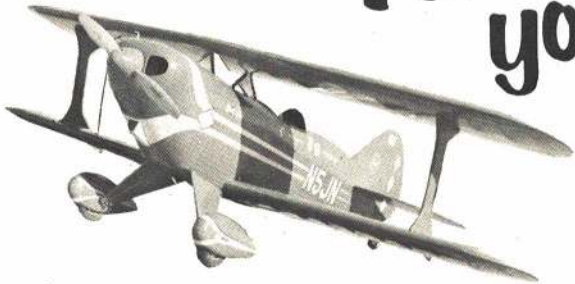


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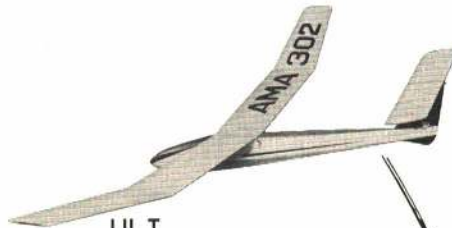
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A masterpiece of design refinement, the Me 262 was well over 100 mph faster than Allied fighters in 1944. The fuse is ready for paint here, while the wings will be glassed and resined.

DAVE PLATT'S LATEST...

## A Ducted Fan Me 262 A-1a

In the July issue of AAM in Don Lowe's and also in Claude McCullough's column, mention was made of my scale Messerschmitt 262. A couple of errors appeared in these descriptions which, if not corrected, might mislead ducted fan enthusiasts. (Both Don and Claude picked up their information from a newsletter source, which listed inaccurate figures—php.)

The motor used is a 40 RC pylon racing type, as stated, but the fan diameter is 5", not 3½". I don't believe a single-stage 3½" fan could absorb the torque of a 40 and make efficient use of the available power.

The other thing is that the scale of the model is 2¼"=1', giving a span of 92", not 70". The engines are some 28" in length. The 6.2 lb. thrust figure is misleading too (see later). This corrects the errors, but some additional information may be of interest:

Along with Bob Talchik of Chicago, I have now spent three years playing with fan-powered models. My part was to design the "aerodynamics" of the engine, while Bob found ways to make the rather exotic parts I called for. I doubt that anyone in the U.S. has developed

more technique than Bob in working with fiberglass, a material we used extensively in our engines.

For the same reasons Bob Violett gave in his absorbing Sundowner article (July AAM), we chose the 40 size from the outset. We have used the "old-style" K&B, HP, ST G-40 and, lately, the new K&B and the ST X-40. We started with 5" diameter fans and still use this size, though pitch, airfoils, washout, number of blades and blade planforms have been varied almost infinitely.

There are essentially two basic differences between our engine and the Scozzi unit used in the Sundowner: (a) Ours mounts the fuel tank as an integral part of the whole engine, resulting in greater length and weight, and (b) we meant to use our engine in scale or stand-off scale models. Thus, we concentrated on getting thrust in an internal-engine situation. The aerodynamics of an external or ultra-short-pipe engine and those of an engine buried in a fuselage perhaps 50" long may be quite different.

By taking a reasonably sophisticated approach at the beginning (far removed

*(Continued on page 79)*

The 262 is a rather large project. The final weight will be about 14-15 lb. Quite a comment on the state of ducted fan technology.



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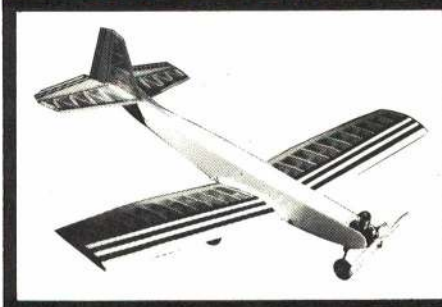
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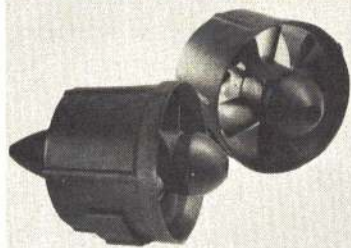
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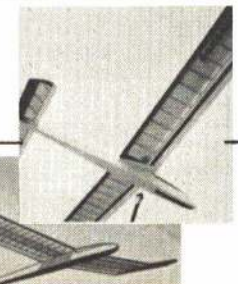
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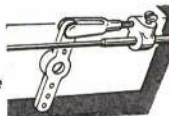
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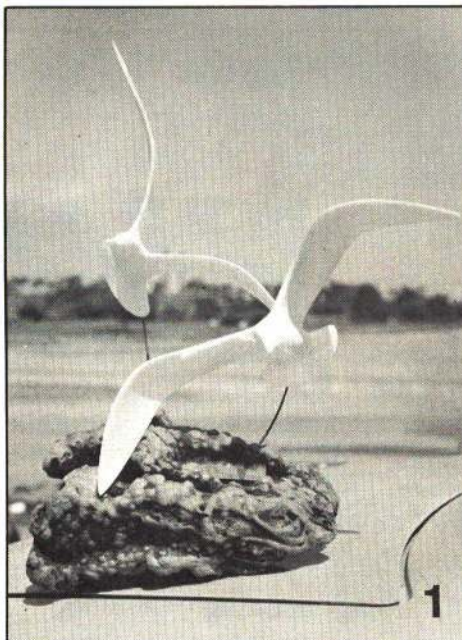
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# Torrey Pines Triathlon

What better place to have a contest than at a vacation resort?

by Paul Denson



1



2

Everyone, it seems, likes to go away for a weekend contest. So they do, except for the guys and gals in the sponsoring club. What do the home club wives say about the Saturday night banquet? "Do we have to eat there again?" To forestall this complaint, it was decided to hold a contest away from everybody's home town, and give the campers a chance to show off their latest rigs—whether they be tent, camper, RV, trailer or just a sleeping bag under the stars.

The contest site was located quite by accident on a visit to friends. A long, flat field was discovered just adjacent to their KOA Campground, south of Hemet, California. The prevailing wind blew down the length of the field, and use permission was granted. The site is located in a small valley just about equidistant from Los Angeles and San Diego. To the east can be seen the snow-covered tops of the San Jacinto moun-



3

(1) The first prize was this elegant pair of free flying gulls—a creative and worthwhile award. (2) A touch of class—Ted Davis' leopard skin Snoopy dustcover. (3) Thirsting for thermals, long-winged things emerge from the sagebrush and bask in the sun in the ready area. (4) Part of what the weekend was all about was an escape with the family. The resort area offered an ideal site for mobile camping. (5) Fliers in line for the open winches—a no-hassle way to get all the flights in. Notice the significant absence of a long queue. (6) Maybe there's something about being 1973 LSF Champion that leads to complacency. Buck Faure casually launches his Presbyterian. Rod Smith acts as winchmaster. (7) Dave Shadel (white cap) and Buck Faure look over their scores. Dave's grin indicates the outcome: "I gotcha!"



4



5



6

## RESULTS

Place	Name	Points
1	Dave Shadel	5142
2	Rick Norwood	5039
3	Kelly Pike	4966
4	Buck Faure	4837
5	Rod Smith	4804
6	Rick Pierson	4756
7	Jim Haldy	4737
8	Hans Langer	4548
9	Craig Hanson	4516

Duration	Precision Time
1 Buck Faure	1 Rick Norwood
2 Rod Smith	2 Mike Fox
3 Mike Fox	3 Dave Shadel

Precision Landing
1 Dave Shadel
2 Jim Haldy
3 Hobie Alter

tains behind Palm Springs and, to the south, the dome of the 200-inch Mount Palomar telescope glints in the sunlight.

Friday afternoon, campers, RVs and trailers loaded with wives, kids and gliders began to arrive. The first person to step on that beautiful flat field discovered the horrible truth. The owner of the field, knowing how destructive

(Continued on page 80)



# For the fun of it...

...if that is why you build and fly model airplanes, **Sport Modeler** magazine is for you. It's a brand-new magazine for the sport modeler and Sunday flier. Edited by Bill Winter, it contains top-draw plans for RC, CL, and FF designs that are great to build and a pleasure to fly. Each issue is written to help your modeling to be easier, more original, more interesting—and more fun. It is packed with how-to-do-it's, techniques, new and unique features, cut-away drawings in the grand manner. The finest designers, writers, artists and innovative minds in the land tell you what you need to know—and then some. Stops just short of the ultra-complex—may even show the competition flier a thing or two! **SM's** the friendly magazine. Try it—you'll like it.

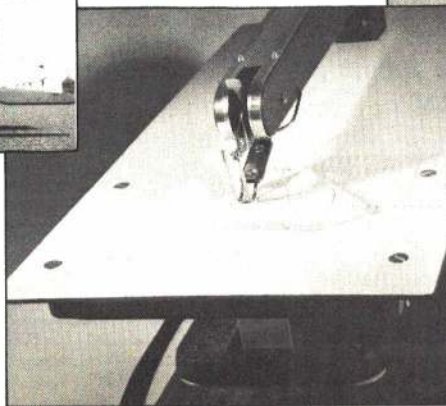
**COMPLETE AND MAIL THE ATTACHED COUPON RIGHT AWAY!**

## In this issue:



Stand-off Scale? Stand-off—Stand-off? Stand-(Way)-off Scale! That's this Boeing F4B-2. Recognize it? By Paul Schaaf for REM. Flies hands-off—and stunts! Only a 15 engine!

For the man who *doesn't* have everything. That's a Dremel Moto-Shop, by the way, but even Dremel lifted their eyebrows at what we've done with it!



Warwick Bantam—CL scale of an E.A.A. home-built for 049 to 09, easy to enlarge, even go RC. Bill Blake—smorgasbord of drawings. Great on lines.

**ALSO:** Fly by night!... Cutting Foam Cores—the Better Way... Bargain Basement Muffler—from shower curtain rod and bottle caps... Glenn Lee's Notes on Engines... Newman's Bench Wisdom... and many, many others.

SPORT



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modeler

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**FOR THE MAN WHO DOESN'T HAVE EVERYTHING:**  
*Add class and versatility to your shop.*

**MIS-CHIEF:**  
*Simple Coup d'Hiver. Step up to folders—and have fun—see page 44.*





(1) Bob Wischer's Emerald, with John Roth's Volksplane just a little behind. (photo by Bob Brown) (2) Ralph Jackson's Cherokee 180. (photo by Eric Meyers) (3) Kramarenko and his AN-14M. (photo by Bob Brown) (4) Ostrowski and the Lockheed P-38. (photo by Bob Brown) (5) Cliff Telford holds the Bob Cat, while Bob Violett balances the Sopwith Cup, his transmitter and his flag. (photo by Eric Meyers)

# '74 AEROLYMPICS

The '74 AerOlympics, held July 1-7 at Lakehurst Naval Air Station, New Jersey, was the first Scale World Championships ever held in the United States. The event was unique in combining the Indoor Internats with not only RC and CL Scale International com-

petition, but also Pylon Racing and Thermal Soaring. From the 133 entries who came from 17 countries, the chosen few who won are listed below. A full feature report on the AerOlympics will appear in the October issue of AAM.



(6) Jerry Mrlik (right) and Jeff with their motorgliders. (photo by Eric Meyers) (7) Mike Reeves' Zlin Akrobat. (photo by Bill Boss)



RC SCALE		
<b>Individual</b>	U.S.A.	Emeraude
1. Robert Wischer	U.S.A.	Volksplane
2. John Roth	U.S.A.	Cherokee 180
3. Ralph Jackson	U.S.A.	
<b>Team</b>		
1. U.S.A.	2. England	3. France
CL SCALE		
<b>Individual</b>	U.S.S.R.	AN 14M
1. Valery Kramarenko	Poland	Lockheed P-38
2. Jerzy Ostrowski	England	Zlin Akrobat
3. Mike Reeves		
<b>Team</b>		
1. U.S.S.R.	2. U.S.A.	3. Poland
INDOOR		
<b>Individual</b>	Poland	
1. Rysard Czechowski		
		2. Bucky Servaites
		3. Karol Rybecky
		<b>Team</b>
		1. Poland
		2. U.S.A.
		<b>PYLON</b>
		U.S.A.
		U.S.A.
		U.S.A.
		<b>SOARING</b>
		South Africa
		U.S.A.
		U.S.A.
		<b>MOTORGLIDER</b>
		U.S.A.
		U.S.A.
		1. Jerry Mrlik
		2. Jeff Mrlik
		No other entries.





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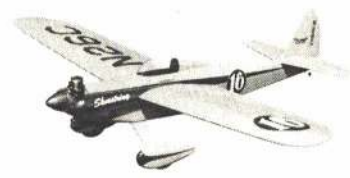
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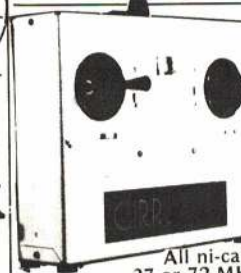
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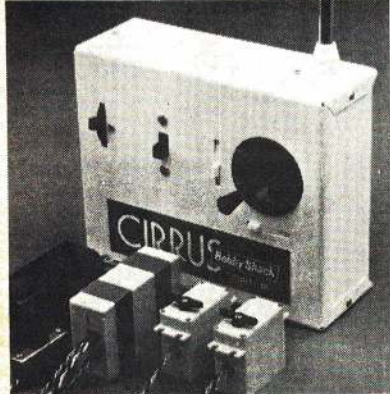
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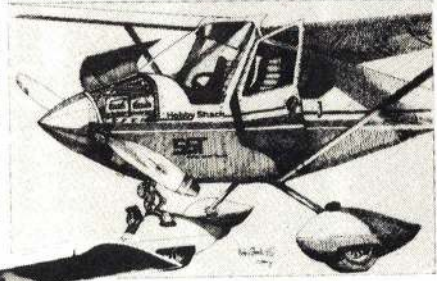
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# the cockpit

A well detailed cockpit gives life to an airplane...it is the heart of any model and the focal point of a spectator's (or judge's) eye. / by Richard Uravitch

**T**o the modeler interested in trying his hand at stand-off scale or scale, the item which seems to strike the most fear into the heart is that area in which our pilot spends his time...the cockpit.

All those little knobs and gauges, the navigation equipment, black boxes, etc., are stuffed into an area of a few cubic inches. Fear not...it can be done, and is done all the time. There is no real trick or wizardry involved, just attacking the problem head on and utilizing available resources.

For our purposes, we'll talk about two types of cockpit detailing: sport (or stand-off) scale, and absolute scale. Now, some of you are probably saying, why detail a cockpit for stand-off scale when the model is judged from outside a ten-foot circle? Good point. Except, watch the judges at the next stand-off contest. There is a certain charisma to an airplane that looks like a real airplane; and a cockpit representation, in most cases, will influence the judges more than an open box with a bust of a pilot sitting in it.

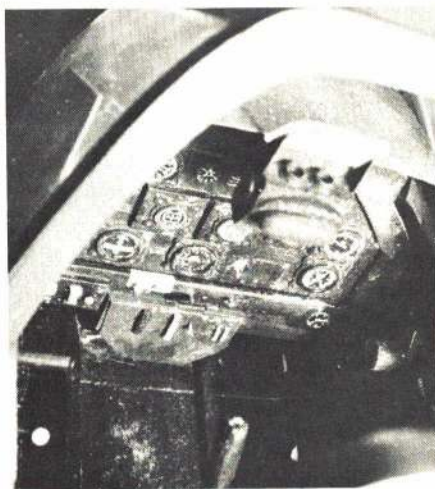
For sport scale or full-scale, the first step in preparation will be the collection of as many photographs of the cockpit you are modeling as possible. All angles, all sizes. Study them!

When you get to the point where a picture of a drag chute handle or parking brake release looks like a T-pin, prop and mixture controls resemble glass-headed straight pins, and control sticks look like that leftover piece of brass tubing you've got, the battle is half over!

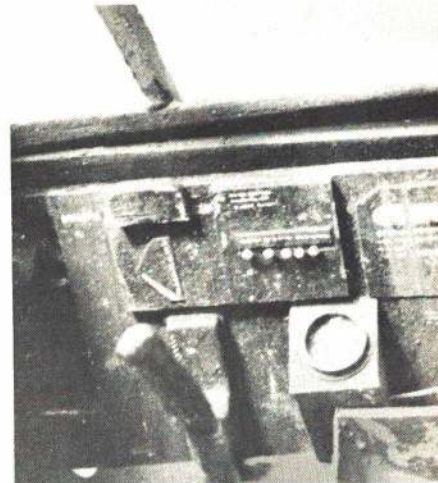
Source material (drawings and photographs) is virtually everywhere, but some of the *Profile*, *Aircam*, and other publications will put you in good shape. Instrument faces are now readily available commercially from sources such as IM (World Engines, Inc.) Tatone, and JP Products to name a few. Some are supplied with scale instrument cases or bezels, some not. Those with bezels eliminate much additional work. That leftover plastic car kit becomes very useful. You know, the one you started when you were "giving up the hobby!" They provide lots of little useful items which can be used either intact or modified to suit your needs.



Can you imagine what this view of the author's P-51 would present if the cockpit were a mere painted slab of balsa? Cockpits represent character (both the plane's and the builder's).



The instrument panel features commercially available dials and bezels, plus a bit of creative junk-box scrounging.



Attention to weathering keeps this most human part of the plane from looking sterile. One feels that a pilot scrambled over this seat, and sweated on this stick.

When starting actual construction of the cockpit, I prefer the "box method" or component approach. (See Fig. 1.) In essence, you will be constructing a model *within* a model. This is much easier, since it gives you something you can work on at your workbench, rather than waving that three-foot fuselage around the room.

The first step in construction should be to approximate the area in the fuse-

lage that will encompass the cockpit unit. Measure it off and transfer the dimensions to a sheet material. Heavy card stock is alright, balsa is better (but will require filling the grain). Thin plastic seems to be the best.

Now, make up the "box" by tacking the four sides together. Tack-cementing will make it much easier to disassemble and work on, especially when fitting side consoles. The bottom



may be added later. Fit the box inside the fuselage and mark its location on the fuselage sides.

Referring to your collection of photographs, break down the cockpit "box" into its individual parts: the instrument panel, left and right sides, floor and back. (See Fig. 2.) Work on each piece separately, fitting the consoles, black boxes, NAV/COM equipment panels and throttle quadrant to the sides first. Balsa blocks work very well for the basic console units because they may be shaped more easily than most materials.

Unless you are constructing an exact scale cockpit, stick to basic shapes for your detailing. A simple, functional-looking cockpit builds up quickly, and starts to come to life with the inclusion of random parts you may have lying around.

You will find card stock (thin) invaluable for raised portions of instrument panels, warning placards, and other areas comprised of various shaped panels. Straight pins (common head) will serve nicely as toggle switches, glass-headed pins make ideal prop and mixture controls, short sections of 1/16th square balsa are readily shaped into switch guards. Warning lights can be either a pin head, or a tiny drop of the appropriate color paint.



Good source material is usually available from quality hobby shops. These references are the road maps to guide you to an authentic model.

One word of caution... paint the interior of the basic box *before* adding lights, instruments, toggles, and any other accoutrements, or you'll end up painting everything over again! Interior colors vary with the subject being modeled but, as a general rule of thumb, military cockpits are either zinc chromate, dark gray (almost black) or green/gray. Individual components, such as the seat and radio equipment, may vary, but you're reasonably safe with the colors mentioned. Cockpit interior colors are shown in the chart below.

MILITARY	COLOR	SOURCE
U.S. (WWII)	Zinc Chromate Black/Gray	Pactra MI6 Chromate Green Pactra MI Scale Black
British (WWII)	Zinc Chromate Black/Gray	Pactra MI6 (acceptable) Pactra MI Scale Black
Luftwaffe	Gray/Green Black/Gray	Humbrol Sky type "S" IR Sky type "S" Pactra MI Scale Black
Japanese	Bare Aluminum Bare Wood Metallic Blue	Aero Glass Silvalre Aluminum Pactra Flat Earth M20 Lt. Earth M18 Testors Pla Metallic Blue (Not Metallflake)
Civilian	Per source material (Model must match documentation)	

(Continued on page 82)

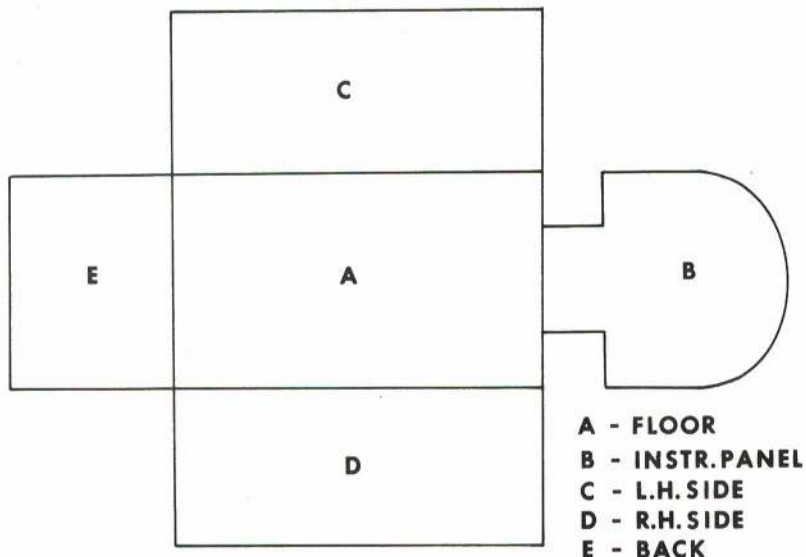


FIG. 1

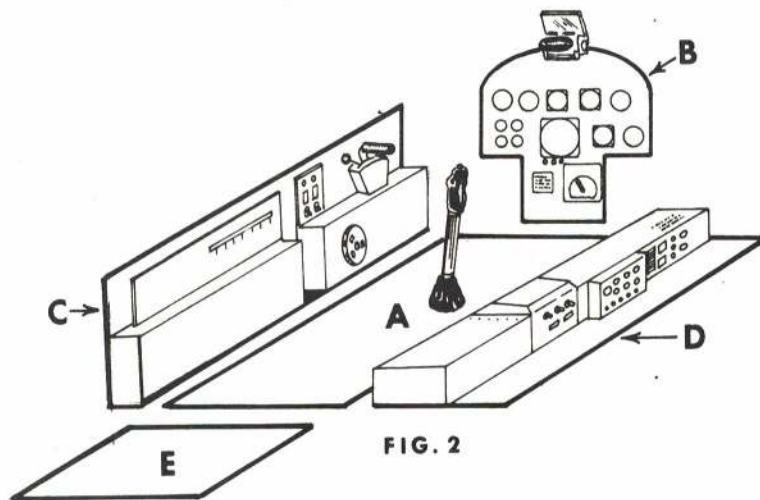


FIG. 2

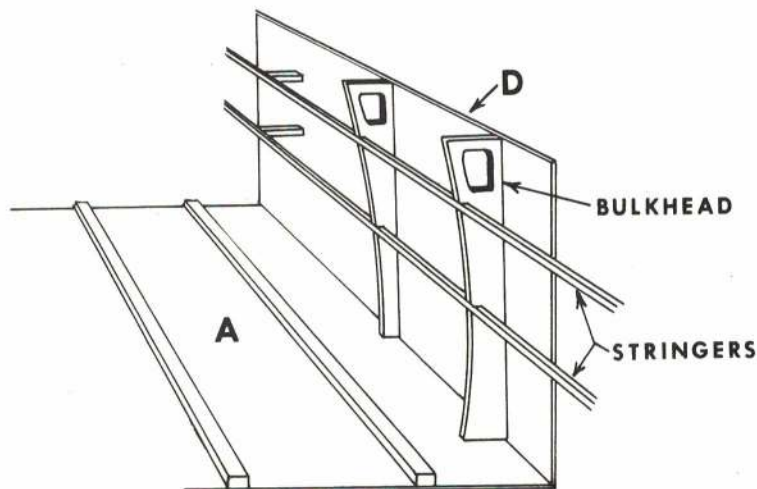
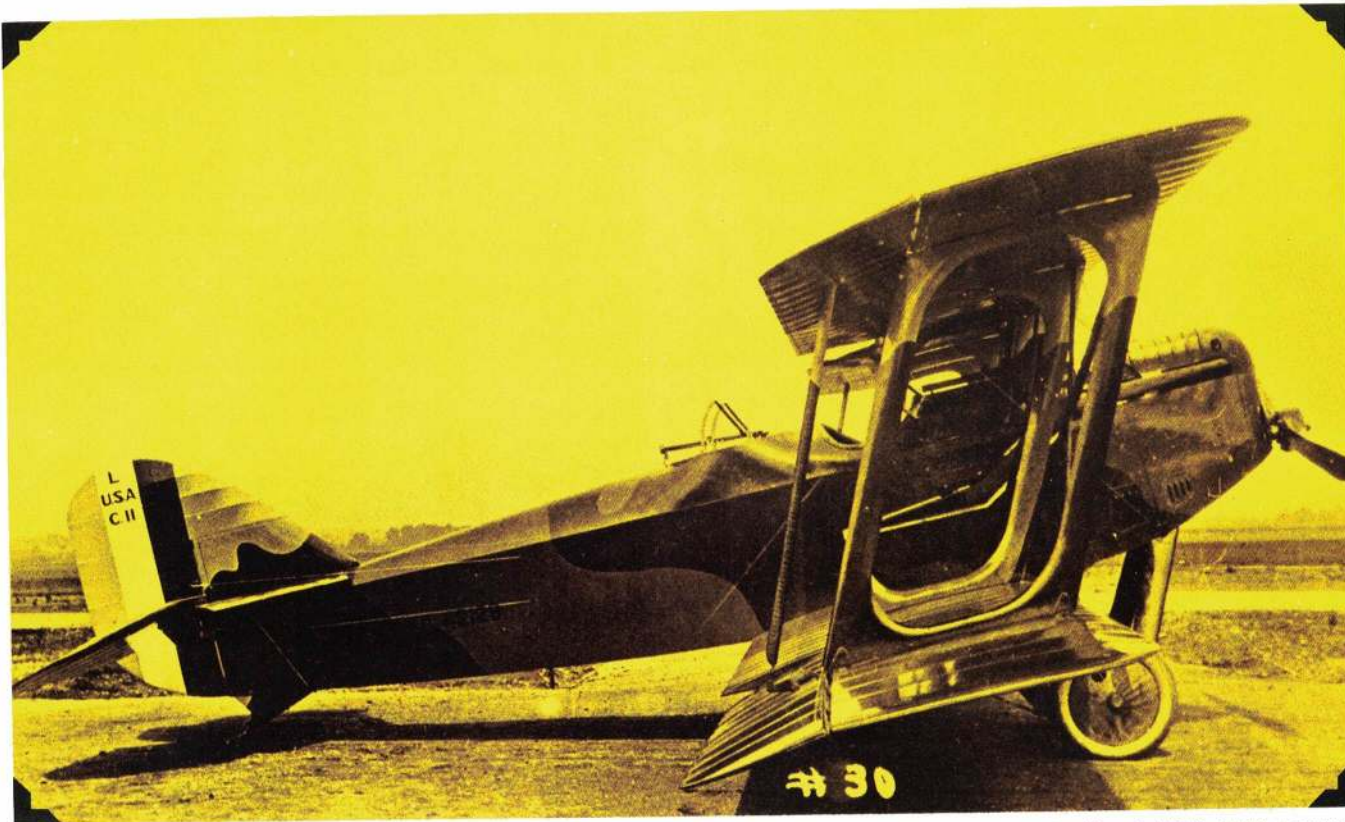


FIG. 3





Leperes, except for two prototypes, were built by the Packard Motor Company of Detroit. The official designation L.U.S.A.C.-11 stood for Lepere/U.S. Army/Combat of the eleventh type considered.

# A La Recherche Du Lepere

Built specifically for the still-developing Liberty engine, this two-seat airplane was of striking appearance, strong and maneuverable. /by Patricia T. Groves

**T**he young American shivered inside his heavy flying coat. In the pre-dawn darkness of Monday, December 18, 1918, France's Orly Field lay shrouded in a bleak, wintery overcast. And icy fingers of cold, wet air, played a fiendish game of Wake Up around his up-turned collar. Lt. Clifton C. Cottrell shivered off the chilly intrusion while he stood and waited.

Across Orly's wide and silent field, distant hangars fused into the darker darks of a dark and silent night. Yet, just a few miles from where he stood, Parisians were at this moment still wildly celebrating Armistice. Armistice! Armistice! Three weeks old today. Happy birthday, dear Armistice. It's over, "over there?"

Tonelessly whistling through his teeth, Clifton C. Cottrell, 2nd Lt., USAS, 24th Aero Squadron, 1st Day Observation Group, First Army, jammed his hands deeper into his pockets and scuffed at the hard-packed earth outside a weathered operations shack: *Where the devil are they? Mitchell will eat us alive if we're not there on time.*

Mitchell was William Mitchell, "pilot's pilot," Brigadier General and feisty proponent of strategic air power. It was his call to the CO of the 24th that brought Cottrell and five others from Vaincourt to Paris.

The outspoken General wanted a group of combat-experienced pilots to evaluate a new machine. An American

bi-place fighter. The Lepere. There was a big bruhaha going on about America's participation in the War, about American-built airplanes, American-built engines and, well, our reputation was pretty ruffled. Mitchell was not happy.

Personally as well as professionally aggressive, General Mitchell wasn't ex-  
*(Continued on page 20)*



Novel inter-strut bracing gave strength, yet didn't interfere with streamlining.





In full military colors, L.U.S.A.C.-11 stands ready for aerial action. An exceptional rendition of this unusual airplane.

# LEPERE L.U.S.A.C.-11

Built specifically for scale contest work, this two-seat airplane is of striking appearance, strong and maneuverable. /by Floyd E. Carter

Unlike many WWI aircraft, the Lepere L.U.S.A.C. -11 is ideally proportioned for RC model use. The long nose moment, and large tail surfaces, help contribute to a stable and easily flyable model. An abundance of scale detail items make it particularly attractive for AMA or FAI Scale competition. At a scale of 2"-1', the 1580 sq. inch wing and 10 lb. flying weight produce a wing loading of a scant 14½ oz./sq. foot. Plenty of control surface all around, including four ailerons, assures good maneuverability at low speeds.

Photos of the Lepere were obtained from the Smithsonian Institution, while other sources produced a detailed cockpit photo. Working drawings for the model were scaled up from available data gleaned out of several publications.

## CONSTRUCTION

Most construction articles begin by telling you to start with the wings, or some other part. I will begin by telling you not to build anything!—until you have assembled all the photos, scale three-views, etc. Don't get yourself

trapped with a finished model and no documentation.

The sheet metal forming is a real challenge, so it might be fun to start there, as a test of your nerves and stamina. Once the technique has been mastered, metal forming can be a valuable part of your arsenal of construction tricks.

The best metal-forming procedure is to first make a male mold from pine or other soft wood. Next, cast a female mold, using a low-temperature alloy. Cerro Bend has a melting point of 158°F., and is quite strong when cast. If not obtainable from local sources, contact Cerro Copper & Brass Co., Alloy Department, Rolling Place, Stamford, Conn. 06907.

After melting the alloy in a pan placed in boiling water, pour the casting. If trapped air bubbles cause imper-

fections, just re-melt and try again. There should be a flat edge around the outside of the mold, for attaching the flat sheet of material to be drawn.

When stretched into the mold, some parts of the material become quite thin, so it is good to start with thick stock. T-O temper aluminum is ideal, but harder alloys can be annealed by placing them in a 500°F. oven for an hour, and cooling slowly. Attach the aluminum sheet to the mold with screws spaced about one inch apart.

Now the creative part begins. Use a vibrator type sander, to which is attached a hardwood mandrel that has been carved to a blunt-nose shape. This makes a nice hammer that strikes the aluminum sheet 60 times each second. Work the sheet slowly into the form with a circular motion, until it contacts

(Continued on page 21)

## LEPERE COLOR SWATCHES—AEROGLOSS PAINTS



OLIVE  
DRAB



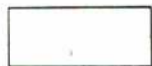
CAMOUFLAGE  
TAN



FOKKER  
RED

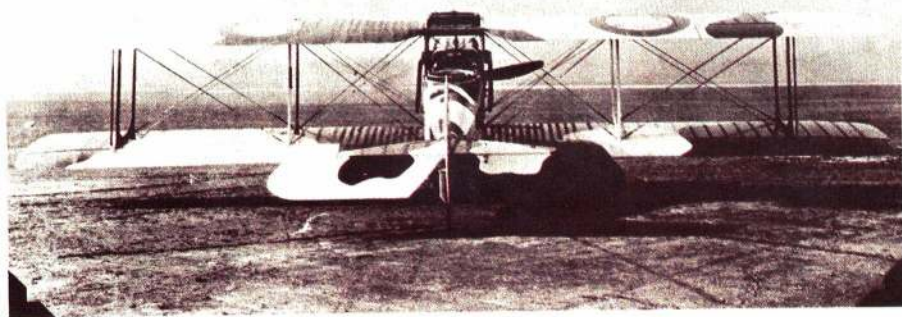


CURTISS  
BLUE

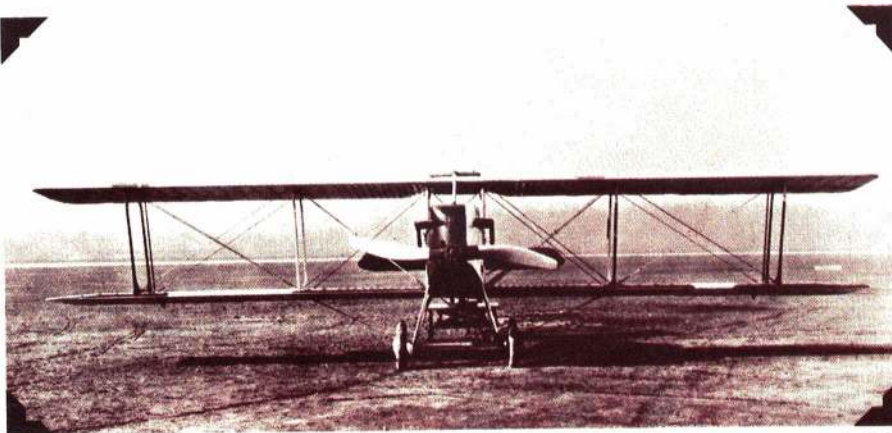


SWIFT  
WHITE





Peibald camouflage pattern shows up well on this McCook Field Lepere.



With a 425 hp Liberty 12A engine, this Lepere was photographed at McCook Field, in late 1918. Rushed to production, the Liberty engine would be little endeared for many years.

(Continued from page 18)

actly GHQ's fair-haired boy. But, in September 1918, he'd amassed the largest air armada ever, and helped the U.S. First Army wipe out the St. Mihiel salient. And, the following month, his command over huge air formations, engaged in mass bombing enemy targets, helped break the back of the dreadful Meuse-Argonne campaign.

But, between the political situation within the A.E.F. General Staff and the stand-offishness of the Allies, Mitchell hardly had a chance to prove out his theories. So "Billy" was in a real lather to get the Lepere accepted and up to

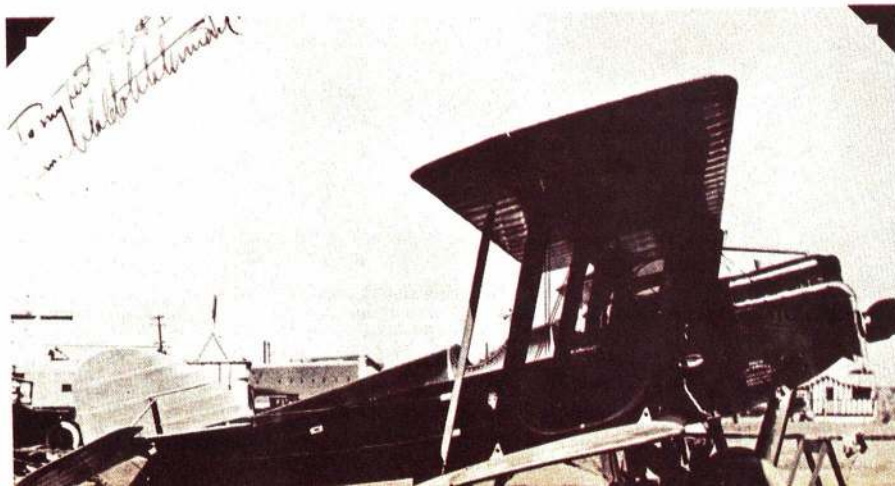
The Front. Oh, it was still The Front, all right, even though it was quiet now.

Ever since his arrival in France, Lt. Cottrell's duties had been split between days at the Front and days back at Colombey-les-Belles, where he tested rebuilt or newly assembled aircraft for the First Air Depot.

A smile crossed his young face. He'd gotten the job, the CO barked, "...not because you're a sensational pilot, Cottrell! Just—sensitive." True, experience and seat-of-the-pants flying do make one—sensitive.

The last 50 days of the war had been intense. (Was it really over?) The General's call, last week, meant a weekend

If you can't decide whether to build a WWI or Between The Wars Lepere, how about building this civilian variant—the Waterman (L.C. Brand) Lepere.



in Paris for six of them. And they all could use the leave. But Cottrell would have been just as happy had the CO put somebody else in charge of the expedition.

"Bill, are you awake? What time is it? Where are those guys?"

Lt. William J. Daniell yawned in the shadows: "Quit worrying, Cliff. They'll get here. After all, liberating Paris in one weekend isn't easy, you know."

Wishing he had Daniell's confidence, Cottrell stood and listened to the dark until, gradually, he became aware of the gasps of a definitely pre-war engine in the vicinity. A veteran French taxi sputtered and coughed to a halt beside the waiting airman. Happily, all of Cottrell's anguish vanished at the sight of the four tardy pilots. No military police in escort. No hysterical young ladies. And, best of all, no irate Frenchmen *avec* shotgun.

"Mother was worried," Daniell teased.

All of them barely into their twenties, all of them three weeks out of the killing—six pilots—hurried towards a waiting hangar and an unknown airplane.

When the Liberty fired up on all 12, its roar certainly got your attention.

In the previous hour, a technician had walked the pilots through the procedures of the test. And, while they checked over the airplane, he patiently responded to their questions, and recorded their comments.

Though the pilots of the 24th were a little disquieted to see single-strand elevator control wires, everyone allowed as how that could be changed easily enough. That—and the guides. The control wires slid through metal guides, and already there was noticeable wear in the area. Horsehide would be safer.

And they weren't too happy about the placement of the radiator, nor the pipe leading to the motor. With that location, in combat, a direct hit would drench both pilot and observer in boiling water. An unpleasant prospect.

But they weren't going to get shot at today. And, all in all, the Lepere appeared to be a stout, sturdy airplane. Construction and materials—all O.K. There were no qualms about taking it up.

"You first, Cottrell."

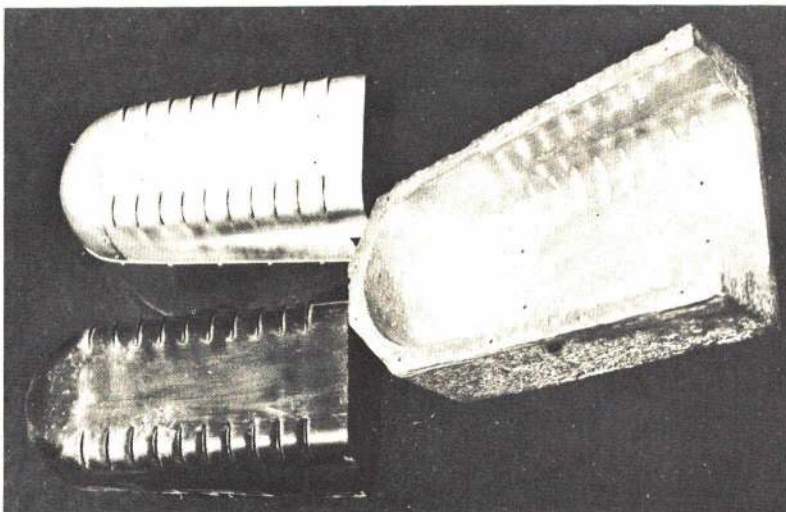
The sky was a cheerless grey and, except for the Lepere's bright red, white and blue tail, there was little color anywhere as Cottrell slipped his 5'8" frame into the cockpit. When his feet found the rudder bar sooner than expected, he cocked his head over for a look-see. Gee, that's awfully close.

Minutes later, while 400 horses idled at a frisky rumble, he took a quick trip through the controls. O.K. Nothing seems to bind. And while needles bounced on the unfamiliar panel, Cottrell ran up the engine. Notched throttle—doesn't particularly thrill me.

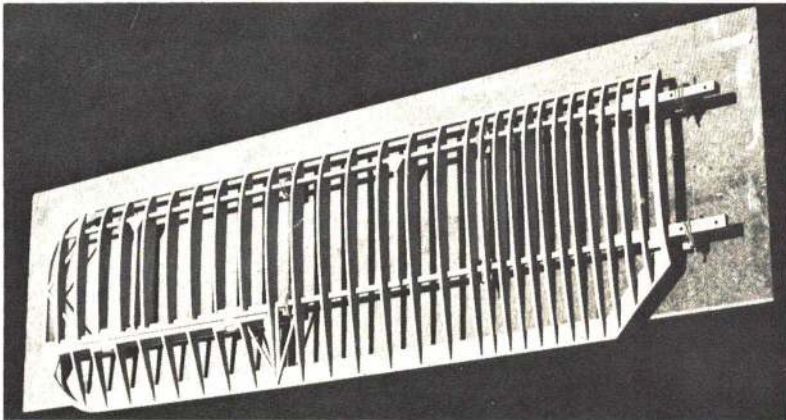
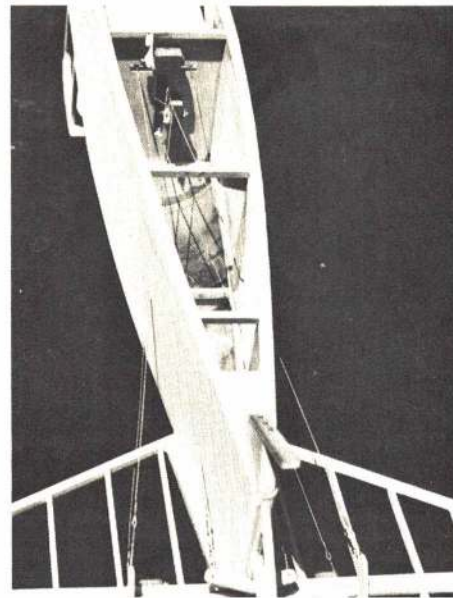
Then, bumping over the rough turf towards the end of the strip, he turned the Lepere into the prevailing breeze,

(Continued on page 74)





ABOVE: To produce the authentic metal cowling, Cerro Bend is used for a hard, low temperature mold. RIGHT: External elevator and rudder control systems achieve scale appearance.



ABOVE: The completed left upper wing structure on its building jig. RIGHT: The fiberglass turtledeck, as installed on the top of the fuselage.



(Continued from page 19)

the mold. Use mandrels, made from dowels, to shape the smaller recesses. Remove the shaped piece, sand and polish.

The cowling is easier to form in two parts—the front “nose” piece, and the remaining top piece. After forming the exhaust stacks, rivet each one to a flat backing sheet. Make the individual exhaust headers from tubing and epoxy to holes drilled in the backing plate. The side louvers are all interchangeable, except for the tapered front louvers.

With the metal parts completed, we can get back to the more familiar balsa construction. The fuselage box is conventional, and should lift your spirits after all the metal work. When the fuselage sides and formers are in place, epoxy the cabane struts to the inside of the fuselage sides (checking for incidence). Face these, on the outside, with balsa to bring the struts flush with the outside of the fuselage.

The fiberglass turtledeck is made in the usual manner with a pine plug and a plaster of paris female mold. After a gel coat, lay up three layers of medium weight fiberglass at the front. Around

the gunner's cockpit, and aft, use two layers to avoid excess weight at the tail.

Begin landing gear construction by fastening the wire to plywood formers. Epoxy the inner plywood face to the wire. Next, fill in around the wire with more plywood and, finally, add the outer face. The spreader bar is made from pine, and grooved to accept the axle housing.

The important thing about the axle/wheel assembly is that both wheels are soldered to the wire axle. This prevents the wheels from turning independently, and allows straight takeoff runs with no tendency for ground looping. This is the secret for building tail draggers that have a through axle. The axle turns in a brass tubing sleeve, which has a bungee hanger soldered at each end. The bungee system is authentic and effective.

The rudder and elevator are controlled by cables. Since the elevator halves are not joined, two cables must exit the fuselage side for each elevator horn. Attach the cables to bellcranks mounted on the rear of F4. From the cranks, conventional Nyrods connect to the servos. Servo access is through a bottom hatch.

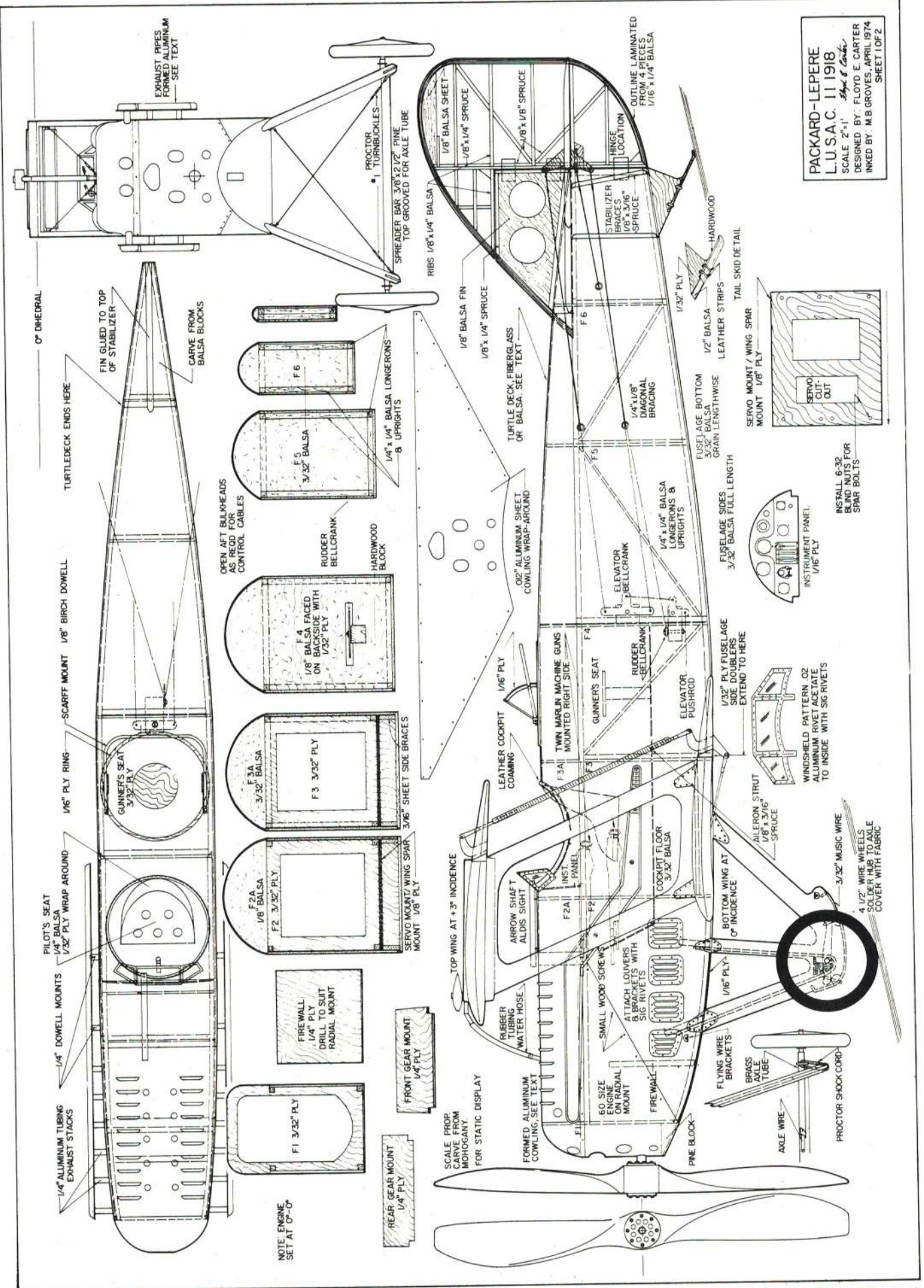
There is a shortage of cooling air around the engine, which results from building an RC version of a water-cooled airplane. The Lepere had some small holes in the cowling front, which were enlarged slightly on the model. A cylinder head heat-sink was used, which allows the engine heat to be conducted away to a larger surface area and, thus, dissipated more efficiently. Even so, engine overheating can be a problem with this model.

**D**ne discouraging feature of bi-plane construction is the tedious job of making ribs. The sandwich method is the quickest, and most accurate method. Make two identical metal rib patterns, and sandwich eight to 12 pieces of wood between them. Clamp this sandwich in a vise, and sand the pieces down until metal is reached on both sides. While the sandwich is still clamped together, make the rectangular spar holes with a long, slender file.

The plans show only one of the four wing panels, because the wing is built on a wing jig instead of over the plans. You can make a satisfactory wing jig by glu-

(Continued on page 72)





PACKARD-LEPERE  
 L.U.S.A.C. 11 1918  
 SCALE 2"=1" *Ship & Co.*  
 DESIGNED BY: FLOYD E. CARTER  
 INKED BY: M.B. GROVES, APRIL 1974  
 SHEET 1 OF 2



TYPICAL WING SECTION SHOWING INTERPLANE STRUT FOUNDATION



ALERON PUSH ROD HOLE



LOWER RADIATOR 1/8" SHEET Balsa STRIP STRUCTURE Balsa STRIPS SIMULATE



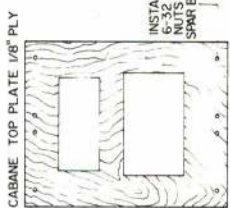
W4, W6, W8, W10, W12, W24 1/8" SHEET



W28 1/8"



W21-27 1/8"



CABANE TOP PLATE 1/8" PLY



W2U 1/8"



W3U 1/8"



W5, W7, W9, W11, W13, W15 1/8" SHEET

ALL RIBS MADE FROM Balsa SHEET

AILERON RIB, 36 REQD.



AILERON HORN .030 ALUMINUM



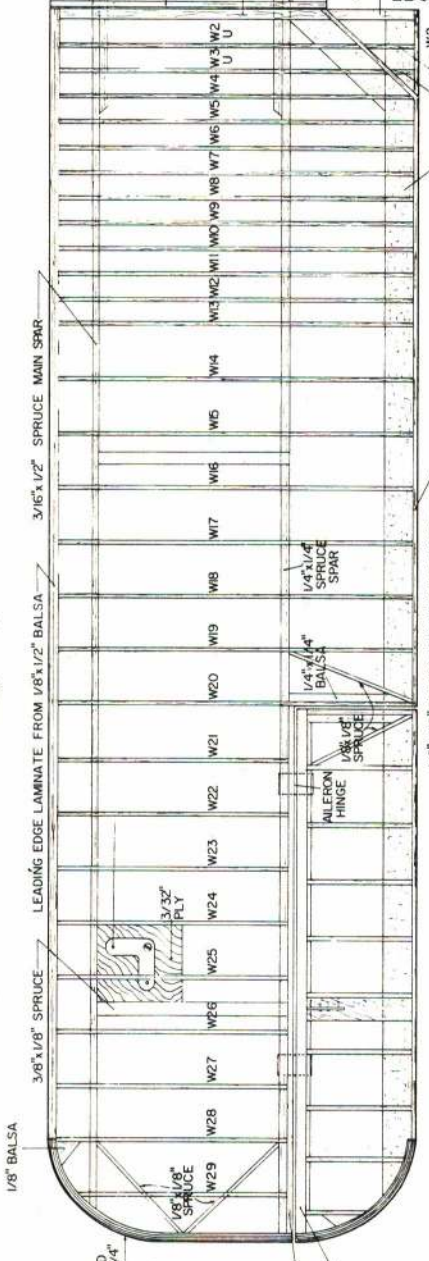
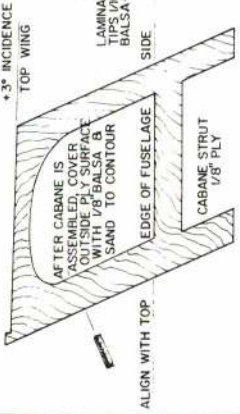
RADIATOR DETAIL



BUILD BOX FROM 1/8" Balsa PIPES ARE 1/8" ALUMINUM TUBING SPACED WITH Balsa STRIPS



SCRAP Balsa



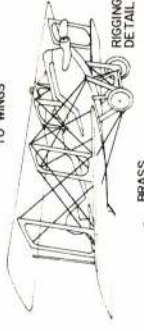
NOTE: FOR THE CUTOUT SHOWN EXCEPT FOR THE WIRE, USE SAME SIZE AND CONSTRUCTION



MARLIN MACHINE GUN .30 CALIBER MAKE FROM BRASS TUBING & SHEET 2 REQD.



INSTALL BRACKETS BEFORE EXPOSING INTERPLANE STRUTS TO WINGS



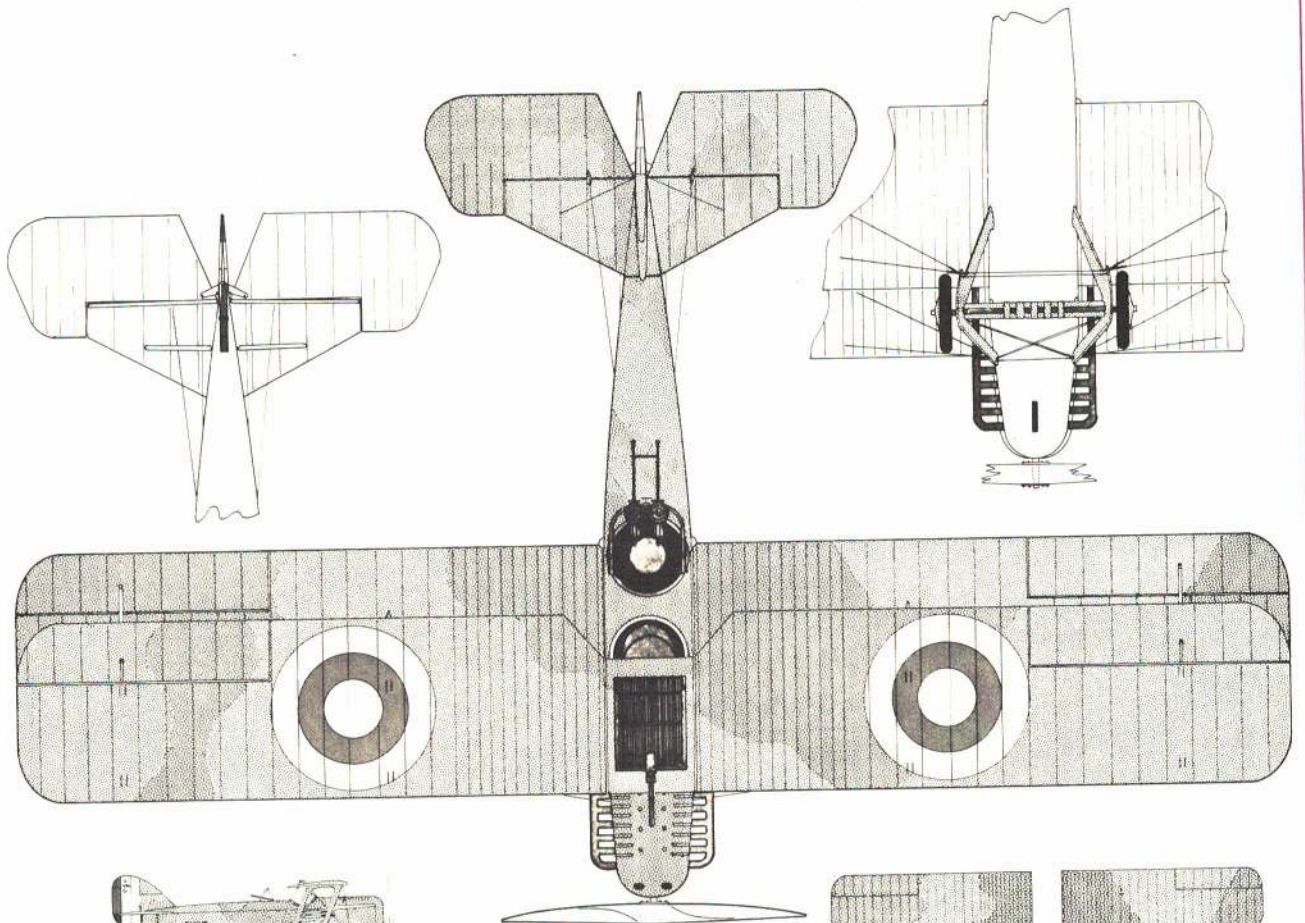
LANDING GEAR FACING & WING TIPS TO BE LAMINATED FOR GEAR WIRE



BRACKETS FOR LANDING GEAR & FLYING WIRES, .020 ALUMINUM

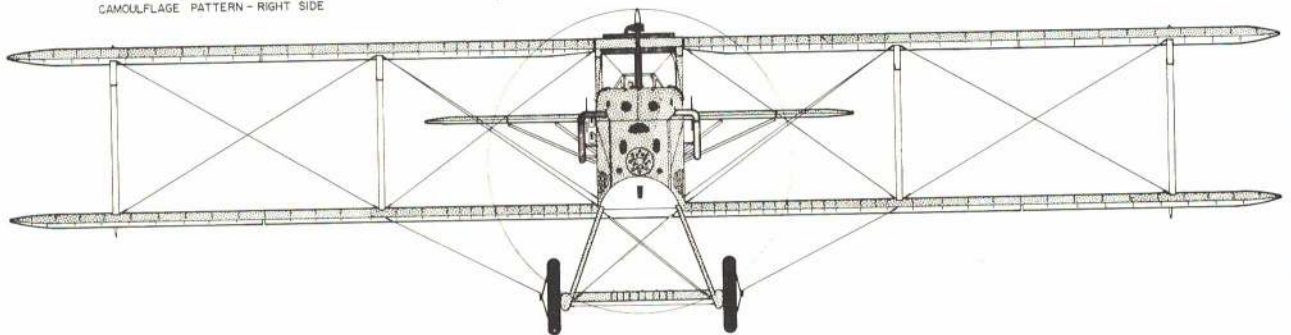






CAMOUFLAGE PATTERN - RIGHT SIDE

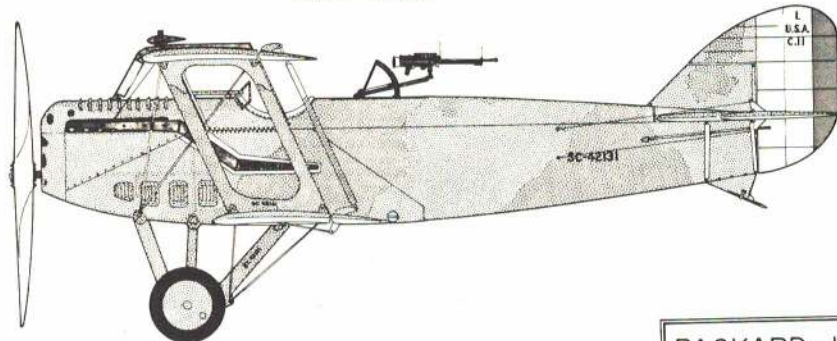
PAINT PATTERN, UPPER SURFACE - LOWER WING



0 1 2 3 4 5 6 7 8 9 10  
SCALE IN FEET

COLOR KEYS

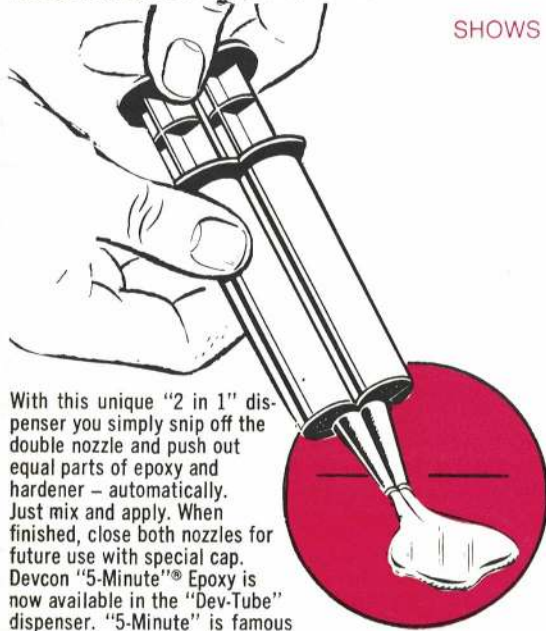
- RED
- BLUE
- OLIVE DRAB
- MEDIUM EARTH
- UNDER SURFACES  
CLEAR DOPED



PACKARD-LEPERE  
L.U.S.A.C. 11 1918  
400 hp LIBERTY 12 - M.B. Groves



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"5-Minute"® Epoxy in the  
Revolutionary new 2 in 1 dispenser.



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R-208 1 oz \$1.70

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Fantastic bonding strength. One square inch of "Zip-Grip" 10 will support 5,000 lbs.



Bonds Steel, Aluminum, Brass, Copper, Glass, Rubber, and most Plastics to themselves or each other. Sets in seconds. Most items can be handled in 1 or 2 minutes. Very thin films work best. One small drop or less, per square inch.

R-290 2 grams \$2.00-

**Devcon® "5-Minute"® Epoxy**

For super-fast repairs.



First epoxy material to provide all physical strengths of epoxy adhesives plus quick setting, even in thin films and at low temperatures. Use it to build and repair RC models.

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R-206 2 1/2 oz 2.50

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PRECISION GROUND  
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KNURLED  
-BASE CAP

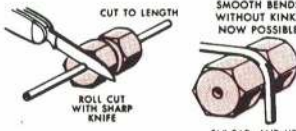
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KB-125 ONLY \$1.25

**DU-BRO BRAKE**



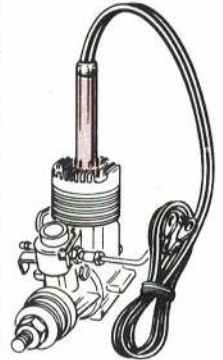
Requires very little pressure to engage brake. is not affected by fuels.

Complete Brake & Linkage Hook-up (11 PIECES) CAT. NO. WB 100

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WHEEL NOT INC.

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KG-200 GLO-PLUG CONNECTOR**

THE IDEAL GLOW PLUG R/C ENGINE CORD SET. SLIM 1 3/4" BY 3/8" ONE PIECE BRASS BARREL SNAPS ON TO PLUG. NO FLIMSY SPRINGS OR CONNECTIONS. WIRES FIRMLY ANCHORED IN TOUGH NYLON. - CAN'T JERK OUT. EXCELLENT ACCESSORY FOR TODAY'S KIND OF R/C MODELER. ENGINES .10 AND UP. APPROX. 2 1/2" LONG.



KG-200 WITH ATTACHED BATTERY LUGS \$2.00

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RIGGING  
COUPLERS**



**30c**

FOR KWIK LINKS  
THREAD SIZE  
2.56; 1/32 EYE

Catalog No. RC-30



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Dura-Hub

Newly styled, hand inspected, top quality tires with treads

**REGULAR**

NH-1	WHEELS 2 1/4"	2.59/pr
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NH-3	WHEELS 2 3/4"	2.99/pr
NH-4	WHEELS 3"	3.19/pr
NH-5	WHEELS 3 1/4"	3.39/pr
NH-6	WHEELS 3 1/2"	3.59/pr

**TREAD  
OR  
Du-Bro smooth surface tires  
available!**

175R	WHEELS 1 3/4"	2.19/pr	"T" OR "R"
200R	WHEELS 2"	2.39/pr	
225R	WHEELS 2 1/4"	2.59/pr	<b>LOW BOUNCE</b>
250R	WHEELS 2 1/2"	2.79/pr	
275R	WHEELS 2 3/4"	2.99/pr	
300R	WHEELS 3"	3.19/pr	
325R	WHEELS 3 1/4"	3.39/pr	
350R	WHEELS 3 1/2"	3.59/pr	

**Low Bounce "SLICKS"**

225S	WHEELS 2 1/4"	2.59/pr
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275S	WHEELS 2 3/4"	2.99/pr
300S	WHEELS 3"	3.19/pr



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# AEROSPORT

**T**he AeroSport is an easily controllable and fun-to-fly plane of simple construction with realistic appearance. It was designed as a sport ship, which could also be used as a trainer.

My touch-and-goes and right-hand pattern approaches were in need of some improving, and a plane which would fly at a moderate speed would be ideal to use for this type of practice.

With these qualifications in mind, I decided on a high-wing design for its forgiving stability, and

ailerons for ease in making turns. It is generally thought that high-wing models are not very responsive to ailerons; however, this problem is not evident in this design.

The AeroSport is flown as most RC ships, using only the ailerons for turns. In comparison to the rudder/elevator trainers, its smooth flight characteristics give a valid reason for the beginner to consider having his first ship equipped with ailerons.

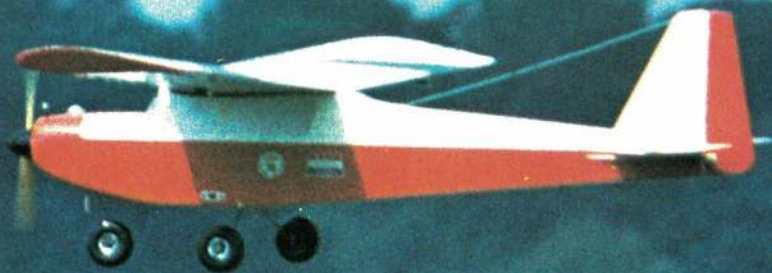
The original has been flown many times by beginners and experts, and all like the way it flies.

(Continued on next page)





The first designs an RC neophyte selects are the most critical planes he will build, for they are the foundation of his flying future. The AeroSport is designed with this in mind. / by William E. Patterson

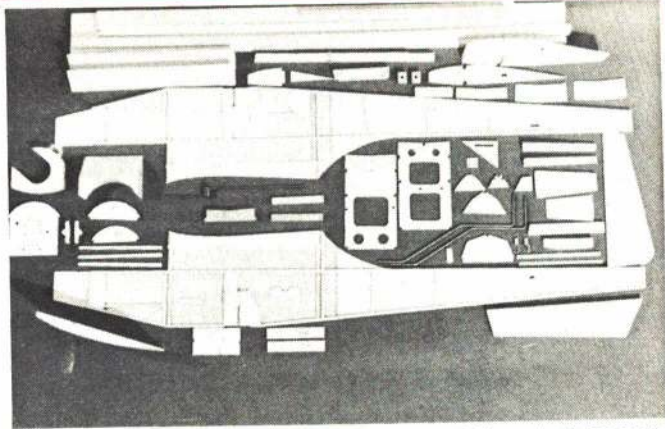






The utilitarian lines make for a beefy structure, roomy access and installation areas, and uncomplicated construction. The wing and tail are designed to deploy upon impact, thus minimizing repairs.

Use weights to hold the fuse sides in place while checking alignment, not the large size of the model itself.



With both sides of the fuselage completed, and the rest of the parts cut out, a building project like the AeroSport is the same as finishing a kit.

Rough shape the nose blocks, then test fit the engine before finalizing the nose contours. The 45° mount eliminates muffler location problems—and it looks distinctive.



It's a real fun airplane, and should make an ideal building project.

The AeroSport offers many advantages for one's first RC model. Its large size makes visibility something that can work in your favor—beginners tend to fly too high and far away, as a rule. The engine displacement used (45-60) can save the newcomer \$20-40 over trainers requiring smaller power plants. Our kit and plan market is disproportionately favorable to the larger engines, so investing in the inevitable, right off the bat, makes sense. And let's not forget that big airplanes handle wind gusts well. Penetration and smooth flying can do a lot to ease the tensions of those first flights. You'll get more practice, while lighter craft are grounded by the wind.

The clean exterior lines of this ship have been accomplished by replacing the customary rubber band wing hold-down with two 10-32 nylon screws. Although they may appear to be undersized, they are strong enough for all in-the-air maneuvers, but will shear off during those sudden stops.

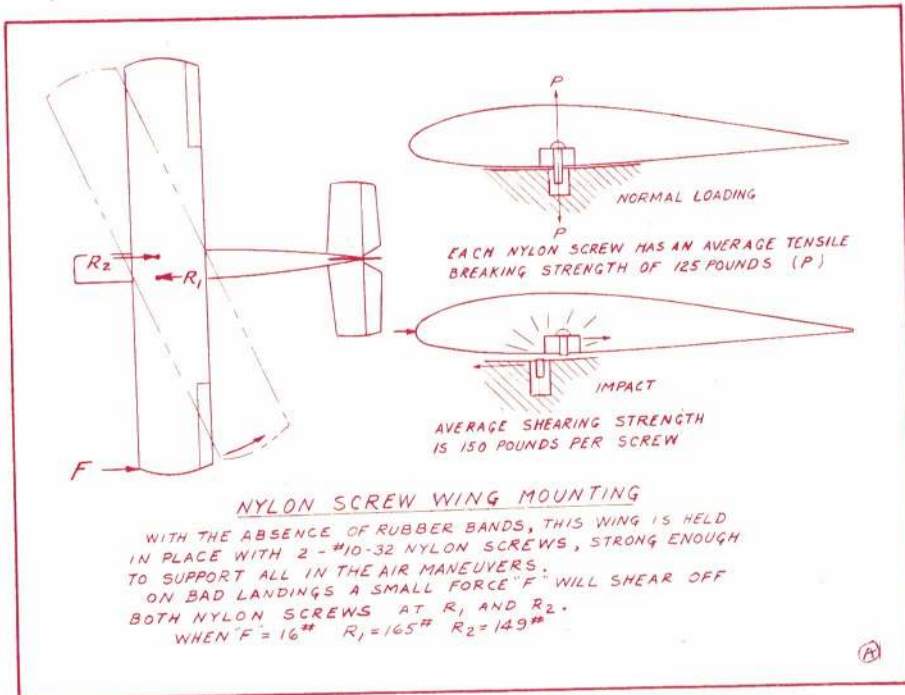
Another unique design feature is a spring-mounted tail section, which will flex enough on bad landings to keep from breaking off. This system use two internal extension springs obtainable by mail order, at \$.50 each, from: The Penn Valley Hobby Center, 837 W. Main Street, Lansdale, Pa. 19446.

A newly designed plane generally offers a few surprises on its first flight.

This one certainly did. Gross pilot error resulted in insufficient flying speed, and it stalled out shortly after takeoff. While not a planned test, it proved that the nylon wing screws would shear off. Other than a bent landing gear and some mud in the carburetor, everything was okay. It was successfully flown the same

day. During the many flights that have followed, it has been looped, rolled, spun, and flown inverted; and, it handles beautifully.

The original model weighs 5½ lb. and uses the older GD 47 Heath Kit proportional system. It has a 62" span; fuse is 47½" overall. Power is a muffled En-

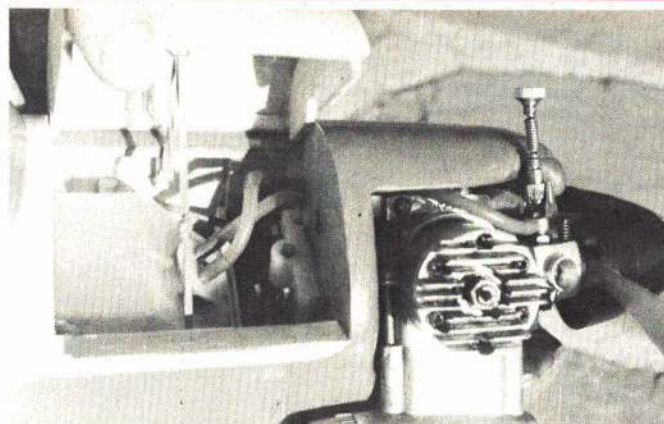
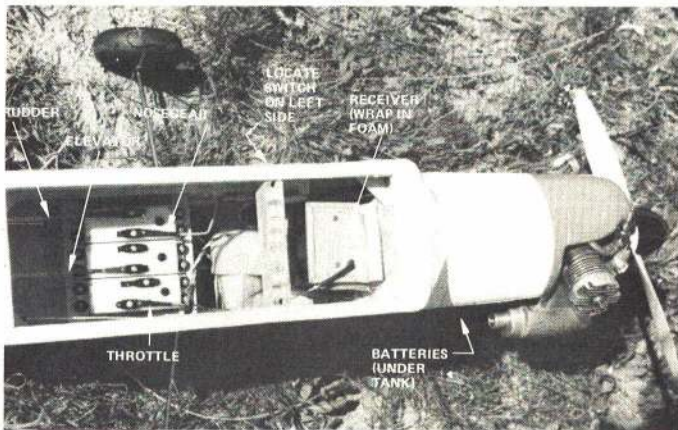






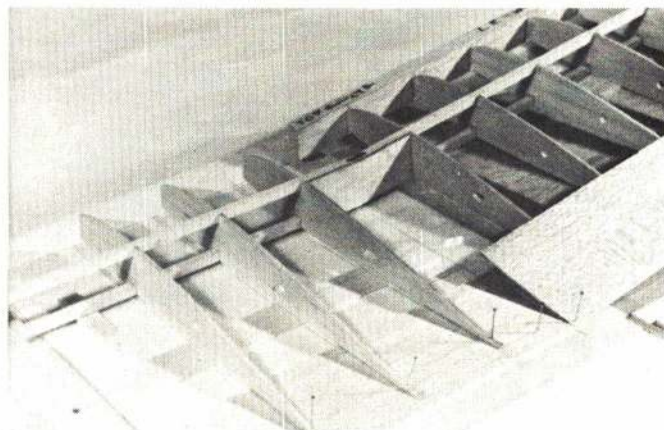
It doesn't take too much time to get the fuselage to this finalized stage. Let the sandpaper achieve those nicely rounded corners.

Typical radio installation. Beginners should pay special attention to the placement and proper mounting of that new radio. Keep the pushrods straight and free of binds.



The tank access hatch is rubber band retained. Note that the center line of the tank is on the same reference line as the center of the carburetor—this is important.

While the trailing edge is pinned to the building board (which is straight, of course), the spar is elevated with shims.



ya 45, which is plenty of power to get off the ground. The model can be flown easily at half throttle.

### CONSTRUCTION

There is always a challenge in starting a building project. You look ahead, knowing that when you are finished, your ship will be different than the kit jobs out at the field. So you start by lifting the information from the plans and cutting out the many pieces. When enough parts are accumulated, start building and you'll find that it is very much the same as putting a kit together.

These plans have been made to give the builder plenty of good working information. Although this ship is easily built, there are a few tricks in making it go together smoothly. I'll try covering the more difficult points in the text, and I'm sure the plans will explain the remaining details.

**Fuselage:** Start by cutting the plywood doublers from a sheet of 1/32 x 12 x 24" aircraft plywood. Then build the sides, as shown by the illustrations on the plans. Use regular model cement or epoxy, and keep the pieces weighted down to your building surface until thoroughly dry.

Following this, cut out the side profiles, except for the wing contour. Mark the side sheets for support pieces and longerons and cement them in place.

The 3/16" square balsa at both sides of F2 and F3 should be cemented in, so

that formers F2 and F3 may later be slipped into place. The wing contour reinforcement, F8, must now be located so that it keys into the notches of both F2 and F3, assuring accurate alignment with both fuselage side sheets. With F8 now cemented in place, the wing contour may be cut in both side sheets.

With the fuselage sides and formers prepared, the next step is to put the cabin area together, by first fitting, then cementing F2 and F3, wing mount F9, and the landing gear support F17.

**Wing:** The wing uses a 14% semi-symmetrical airfoil, with a flat section toward the trailing edge, permitting construction on a flat building surface. The plan shows a basic rib, which is altered slightly for the aileron and bellcrank cutouts.

The first step in construction is to glue the four main spruce spars to the dihedral brace W8, using white glue or epoxy. Now with all ribs, braces and trailing edge prepared, start the right panel by pinning down the lower trailing edge to the plan. Then, starting with W1, cement in all of the ribs. Use 1/16" thick scrap balsa to shim up the ribs from the plan.

The next step, attaching the 1/2 x 1" leading edge, is the most difficult part of the wing construction. Any curved or twisted wood here will cause difficulty in keeping the wing straight, so select good material. Cut one end of

the leading edge strip to the dihedral angle of the wing. While this half of the wing is in its flat position, add the 1/8 x 9/16" strips at the aileron cutout, then attach the upper trailing edge piece. Be sure to bevel this piece at the trailing edge joint. When the right half of the wing has dried, repeat the procedure for the left half.

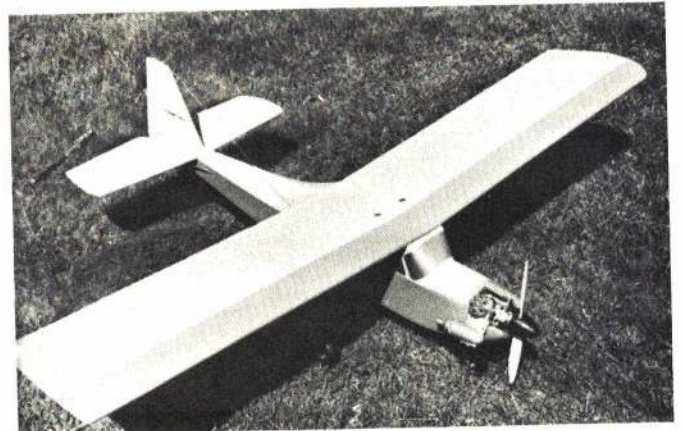
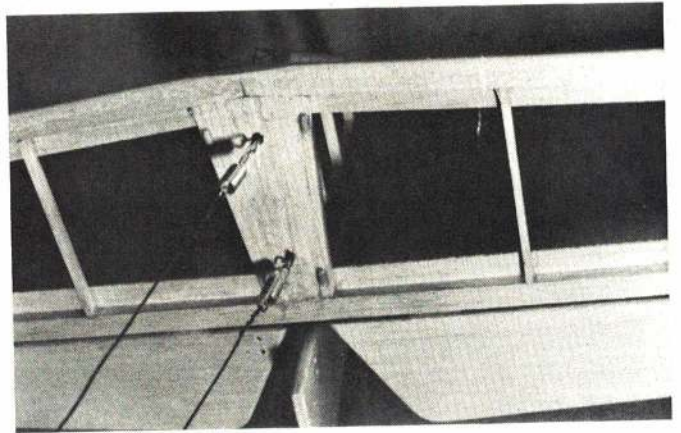
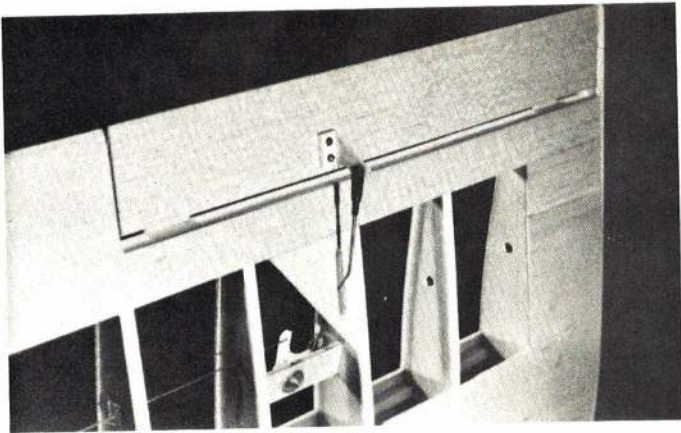
As with most plans, the left half of the wing must be made by retracing the essential lines on the reverse side of the plan, or by tracing the outline on a translucent paper and building from the reverse side. After both halves are completed to this point, the curved leading edge sheeting is added.

Lay the fuselage on its side, check it for squareness, then hold it in position on your building surface until dry. Following this, cement in the engine support F1 which must be completely drilled for the engine mounting, fuel line, throttle rod and nose gear bearings. Several heavy rubber bands are needed to pull in the fuselage sides for a tight joint.

The remaining 3/16" square cross-pieces are now added, bringing the rear section together and completing the most difficult portion of the fuselage.

To prepare the rear deck 1/8" and 3/16" square spruce stringers, soak them in water. Then, while holding them temporarily in place with rubber bands, allow them to dry. They will take a curved shape and can then be





**ABOVE LEFT:** When securing the ailerons, line the control horn up with the hinge line, and make sure that the linkage works easily and reliably before covering the wing.

**ABOVE RIGHT:** Detail view of the tension springs which retain the stabilizer.

**CENTER LEFT & RIGHT:** A simple-to-apply, yet visually contrasting paint scheme really helps the novice maintain reference with his craft. (See Bob Noll's "Paint for Performance" article in this issue of AAM).

**LEFT:** The rewards of learning to fly. The instructor stands close, while the student makes a controlled low pass. "Look at me, I'm flying!"

fitted and cemented into place.

The engine compartment is made to suit your engine and its selected mounting position. Although the engine may be mounted in any position, I chose a mounting 40° from horizontal, which places the muffler as low as possible outside the fuselage.

The curved 1/8" thick balsa over the front deck and the hatch was made by cementing several widths together, then soaking them in water. It was then wrapped around a 4" diameter tin can and allowed to dry, then fitted and cemented into place.

From here on, all remaining work on the fuselage may be taken from the plans.

To prevent building in any warps, again set and weight the trailing edge on your flat building surface, then attach the upper leading edge sheeting. When this is completed, remove the wing from the flat surface and cement on the lower

edge sheeting. I suggest using contact cement to attach all the leading edge sheets.

With the wing completed to this point, you can now say that the most difficult part of the job has been completed. The rest of the information can be obtained from the plan.

**Ailerons:** The construction of the ailerons should go smoothly. One item which must be kept in mind is that the control horns used for both the right and left ailerons are identical, but require a different mounting hole location on the underside of each aileron to obtain alignment with the bellcrank operating rods.

**Tail Section:** The rudder, fin and stabilizer are of open type construction and are built flat.

Should you want to use the spring hold-down idea, the stabilizer will re-

quire the 1/16" plywood reinforcement and two drilled holes, to accept the spring retainers.

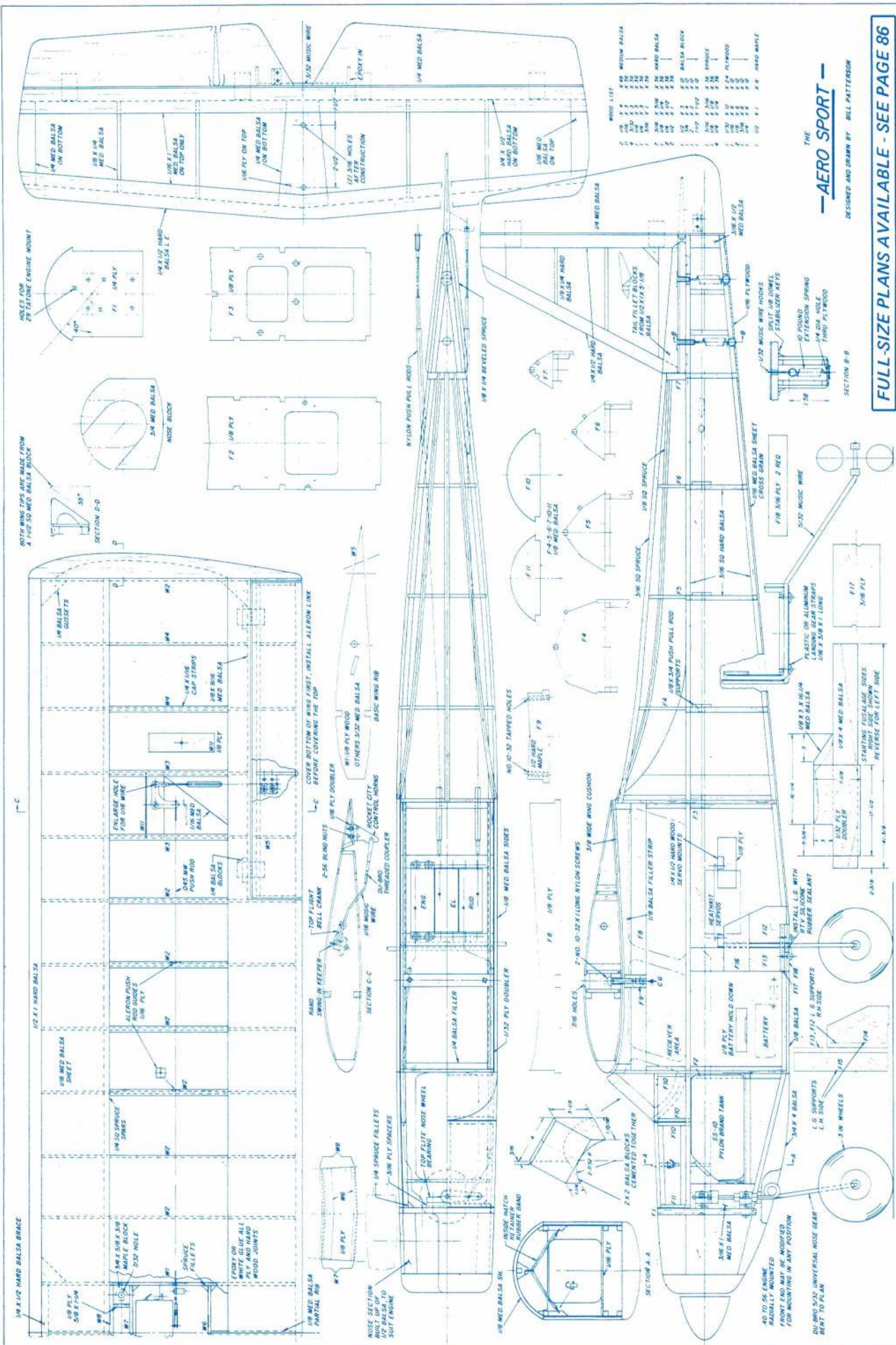
The tail assembly is cemented together prior to covering, using the fillet pieces shown on the plans. The locating keys on the underside of the stabilizer are also attached prior to covering.

**Finishing and Covering:** When all of your construction is completed, you're ready to smooth up the wood. If possible, do all this dusty work in one shot. Rough everything down with a small block plane, coarse sand, then fine sand. When this is completed, you can stand back and admire your work.

On my ship, the forward section, inside and out back to F2, was given a coat of Hobby Poxxy Formula II. It was then covered with red and white Super MonoKote, and the windows were made

(Continued on page 85)





THE **AERO SPORT** —  
 DESIGNED AND DRAWN BY BILL PATTERSON

**FULL-SIZE PLANS AVAILABLE - SEE PAGE 86**



# getting started in R/C

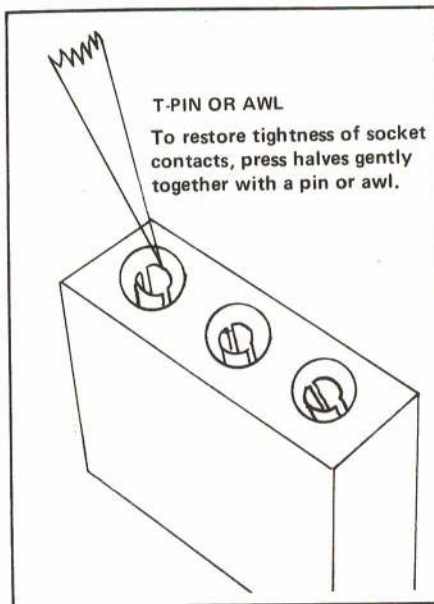
PLUGS / by Jim McNerney

SEVENTY-THIRD IN A SERIES

One of the major sources of problems in RC equipment is the plug or connector system. Plugs are used to connect servos and switch harnesses to the receiver, battery and switch harness, the charging system and, in some units, to join separate RF boards or crystals for easy frequency change. A radio system can have from two to 15 or more double connectors, each having two to five wires attached on each side. So, in a four-function, three-wire system, for example, there are about 40 potential trouble spots.

Connectors receive the most use and abuse in the average radio, except for servo gears. Each time a radio is installed or removed, each bench check-out, each crash, the connectors are subjected to some mechanical operation. We'll get into the effects of these operations shortly. First, let's talk about the connectors themselves, the types used, their good and bad features.

In the early days of RC, when tubes and B batteries were in vogue, connector size was relatively unimportant. Consequently, large plugs, such as tube and speaker sockets were used. These plugs, up to an inch in diameter, had heavy pins, up to 1/8" thick, with plenty of tension on the socket and plenty of contact surface on the pins. A nine-foot wingspan airplane could easily accommodate these connectors.



As equipment became more complicated and smaller, the need arose for smaller connectors, but with as many or more connector pins than earlier plugs. At this point, connectors branched into two basic types, flat or ribbon connectors, and round plugs. Ribbon connectors have the advantage of compactness. Many multi-pin connectors can be

placed side by side in a small space (plug block). They are lightweight and lend themselves to modern production techniques.

Round plugs, on the other hand, are relatively bulky and present difficulty in soldering to "inside" pins. But the round connectors have one big advantage. They can be provided with a plastic cover mechanically fastened to the plug. The wires can be knotted inside this cover before being attached to the plug. This provides strain relief so that the force of connecting and disconnecting the plug is not transmitted to the soldered joints of the wires and pins. Ribbon connectors don't provide strain relief. Some manufacturers put heat-shrink tubing over the entire connector. This helps, but is not a positive mechanical attachment.

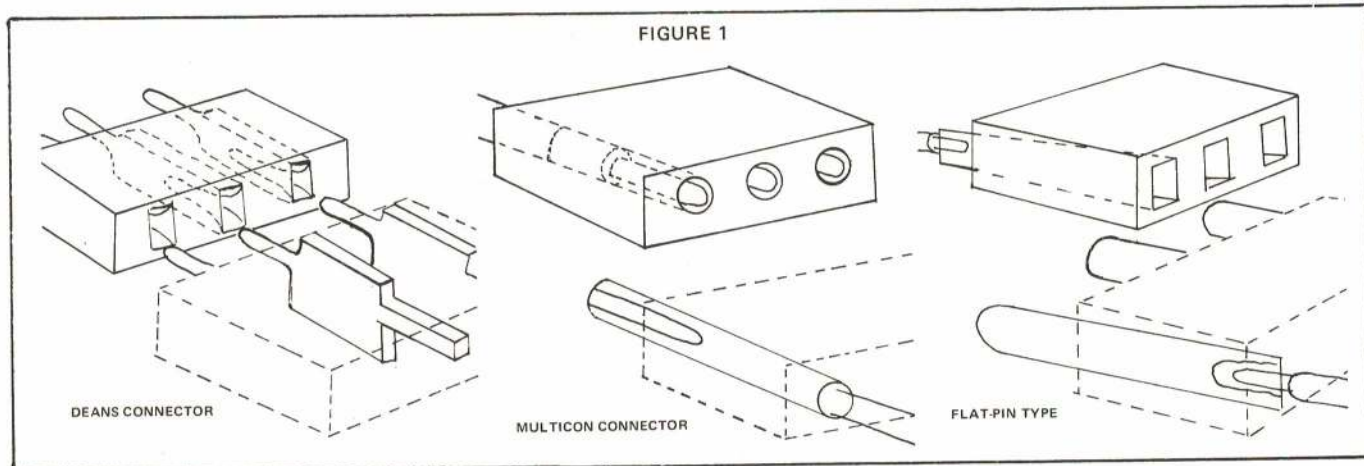
The pins and sockets have various configurations. Some pins are round and solid, some square, and some are flat strips of metal. Positive contact must be maintained between the pin and socket. For round pins, this is done by slotting and crimping the socket. Flat sockets are curved slightly to squeeze together on both sides of a flat pin. Three basic types of ribbon connectors are shown in Figure 1.

The first rule of maintenance for connectors is to keep them clean. Most of today's connectors are gold plated, so that tarnish and corrosion are not a severe problem. However, there are still many of the older sets around, and some new sets still use non-plated connectors. These must be inspected and cleaned periodically and burnished or replaced if corrosion is present. Keep plugs wrapped with tape or sealed in a plastic bag if you are flying hydro.

The next critical item in plug maintenance is contact tension. Some connectors, such as the old Brunner and Heathkit plugs, lose tension with repeated use—and abuse. The spring sockets must be periodically crimped back together with a pin or awl (see illustration). Check each time a plug is mated for good friction contact.

The next maintenance check is for integrity of the wire attachments to the plug. This is probably the single most frequent cause of radio failures. Each time you install and remove the radio or insert or remove a plug, inspect each

(Continued on page 90)





A minute and a half with  
a balsa wood glider? . . .  
Indoors? . . .Impossible!  
That seemingly impossible feat has been  
accomplished.



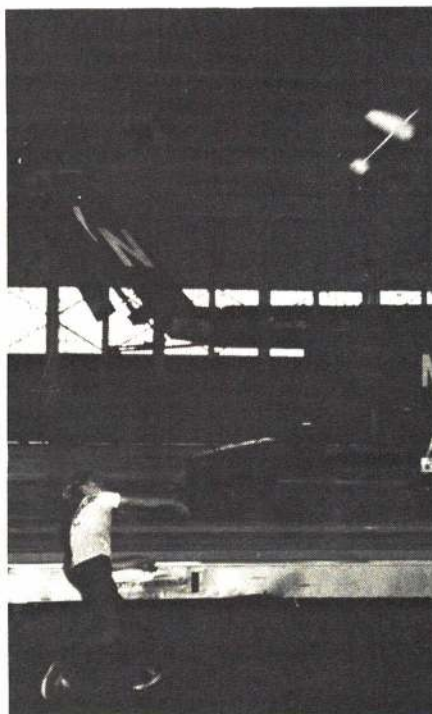
by Ron Wittman,  
as told to Bob Meuser

The Supersweep 22 has all the lines of a winner. The looks are deceptively simple, though, as a quick reading of the construction sequence reveals.

On February 18, 1973, flying in the old Marine dirigible hanger at Santa Ana, Ron Wittman made flights of 90.0 sec. and 88.7 sec.—the best two flights in the series of nine—to establish an official AMA National Record for Indoor Hand-Launched Gliders, Category III (unlimited ceiling height).

A couple of lucky flights perhaps, made under ideal conditions? Hardly! Rather, during a year of intensive effort (backed by nearly two decades of previous glider experience) Ron inched his way toward the record with a series of increasingly successful designs. Ron made 90 sec. twice, dozens of flights over 85 sec., and only rarely a flight under 80 sec. And the conditions? The worst imaginable! If the launching was the slightest bit off, a collision with a parked helicopter was inevitable.

At the 1973 NATS, flying a light straight-dihedral version of the SS22, Bucky Servaites won the IHLG event in Open Class. And while we were polishing up this story, Ron's 11-year-old son, Steve, who looks scarcely big enough to carry a 22" glider, let alone throw one, established a Junior National Record with a two-flight total of 127.2 sec. That should permanently lay to rest the myth that small people should fly small gliders.



Steve Wittman, the author's 11-year-old protege, set a Junior National IHLG Record with the Supersweep. He sure showed dad that record-setting can be a family affair.

Ron's record was set with the SS22. However, he has actually surpassed his record by a half second using a 24" span version. While the difference in flight times is not significant, Ron feels that the Supersweep 24 has more potential than the SS22, and is currently flying only the 24. The plans are basically those for the 22, but the minor modifications required to stretch it to the 24 are also indicated.

The Supersweep incorporates distinctive design features that might be applied to any design to advantage. The most noteworthy features of the design are the airfoil section, the high aspect ratio pointed-tip wing planform, the manner in which the thickness tapers toward the paper-thin tips, and the severe wash-out in the wingtips.

The design of the glider, however, is only one of many factors required for success in IHLG. Other important factors include: the construction and finish, proper trimming and adjustment, the athletic factors—strength, stamina, and control—that result in a powerful, consistent launch, and a long list of psychological factors including the will to improve, and the persistence to view failure as merely a temporary setback.



Although there are probably a number of modelers who can build as good a glider as Ron Wittman, I doubt if there are any who can build a better glider. Since we have not chosen to emphasize the importance of each step as we consider it in sequence, we do emphasize that *every* step in constructing and finishing an IHLG is important and must be done with care. We strongly urge you to follow these instructions to the letter. Then, if you think you have a better way of performing a particular operation, or if you wish to try a different method later, you will have a point of reference. The following description applies to a right-handed person. For lefties, of course, everything is reversed.

**Selecting The Wood:** The wing, being the heaviest part of the glider, must be made from light wood, or the glider will be overweight. A piece 1/4 x 3 x 36" should weigh no more than 30 grams; a piece 4" wide, 40 grams. If such light wood is not available, the wing will have to be made thinner and possibly slightly undercambered, the spruce leading edge might have to be omitted, and you will have to be extremely careful not to apply too heavy a finish. C-grain or quarter-sawed wood—the kind showing iridescent specks on the surface—is ideal. The wood should be flat, and the grain should be straight and parallel to the edges. The piece should balance very close to its center. If a piece of uniform density cannot be found, the heavy end should be toward

the left wing tip, and the hardest edge should become the leading edge. Usually, suitable 4" wide material is not available, so the wing blanks must be made by gluing two narrower strips together. Be certain that the edges to be joined are straight and square. Use a white glue—Franklin Titebond is an excellent one.

For the tail surfaces, perfectly flat C-grain wood is essential. The wood should be light, but not so light as to be flexible or mushy. Lack of flatness or stiffness will cause the tail surfaces to deflect or vibrate during the 80 mph launch, and that will decrease the launch altitude, or result in a smashed glider.

For the fuselage, select a piece of stiff, medium weight straight-grain 3/16" balsa sheet, preferably with some showing of C-grain. Compare the weight, stiffness, and straightness of several pieces, and select a piece that is as stiff as possible but not too heavy. It is difficult to set down hard and fast rules; selecting fuselage wood requires judgement that can be gained only by experience. The finger brace can be made from scraps of the same piece.

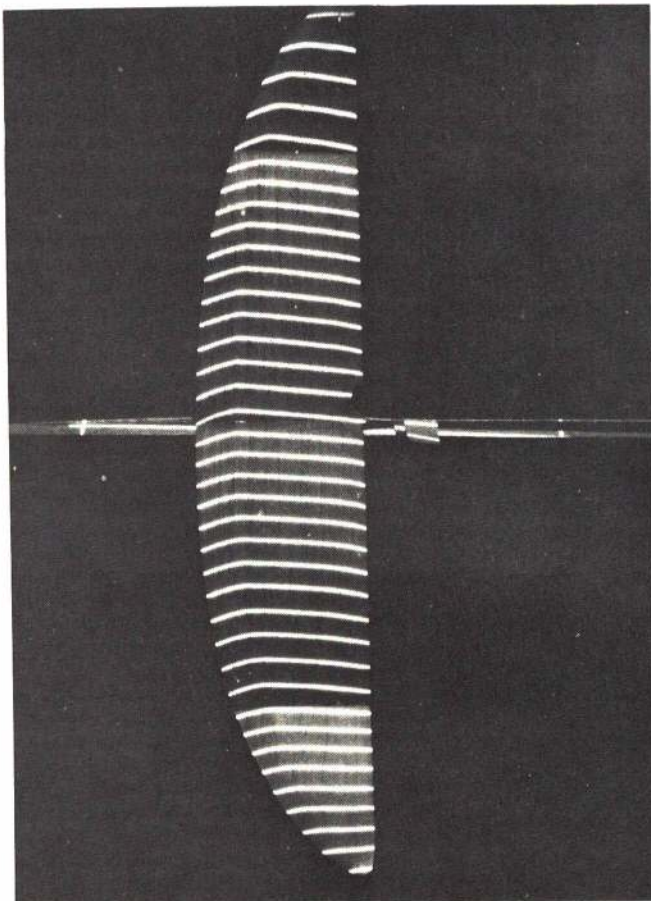
**Laying Out The Parts and Cutting To Outline:** Make cardboard templates for the wing and tail surfaces. Transfer the outlines to the balsa by tracing around the template with a ballpoint or sharp nylon-tip pen. For the wing and stabilizer, only a half-template is required (flip the template to get both

sides). Note that the wing is to be made in one piece, then cut into four sections and rejoined after the sanding has been completed.

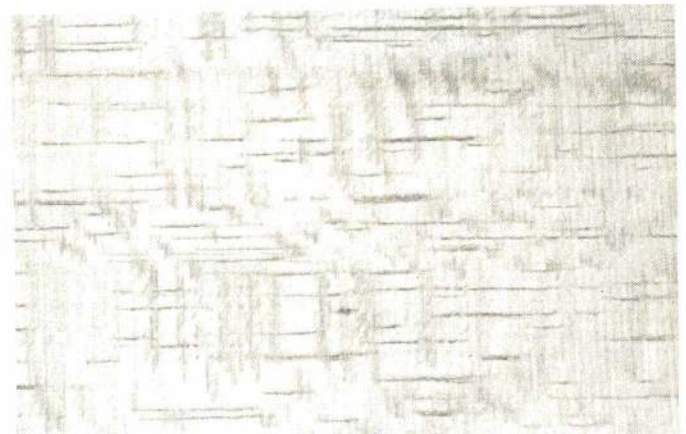
Cut all of the parts to shape, using a power jig saw or a new single-edged razor blade. The blade must be sharp, or it will tear or compress the soft wood. Cut no closer than 1/32" to the outline, then block-sand each part to its final outline using 320 garnet paper. Using the template, mark the centerline of the wing. Balance the wing blank along the centerline, and turn the blank so that the heavier side becomes the left wing.

The spruce-reinforced leading edge is well worth the effort it takes to apply, provided that the model is not in danger of being overweight. It minimizes damage, and makes it easier to accurately form the front portion of the airfoil. A piece of 1/16 x 1/8" spruce is glued to the leading edge, flush with the bottom surface. When the sanding of the wing is completed, only a hair over 1/16" of the original 1/8" depth remains. Soak the spruce in water first, or simply pre-curve the spruce by drawing it between the fingers. This will place smaller demands on the strength of the glue joint. However, as the curvature of the leading edge of the Supersweep is gentle, this process is not essential.

**Sanding:** Make two balsa sanding blocks, each 3/4 x 3 x 11". Round off the long edges slightly. Each side of the block is covered with paper of a different grit number. No. 180 and 280

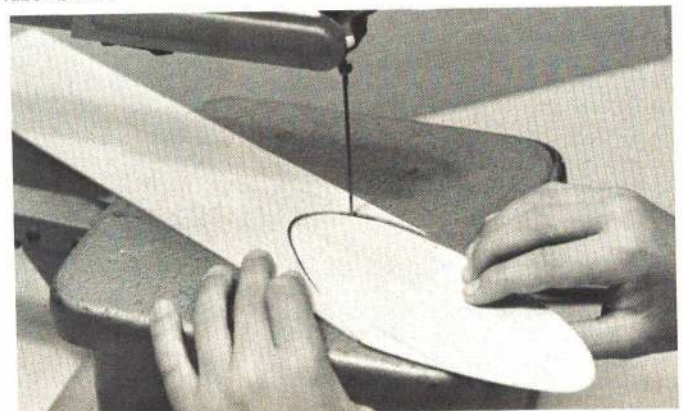


This eerie looking photo is an illumination of the wing with "sheets" of light to show the airfoil section. The depth is exaggerated, especially on the right wingtip. One can clearly see the tip wash-out, as well as the wash-in on the left panel.

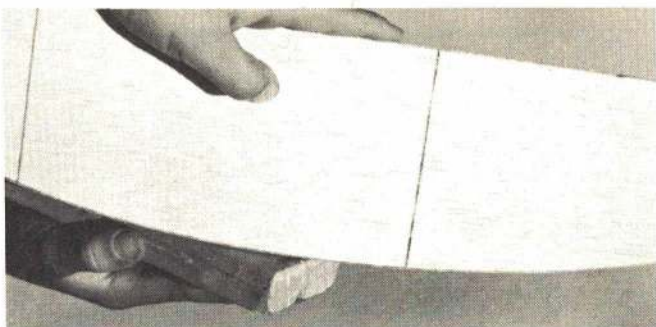


C-grain or quarter-sawed balsa, as shown here, is very resistant to bending across the width of the sheet. Since it resists warps, it is essential for true tail surfaces.

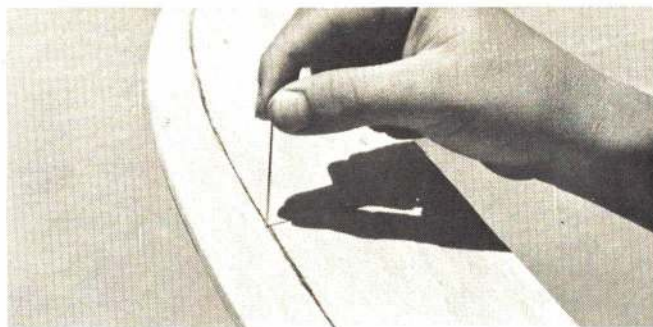
All parts should be jig-sawed to outline, or cut with a sharp single-edged razor blade.



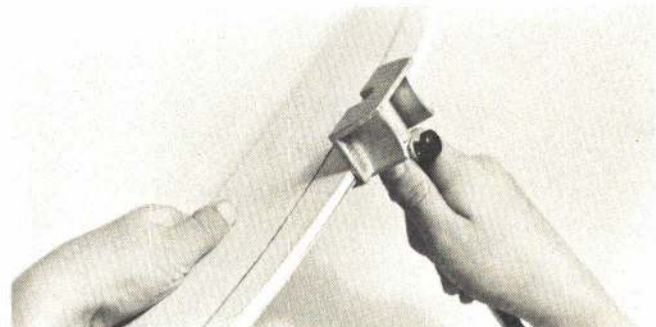




Final shaping to outline is done with coarse garnet paper.



The high point of the wing is marked with pin holes in the partially shaped wing. The holes remain visible as the sanding progresses.



A handy gadget for marking the leading edge is a cabinet maker's gauge. Accurate marking is essential.



A razor plane saves time, but can cause problems if not properly used. Note that the cutting edge is angled 45° to the direction of the stroke.

garnet paper are used for rough and final shaping, while 320 and 400 "wet or dry" silicon carbide paper are used for final thinning and smoothing. This stuff is expensive. Don't use a cheaper grade. Ordinary "flint" sandpaper is far less suitable.

Cut the paper into strips 1/2" wider than the sanding blocks. Stick it to the block with contact cement and wrap the edges up around the sides of the block. While balsa is about the softest material anyone would think of using sandpaper on, it dulls sandpaper rather quickly. Replace it as soon as it begins to lose its cutting ability or becomes clogged.

A modeler's razor plane can be used to rough-out the top of the wing and the fuselage, but it cuts too fast to use for shaping the tail surfaces. Use a new blade. Hold the plane at an angle to the direction of the cutting stroke. Soft balsa is difficult to plane. If it doesn't plane smoothly, or if it leaves streaks of uncut wood, forget the plane and use sandpaper for the whole job. Don't use a thin blade, a hollow-ground blade, or a stainless steel blade. Since Gillette made their Blue Blades "super," the best blades are industrial paint-scrapers blades.

Any good book on woodworking, some books about model planes, and your next-door neighbor, will tell you that the proper way to sand is parallel to the grain of the wood. Hogwash! Sand directly across the grain, at an angle to the grain, or with a circular motion. If you sand with the grain, the balsa comes off in long strings that simply clog the sandpaper and compress the wood.

Use as coarse a grit as you can get away with. Switch to a finer grit only when the coarser grit cuts too fast for good control. Beginners often switch to a finer grade too soon in an attempt to

get a smooth surface; then, finding progress is too slow, they bear down and crush the surface fibers of the wood. *Never* bear down! That will compress the wood. It will expand later and ruin the airfoil shape. If you feel you aren't making sufficient progress, go back to a coarser grit, replace the sandpaper with fresh stuff, or go watch TV until you get over the feeling, but *never* bear down!

All sanding should be done while the part is held against a hard, flat, clean surface. A piece of 1/4" plate glass with at least one edge ground straight and true is ideal, but it can be dangerous. A lamp placed under the glass will aid in judging the thickness as the sanding progresses. Alternatively, simply hold the piece up to the light to check the thickness, but do it often! A Formica-covered sink cut-out, sometimes available at cabinet shops or lumber yards, is good too.

**Wing and Tail Surfaces:** Sand the bottom surfaces of the wing and stabilizer blanks perfectly flat and smooth, first using 320 paper, and finally 400. Be especially careful not to round-over the edges or the tips. Mark a line along the leading edge of the wing exactly 1/16" above the bottom surface (a cabinet-maker's marking gage does the job nicely). Sand the upsweep of the bottom of the leading edge. The upsweep starts 3/8" back from the leading edge and curves up uniformly to the marked line. To avoid tearing off the spruce strip, it is best to sand toward the wing.

Before shaping the top of the airfoil, sand the wing to the proper thickness at each station, as shown on the plan. Note that the taper toward the tips is quite severe compared to other gliders, and that the tips are quite thin and fragile.

Using a cardboard template, draw a line on the top surface with a nylon-tipped pen to indicate the high point of the airfoil.

Next comes the most critical part: shaping the top of the airfoil, it is essential that the high point be kept sharp. I had difficulty doing that, until I started using the following method. (Ron sands the top surface freehand without recourse to such crutches as this, but I don't have his dexterity.)

Secure a strip of masking tape to the top of the wing, so that the rear of the tape is along the high-point line. Sand the rear portion of the wing to shape. The tape will not only serve as a guide, but since it does not sand as readily as balsa, it will prevent accidental cutting into the front part of the airfoil. Note that the top of the airfoil is a straight line from the high-point to the trailing edge. If you accidentally sand into the tape, replace it.

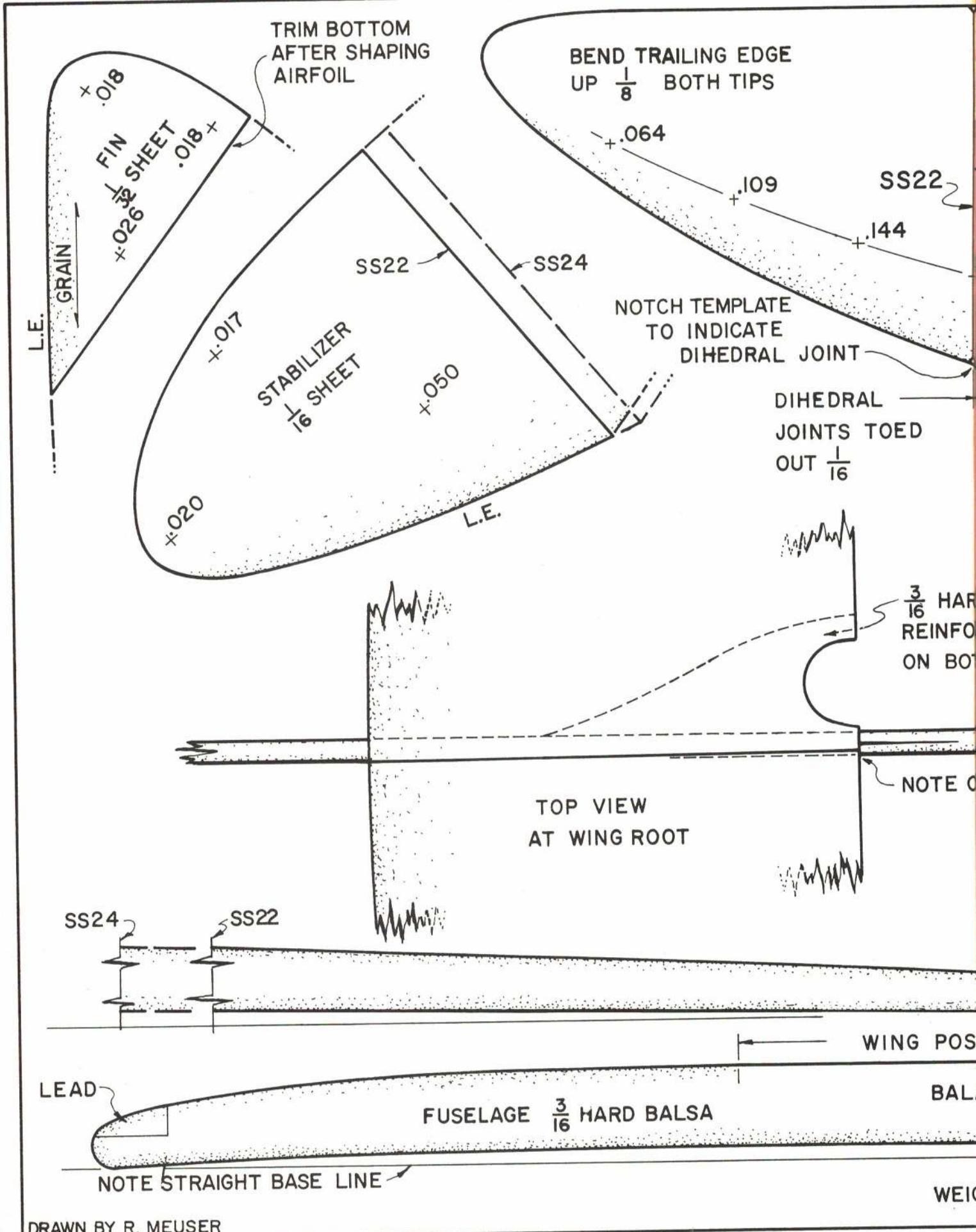
When the aft portion of the airfoil is completed, remove the tape—carefully, so as not to rip up shreds of balsa—and apply masking tape with its front edge aligned on the high-point line. Then sand the front part of the airfoil in a uniform flat curve down to the marked line on the leading edge. Note that the leading edge is *sharp*. The shape of the airfoil section is extremely critical, so refer to the plans.

Sand the top of the stabilizer to the prescribed thickness, then sand in the airfoil shape. Sand the rudder similarly, but work back and forth from one side to the other to ensure a symmetrical section.

Ron doesn't actually measure the thickness of the parts. He knows by the feel of the parts. He knows by the feel of the part, and by how the light shows

*(Continued on page 90)*





DRAWN BY R. MEUSER



BEND DOWN  $\frac{1}{32}$  ON  
LEFT WING ONLY

90°

WING  $\frac{1}{4}$  LIGHT C-GRAIN BALSA

SS24

SS22

SS24

+ .194

+ .209

+ .220

+ .226

+ .230

+ .235

THICKNESS

HIGH POINT

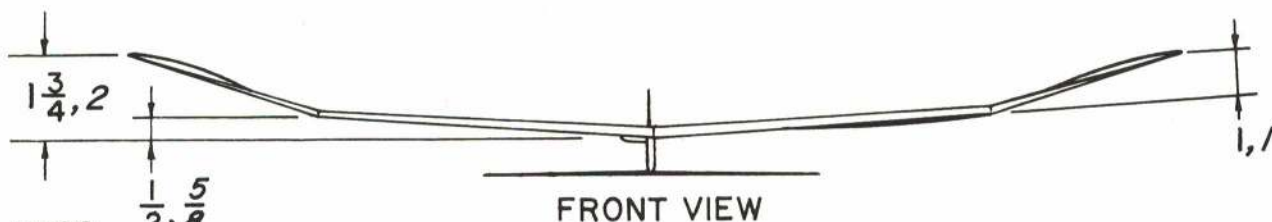
$\frac{1}{16}$  SPRUCE

LEADING EDGE REINFORCEMENT

BALSA  
REINFORCEMENT  
FROM



OFFSET



TAIL POSITION

SDN

LE POINT

WEIG SS24, 25 TO 28; SS22, 22 TO 25 GRAMS

**Ron Wittman's**  
CATEGORY 3 INDOOR  
HAND LAUNCHED GLIDERS  
**SUPERSWEEP**  
**22 and 24**

JR. AMA RECORD STEVE WITTMAN  
OPEN AMA RECORD RON WITTMAN  
BEST FLIGHT 1 MIN. 30.0 SEC.



# OUR Flite Pak Kit will work with YOUR transmitter!

## 1-8 flite pak



12G18-2	1-8 FLITE PAK w/2 BANTAM SERVOS	\$74.95
12G18-4	1-8 FLITE PAK w/4 BANTAM SERVOS	\$114.95
12G18-2L	1-8 FLITE PAK w/2 LINEAR SERVOS	\$76.95
12G18-4L	1-8 FLITE PAK w/4 LINEAR SERVOS	\$116.95

The Digital Commander series of kits are designed to be compatible with any modern existing system and offer expansion within the system without the need to buy a complete outfit.

The Flite Pak comes complete with One-Eight Receiver/Decoder, plastic case, number and style of servos specified, switch, and connectors. All you need for building except batteries.

Will operate with any modern digital transmitter on the same frequency.  
Frequencies available are: 26.995, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5.

CANNON

EK

HEATH

KRAFT

MRC

ORBIT

RCM

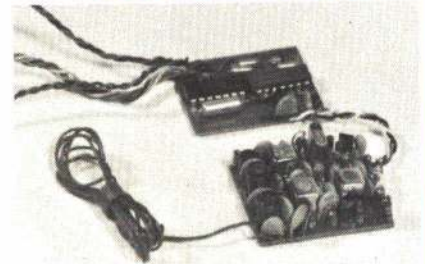
ROYAL

PROLINE

WORLD

OR ANY OTHER  
MODERN DIGITAL  
TRANSMITTER

## 1-8 RECEIVER



12G18 1-8 RECEIVER/DECODER KIT \$34.95

This receiver features voltage regulated circuitry with AGC and a double tuned front end. An 8 bit shift register in the IC decoder offers up to eight channel operation of positive or negative pulse servos with three or four wires.  
Plastic case measures 1.45 x 1.72 in. Weight is 1.4 oz. Connectors are not furnished. Available on 27 and 50 mHz. Please specify frequency.

## SERVO

An IC servo amplifier and the popular D & R servo mechanics combine to make a servo that gives superior resolution and rapid transit time. Will operate with 3 or 4 wire IC decoders with positive pulse output. Available in Bantam (rotary output) which measures 1 1/2 x 1 7/16 x 3/4 in or Linear (linear or rotary output) measuring 1 13/16 x 1 7/16 x 7/8 in.



14G20 BANTAM SERVO KIT \$21.95  
14G20L LINEAR SERVO KIT \$22.95

# DIGITAL COMMANDER

## THE SENSIBLE APPROACH

Technical literature available upon request.

Complete catalog-- \$1.00

ADD \$5.00 FOR RECEIVER/DECODERS AND FLITE PAKS ON 72 MHZ.  
AVAILABLE ON: 72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.64.

# ACE R/C INC.



# PACER

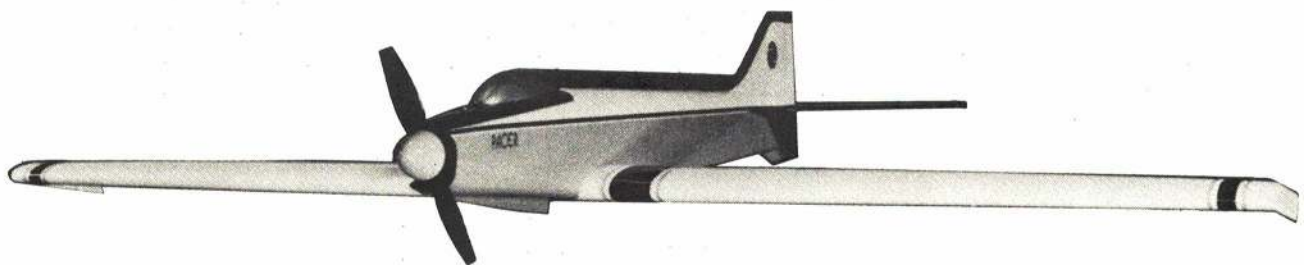
DESIGNED BY OWEN KAMPEN



Ace R/C proudly announces the PACER, a totally new concept in R/C model aircraft. It is a high performance 1/2A powered plane designed to have the fast speed, solid tracking, smooth maneuvering, and axial roll characteristics of modern pattern ships in a small, compact, economical package based on a Cox Tee Dee .049 or .051 and a two-channel radio with miniature servos and a small battery pack.

This airplane offers more excitement and ability-to-perform than ever seen before in its size class. All of the advantages of small airplanes are maintained: it builds fast, it is economical on fuel, it transports easily, it can be flown in the smallest of fields with no need for a runway. With all of these advantages, it still has the outstanding performance to challenge the best of fliers.

All parts are band sawed and precision sanded with foam wing.  
(Ace has a 1 3/8" spinner available for this plane: 37L78-\$1.25.)



13L107--Pacer Kit \$19.95

#### SPECIFICATIONS

Span--40"

Length--30"

Weight--Approx. 22 oz. all up

Engine--Cox Tee Dee .049 or .051

Functions--Ailerons/elevator or  
coupled ailerons-rudder/elevator

ACE R/C, INC. HIGGINSVILLE, MO. 64037

Dear Paul,

I would like to order the PACER kit from you direct. Enclosed is my check for \$19.95.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

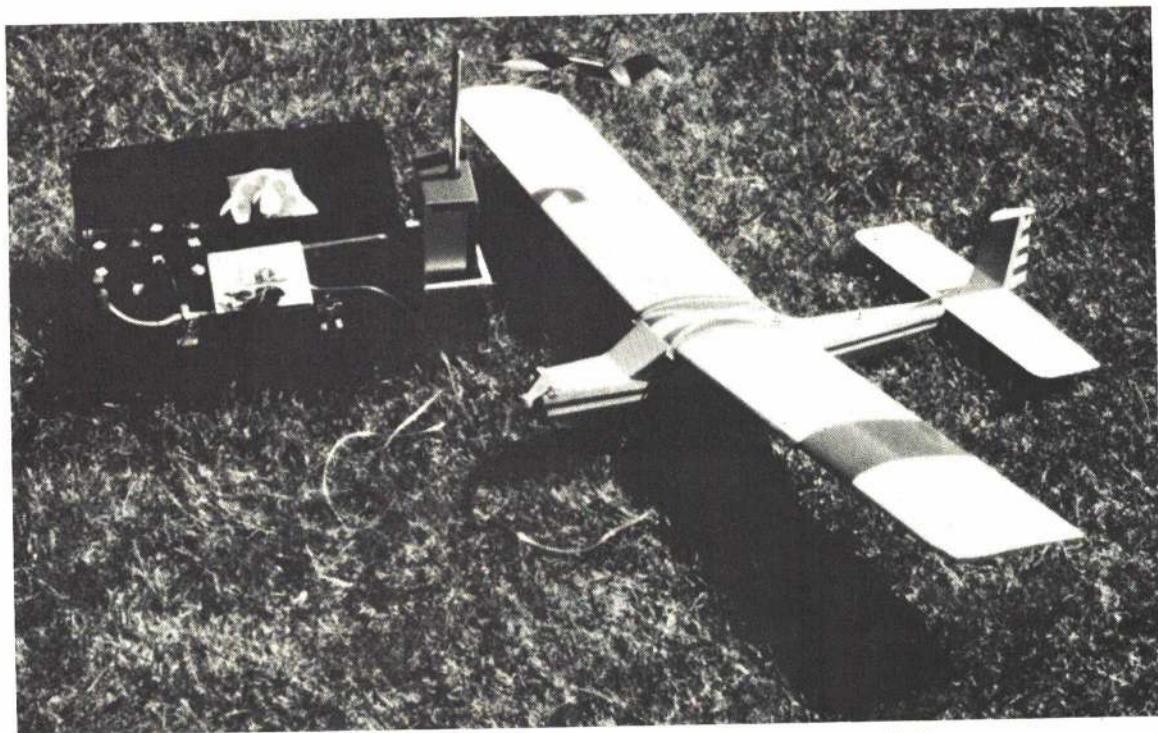
CITY \_\_\_\_\_ STATE \_\_\_\_\_

ZIP \_\_\_\_\_

# ACE R/C INC.



# The 'electri-flying' Dream



The "electri-flying" Dream and the launch box make an entire package for enjoyable electric flight.

This month, build a kit model for electric power. There's also a good ground support system for your flying pleasure. / by Mitch Poling & George Beaver

The electric Dick's Dream\* is a fun plane to fly. It is quick in the air, but gentle for the beginner. It is also a tough airplane; it can take a lot of punishment and will come back for more. If you have seen a glow-engined Dick's Dream fly, you already know its virtues. The electric version flies as well, plus there is no fuss or muss, no clean ups, and no engine starting problems.

One of the authors learned to fly RC with his electric Dick's Dream, in a local schoolyard; the other author has spun his in from two hundred feet, and has thirty flights on it since then (it did get a new nose job!). If you think electric power could be your thing, and you want to do it on a budget, read on!

## CONSTRUCTION

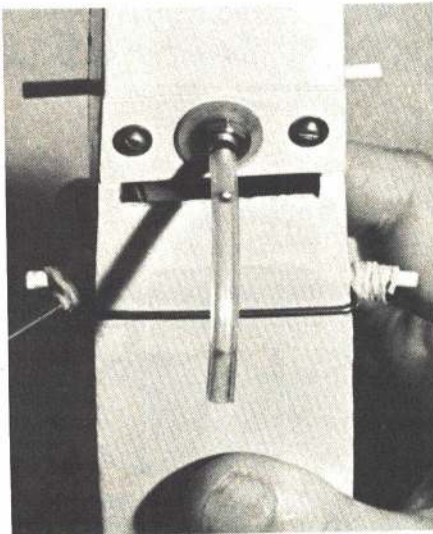
Follow the instructions in the Dick's Dream kit, with these exceptions: (1) Do not shorten the foam wing panels, leave them full length. Do angle the wingtips as shown in the plans. (2) Do not glue in the plywood firewall (it can be taped in to help in the nose assembly). (3) Glue the plywood base for the landing gear under former F2, not to the rear as shown in the plans. (4) Omit the rail and plate actuator mounting. All

\* Last month's AAM featured the authors' rework of a Plymouth motor for use in the Dick's Dream. Since that article, a better version of the motor has evolved. It is recommended that an armature with 25 turns of 26-gauge wire be used for peppier performance. Use silver solder when securing these windings.

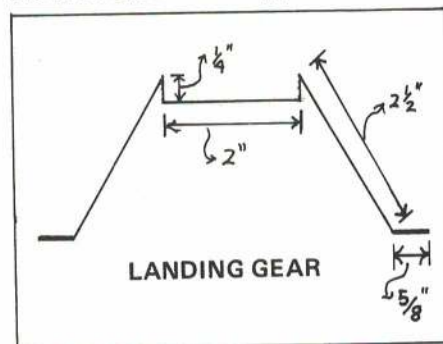
other changes are made after completion of the stock kit.

Complete the fuselage, then trim back 1/8" off the leading edge of the top and bottom nose planking. Replace the firewall with two 1/8 x 3/16 x 1 1/2" spruce or plywood strips at the top and bottom of the nose in the normal firewall position. Trim back the nose cheeks 3/4" to 1" for prop clearance. The photos show the motor mount detail.

The trip switch turns the motor off on landing. Note the cooling air duct and the landing gear placement.



The landing gear is the tail dragger type, to allow the use of a cut-off (trip) switch. It is rubber banded on; use the measurements in the sketch for bending the landing gear wire supplied in the kit.



Light sponge rubber, wood, or plastic wheels are used. Place a 1/8 x 3" dowel through the fuselage at a point 1/2" above the floor and against the leading face of former F2.

The cut-off switch, as described by Mitch Poling in "Fly With Plymouth" (AAM, June 1974) is installed 1" in front of former F2 on a plywood hatch held down with small wood screws. The air vent for the motor is cut out just behind the hatch, about 1/4 x 5/8" in size (see photo). The mini toggle switch is Radio Shack 275-324, 325, or 326, 10A, 125 volt.

Mount the actuator on a bench mount approximately 1" from F3 (rear of the cabin). The bench is made from



two 5/8" foam blocks and a plywood plate (see photo). The actuator is bolted to the plate with a 4-40 x 1" machine screw and blind nut. This method provides easy access to and removal of the actuator. It also provides the needed room for the radio equipment and battery pack.

Install the motor, battery pack, charging jack, and cut-off switch. Hold the batteries in place with a removable 1/8" bulkhead that slides out for access to the batteries (see photo). The receiver and receiver batteries are held in place by foam blocks (see photo).

Several hints for a really great electric Dream Machine: Watch the weight—ready-to-fly weight should be about 16 oz. Spread the glue on thin to win. There's no need for fuelproof finishes; I used wet-look contact paper and household spray paint.

### FLYING

Follow the instructions in the Ace handbooks. The motor has about 1° downthrust and 2° sidethrust. The wing shim varies according to wind conditions. In calm weather, 1/16" to 1/8" shim does fine; in winds ten mph or more, no shim is required. Flip the switch, and good flying!

### LAUNCH BOX

The launch box is a neat and compact means of toting all the necessary equipment for the electric flight enthusiast. It includes the charging batteries for the flight power pack, a metering system with a variable charge rate control, a storage compartment for tools and extra parts, a transmitter caddy and a timing device to tell you when the power pack is charged. All of this is packed in a plastic lunch box; thus the name Launch Box.

Constructing the launch box is quite simple. In fact, the most difficult step is building the meter/storage box and transmitter caddy. The batteries are connected in series with 18 gauge household wire and placed in one end of the lunch box. Color code the positive (red) and negative (black) battery terminals with contact paper to prevent pilot error, i.e., reverse charging. A simple alligator clip system is connected from the meter and terminals to the batteries. This will prevent the inadvertent shorting out of the charging system during transportation or storage.

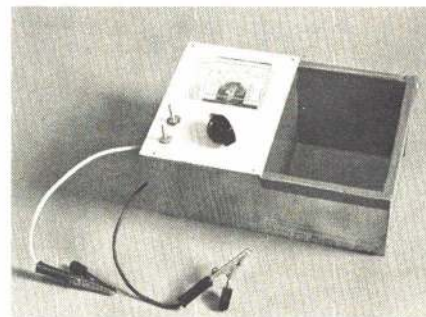
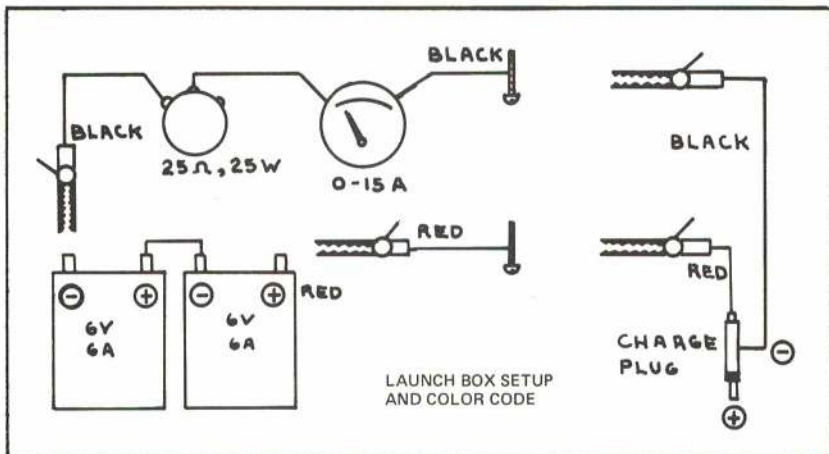
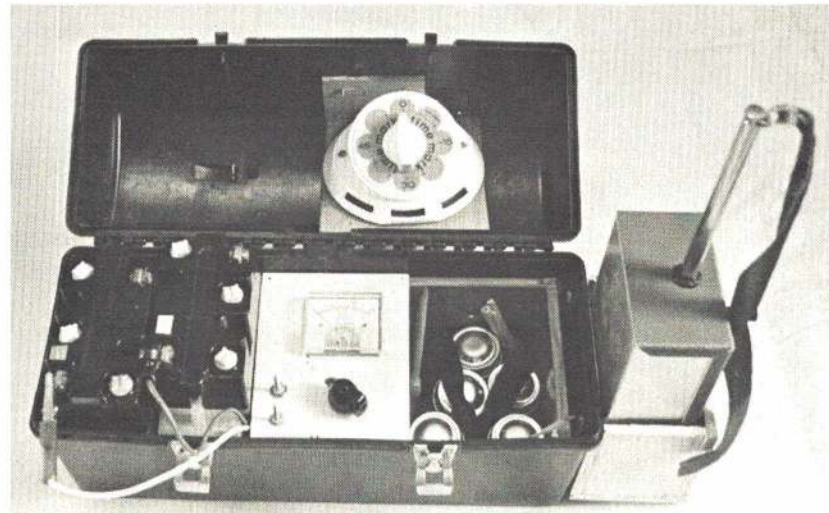
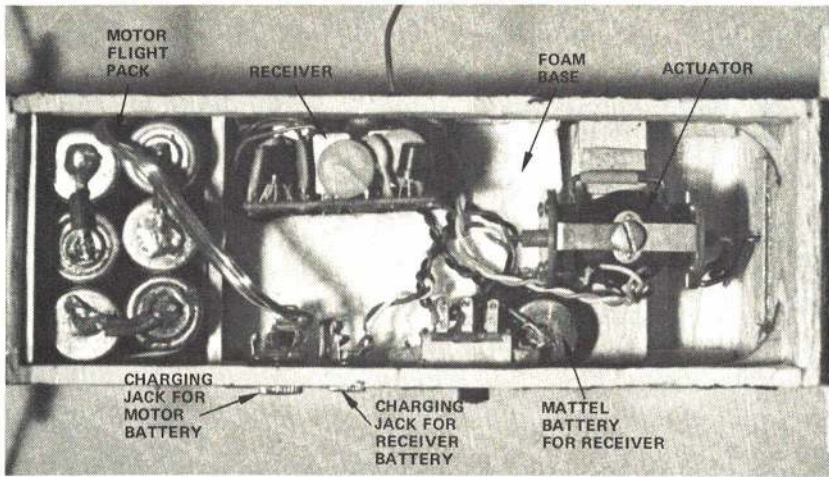
*(Continued on page 91)*

### MATERIALS

- 1 Plastic jumbo size lunch box (thermos)
- 1 0-15 DC ammeter (or 0-10 amp)
- 1 0-25 ohm 25 watt variable resistor
- 1 Kitchen timer with bell
- 1 small phone plug (to fit charge jack on airplane)
- 1 1/4 x 12 x 12" piece plywood
- 1 3' length 2-wire speaker wire
- 2 16" length of 18 gauge insulated wire (2 colors)
- 2 6 volt 6 amp/hr. motorcycle batteries\*
- 2 4-40 x 1" machine screws, washers and nuts
- 4 Alligator clips

\* Batteries can be used if your electric fleet includes a ship powered by the Astro-10; however, you will lose a portion of the storage area.

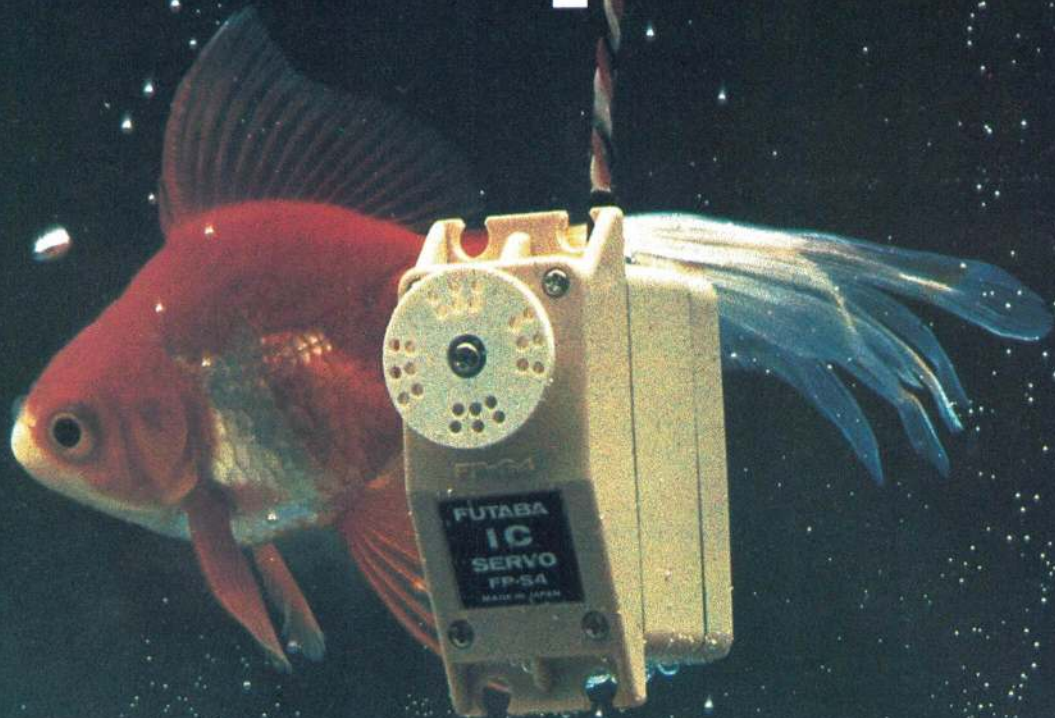
### LAUNCH BOX



TOP: Typical equipment installation. CENTER: The Launch Box is a complete ground equipment center, with timer, charge system, storage areas and transmitter caddy. ABOVE: The Launch Box wiring looks complicated; but check out the drawing and you'll see it is really quite simple. LEFT: The charging system for the Launch Box is simple to build. It charges not only the motor batteries, but also the receiver batteries.



# The Super Servo.



The FP-S4 is Futaba's Super Servo.

It's super inside, because we've installed our exclusive logic and power section IC's, capable of detecting the most minute voltage fluctuation. And because of Tantalum capacitors—costly, but the best available.

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Compton/California/90220



# max-fly

by Gil Rifkin



To call the Max-Fly a machine is to do it an injustice. . .it is an instrument.

Every so often, an idea reaches out and seizes its victim. This is exactly how Max-fly came about.

For years, I subscribed to the concept that a glider is necessarily a machine heavier than air. . .but only slightly. A feather that could carry radio, be controllable as to landing location, and stay aloft on the stillest of air was the epitome—to my way of thinking. Of course, I was constantly frustrated.

In 1970, a very wise man named George Meszterler started me thinking about the differences between the undercambered wing sections that I had been using and the faster laminar airfoils. All of my thinking underwent an abrupt shift. (It would serve no purpose here to discuss the differences between the laminar and turbulator concepts. Any reader who is curious enough can research these differences easily, or call on my teacher George Meszterler.)

Then came some glider rule shifts, and some new tasks started appearing at contests. The glider that can fly thermal duration, step out and move around pylons, and fly goal and return events on the same day (with the same wings) wasn't my old feather.

The winter of 1970-71 was when that new idea seized me. Suddenly, I was hard at work, putting together this fresh idea and checking it out with George. The result flew well, but was not quite good enough for the thermal events. Back to the board, and this time George suggested the Eppler 387 airfoil, for the wing, with a symmetrical stabilizer and rudder configuration. This setup worked well, with one exception—the plane landed at 20 mph or better.

To my consternation, I spent the summer of 1973 landing outside the spot after max flights.

To counterbalance my own weaknesses, I decided on flaps and spoilers. The result was mixed, so spoilers alone were tried and found to be the best way. As was readily apparent on this bird, the use of oversized spoilers (which act partially as brakes) seemed to make the most sense—they were the most effective configuration for me. After some practice, landing on target wasn't too much of a problem.



The Max-fly is not a small airplane. Fourteen feet of span certainly are an asset in performance.

For you technical buffs, the configuration shown in the plans will fly at a median speed of approximately 20 mph, with a Reynolds Number of about 157,886.4 for the center section of the wing. At the tip, the Reynolds Number will be 94,731.8, which is well above the magic danger number of 60,000. Additionally, it should be mentioned that, at 15 mph tip speed, the Reynolds Number would be 71,048.85, still well above that old 60,000 number where the lift-to-drag ratio frightens eagles.

Perhaps it should also be mentioned that the swept-back tips tighten turns almost to the point of winding in. You must start to correct the turn almost as soon as you go into it. The reward, however, is a tight flat turn, ideal for thermaling.

Please bear in mind that this is not a forgiving, slow-moving, easy-to-fly bird. It's a demanding, extremely efficient competition machine. Like a high-powered sports car, it requires time and effort to master, but will reward with tremendous excitement, superlative performance, and loads of fun.

## CONSTRUCTION

**Wings:** (These must be built first to line up wing rod tubes in fuselage.)

1. Cut out center section ribs. You will need six of 1/16" ply, the rest of 1/16" balsa. Cut a root and tip rib of 1/4" ply, sandwich 12 pieces of 1/16" balsa between the ply guides and sand to shape. Cut the torque rod holes.

2. Lay the plans on a flat board and cover with Saran Warp. Place the 1/8 x 1/2" spruce rib header into position against a straight edge at its front to en-



sure alignment, and glue all the balsa center section ribs into the header.

3. Ribs 1, 2 and 3 are ply, since they will carry the wing rod tubes. Carefully measure and drill holes to carry these tubes, as per the plans. Make two of rib 1, two of rib 2 and two of rib 3 at the same time for alignment accuracy.

4. In step No. 2 you glued the balsa ribs to the header. Now glue the ply ribs 1, 2 and 3 to the header. Glue on the top front spar (skip the rear spar) and glue on the 2 x 1/16" sheet top trailing edge. After the white glue is dry, glue in the rear upright spar.

5. Do not glue on the front top sheeting until webbing is added.

6. Turn over the wing panel and glue on the bottom spar, bottom 1/16" sheet trailing edge and bottom front sheeting. Please note that the rib header has to be shaved so that the front sheeting rides on top of it, rather than butting against it. Now glue on the 1/2 x 1/2" balsa leading edge. The bottom sheeting and top sheeting for the trailing edge have to be bevel-sanded, in order to meet at the trailing edge at a thickness of 1/16".

7. Build the other three wing panels in the same fashion.

8. Using 1/64" plywood, cut and glue (with white glue) all the required webbing from top spar to bottom spar.

9. Glue on the top front sheeting, after carefully measuring the required polyhedral angle and epoxying the sections together and adding bracing, as per plans.

10. Note that the front sheeting starts at rib 4. Ribs 1, 2, 3 and 4 are still open and uncovered top and bottom. After fitting wings to fuselage, so that the tubing is inserted accurately, and after epoxying the tubing to ribs 1-3, cover ribs 1-4 (from spruce rib header to front edge of 2" trailing edge) with 1/16" ply. Cover the bottom section first, and load plenty of epoxy around the wing rod tubes and the spars against which they ride. It would be best to use a long curing epoxy, such as Hobby-poxy Formula 2, for maximum penetration and strength.

11. Build in spoiler assembly. Plans show full details; follow them explicitly.

12. Glue on capstripping, 1/8" ply root ribs and wing tips. Sand carefully, being sure to maintain the integrity of the airfoil throughout.

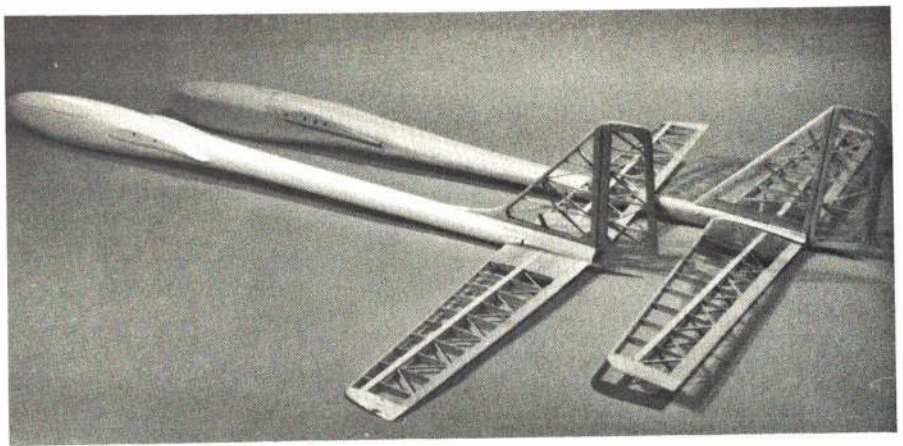
13. Carefully weigh each complete wing section and adjust equally.

**Fuselage:** Some time was spent in making a fiberglass fuselage which will be available at moderate cost to anyone who doesn't want to build the wooden fuse described in this article. Contact me (18 Carmen Drive, Nanuet, N.Y. 10954) and your request will be sent on to the glass fabricator, who will bill you directly.

1. Cut out sides and doublers. Splice with white glue where necessary. Cut out the 1/8" section ply bottom and the 1/16" ply top doubler. Cut out the balsa fuse top (from section D to tail).

2. Glue on the corner bracing (triangular stock as on plans) to balsa sides.

3. Glue on 1/8 x 3/8 x 10" spruce side wall supports for the hatch seat.



The Max-fly can be built with either a fiberglass or balsa fuselage. The soaring scene seems a toss-up on this subject, with an equal amount of each type to be found at most contests.

4. Epoxy (use Hobbypoxy Formula 1) the 1/16" ply doublers to the 1/4" balsa sides between the triangular stock.

5. Cut out the front balsa block side and bottom pieces.

6. Trim the top part of the 3/8" triangular balsa at the top of the fuse (from D to H) as a seat for the 1/16" ply top doubler. (Trim the inside 3/16" wide by 1/16" deep.)

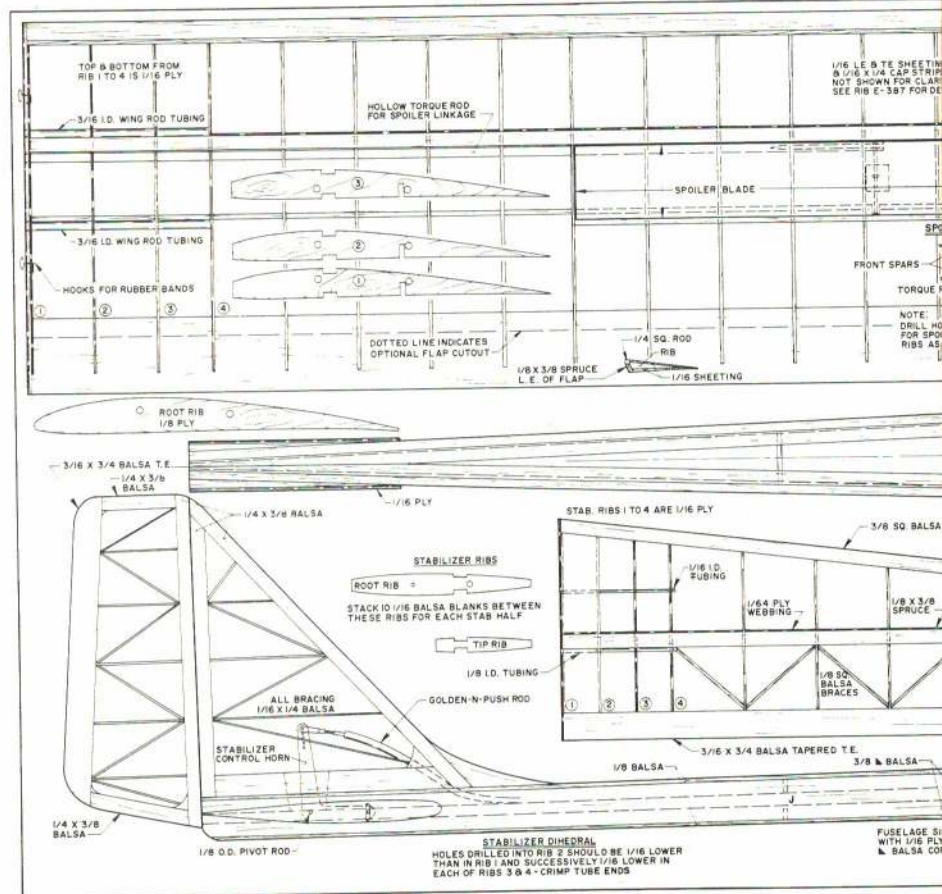
7. Trim the tail end of the sides so as to facilitate their joining.

8. Glue in formers C, D, E, F and G. When dry, glue in H, I, J and pull the tail together.

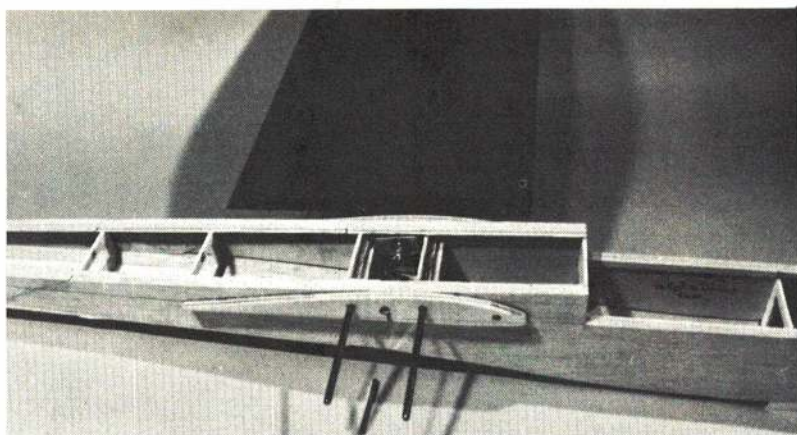
9. Glue on the root ribs and epoxy (Hobbypoxy Formula 2 here) the wing wire tubing, using wings and wing wires as an assembly jig to ensure perfect alignment of both tubing in fuselage and tubing in wings.

10. Make up the spoiler linkage. Study the plans. Epoxy the square tubing into wing torque rods only after all else is assembled and working, so that the blade opening angle can be set equally in each wing panel. Loosely mount linkage into fuselage and put in 1/8" OD square tubing (2 3/4" long) for test fit. Now epoxy 1/8" ID square tubing into wing torque rod. Make sure no looseness exists and no binding. When satisfied, epoxy the linkage mounts (plywood bearers) to fuselage. Note that there is an angle necessary, due to the 3° dihedral. Leave the wings attached when epoxying this piece in (with the 1/8" OD square tubing inserted so as to align correctly).

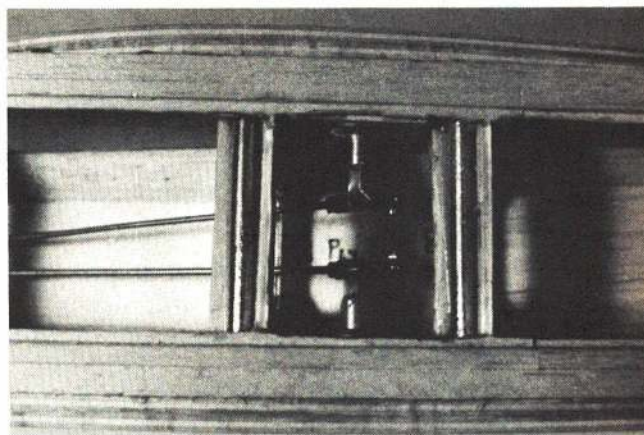
11. Glue in former B, drawing the fuselage together. Use masking tape to keep secure while drying.







The torque tube spoiler mechanism is installed relatively early in the fuselage building stages.



The actuating arms are made from brass tubes and missing links.

12. Glue the balsa block front sides to the 1/16" doublers. Also secure the bottom and top front blocks between B and C.

13. Fit and glue the 1/16" ply top (from D to H) and glue on the 3/16" top sheet from D to tail.

14. Fit, insert and epoxy in the Sup-R-Rod. Do it now, before fuselage is closed up.

15. Glue on the 1/8" ply flooring and sheet the entire bottom of the fuselage.

16. Fit, cut and shape the balsa hatch cover.

17. Glue on the front hardwood nose piece.

18. Glue a 1/16" ply stab root rib to each side of fuse. Make sure the mean line is at 0° incidence to the wing. Since the fuselage is tapering at this point, and

you want the stab fillet to be square to the fuselage center line when viewed from the top, it will be necessary to fill with scrap balsa. See the top view of the rear of the fuselage.

19. Sand the entire assembly well and coat with Hobbypoxy Clear, and then two coats of Hobbypoxy filler. Sand wet with 400 sandpaper after each filler coat. Spray with Hobbypoxy color.

#### Stabilizer:

1. Cut out all ribs.
2. Drill holes for tubing in ribs 1, 2 and 3, drilling both ribs No. 1 together, etc. Proper holes will ensure same dihedral as wing.
3. Mark the spars and trailing edge for the rib locations.
4. Glue the ribs to the bottom spars.

5. Glue the leading edge to all ribs.

6. Glue on the top spar. Make sure that the spars fit flush with the tops of all ribs, so that covering will have less drag points.

7. Glue on the trailing edge and sheeting on one side.

8. Epoxy tubing into holes in ribs. (Use one piece of tubing and then cut to

separate stab halves. This will ensure alignment.)

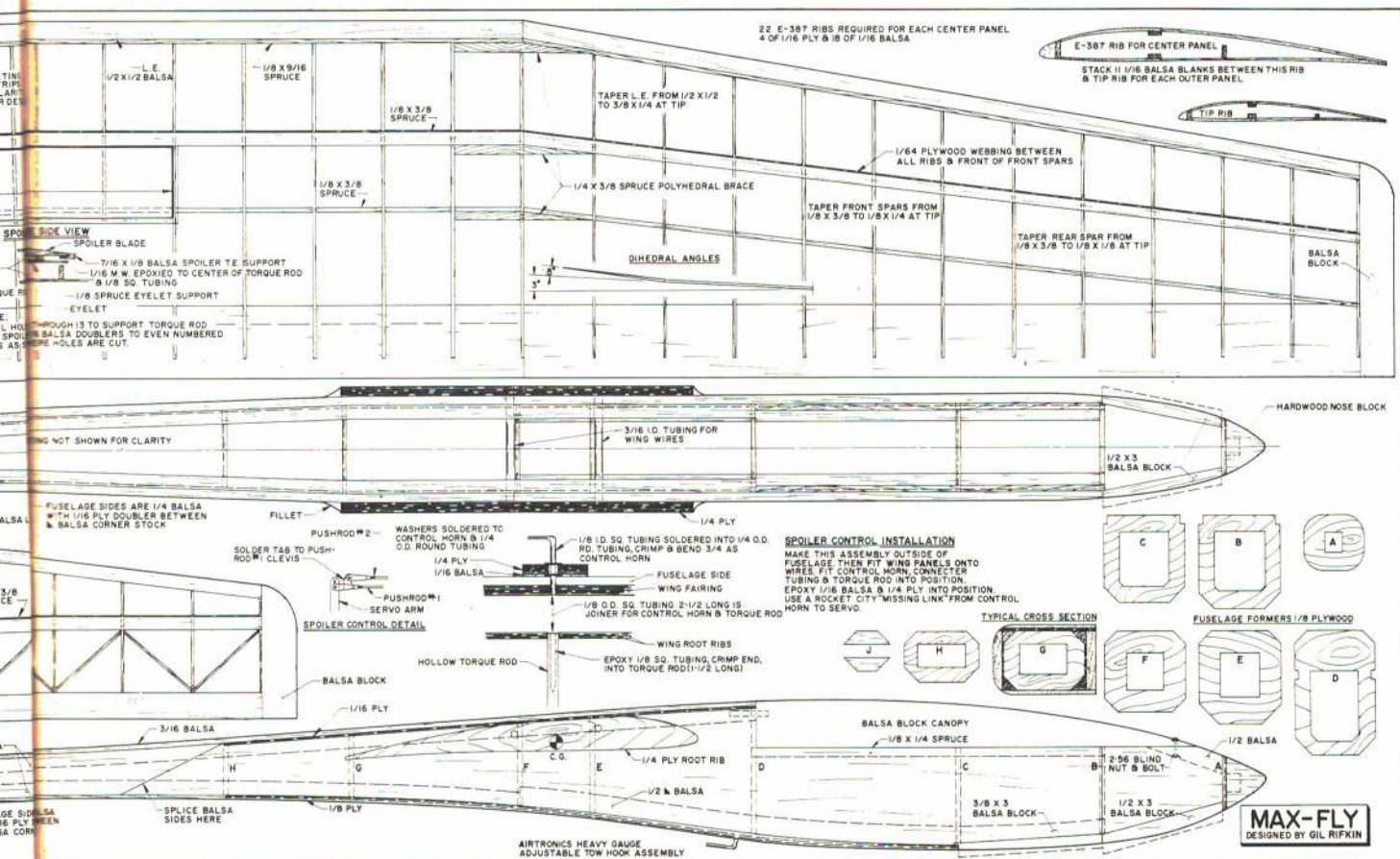
9. Glue on remainder of sheeting.

10. Glue in the 1/8" square balsa bracing.

11. Sand and glue the tips.

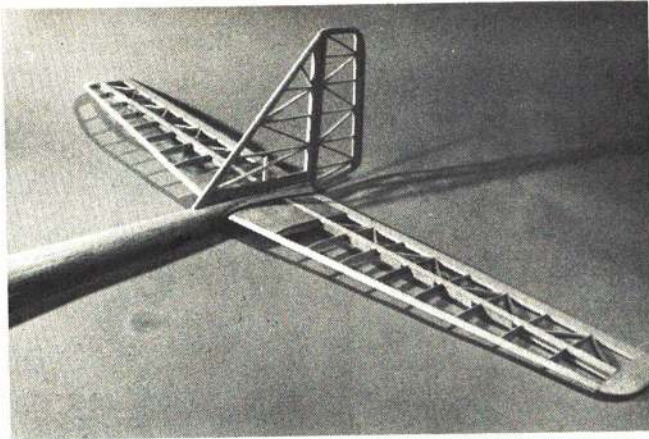
#### Rudder and Fin:

1. Trim the leading edge of 3/16 x 3/4 x 8", and the 1/2" balsa tapered trailing edge stock so that it is square to

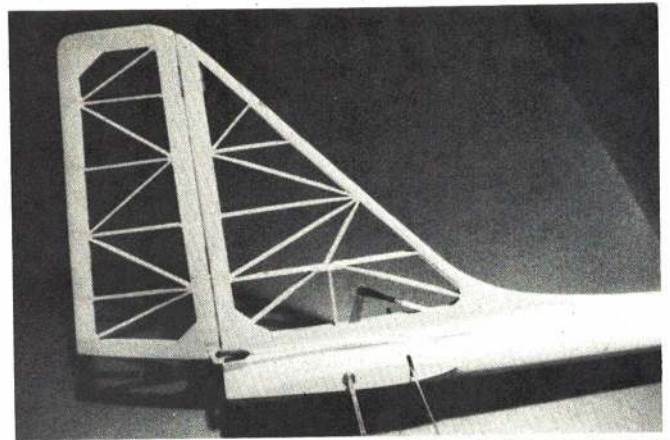


FULL-SIZE PLANS AVAILABLE - SEE PAGE 86

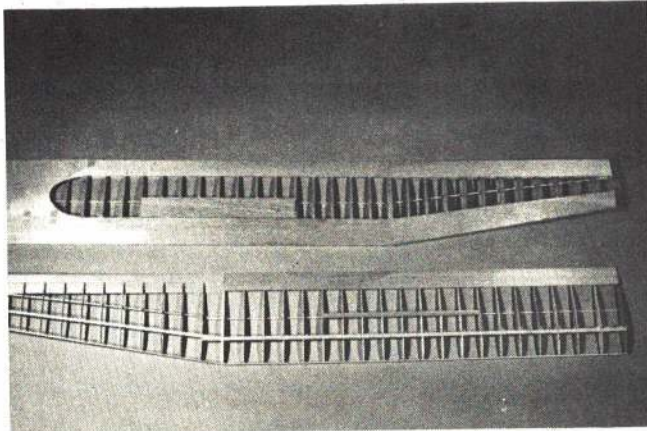




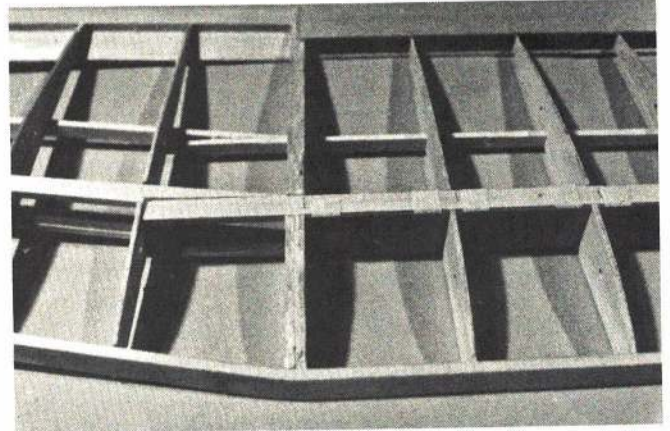
The tail surfaces are built-up for weight economy. Webbing and geometric truss structure add strength.



The linkage for the flying stab is concealed in the fin, making for a minimum profile tail assembly. (photo by Josh Titus)



The wing panels follow typical construction techniques. The constant chord center section uses the popular Eppler 387 airfoil, while the tips develop a slight camber.



The polyhedral joint has overlapped spars. The tip hasn't been angled up yet in the photo.

a center line through the middle of a top view (see plans).

2. Pin or wedge with weights the various pieces of outer balsa to your building board, shimming up the front of the rudder 1/32" and the rear of the rudder 1/16". Shim the bottom cross-piece of the rudder 1/16". Glue all pieces together.

3. Glue in fillets at all corners.

4. Glue in bracing, as shown.

5. Bevel the leading edge of the rudder, and hinge it to the trailing edge of the fin. Do not epoxy in hinges until after covering.

6. Sand to shape.

7. Notch through the center of bottom piece of fin and first brace to allow for free passage of elevator control horn.

8. Cover, hinge rudder to fin, and epoxy to fuselage, making sure that the assembly sits exactly on the center line of the fuselage and is also square to the stab and wing (allowing for dihedral, of course).

9. Cover the wing and stab. MonoKote does a great job and allows a MonoKote hinge on the spoilers, affording less drag than would regular hinge materials.

**Radio Installation:** The width of the Max-fly allows all three necessary servos to be mounted alongside one another, directly in back of Former C. The switch is mounted in front of C, with the receiver and battery in the remaining forward area. The antenna was en-

cased in several straws and run through the fuse, rather than outside. To operate the spoiler efficiently, it was necessary to use a long arm on the servo. If possible, get a piece of radio phenolic board and cut your own servo arm, using a washer between the arm and the screw head to hold it to the servo. The arm should be 3/4" long.

#### Final Adjustments:

1. Towhook used was the Airtronics heavy-duty adjustable. It was installed so that the hook would be located on a line drawn downwards, and 60° forward from a center of gravity at 40% of the chord.

2. My Max-fly weighed exactly 4 lb. 8 oz., with 2 oz. of lead ballast riding in with the battery.

3. First flights indicated that a 1/4" washout at the tips will aid slow turn stability.

4. A vigorous hand launch is alright to test the glide, control effect and general flight stability. Don't open your spoilers unless you are up about 50 feet the first time. They work well and will ding up your plane unless you have some speed to use the elevator and rudder.

**Flying with a hi-start or winch:** Use a strong line and a good hi-start or winch. Max-fly may not be too heavy, but she carries a lot of wing area and will create quite some resistance on tow. Our first flights indicated that she will go straight and true up the tow line. She is ex-

tremely responsive and alive and will remind you of a pattern ship in her ability to hold a line of flight. Set up some easy turns and note that you will have to start easing in opposite control almost as soon as you go into a turn so as to open out into a straight path after the turn. Now put in a little up trim and go into a turn. If she falls off a little, you need a bit more washout at the tips. When properly set up, she should turn in a plane that is quite flat for a glider with a conventional tail.

The first time you try the spoilers you should be at least 50 feet up, and flying either straight towards yourself or away. This will help show whether or not the spoilers are equal in angle opening. Obviously, if the ship goes to one side, that spoiler is creating more braking action, or killing more lift on that side of the wing by being more open than the other.

The second attempt at spoiler operation should also be made at 50 feet altitude or better and after the adjustments were made for opening equally. This should be with the plane moving across your field of view. This will help you see the effect that the spoiler/brakes have on speed and altitude. You can then determine at what angle the ultimate descent should be made. Mark your decision about blade opening angle on your box for reference and possible stop mechanism.

Now you're all ready. See you at the meets!



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**THE CONTENDER**—The first all-balsa R/C model you can build in just 8 hrs. Wing Span: 54" Eng.: .29 to .60. Kit RC-15

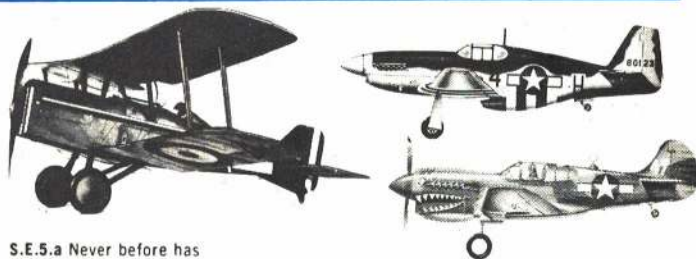
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**FLYING MODELS**

*for those who insist on the*  
**VERY BEST!**

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**HELLCAT**... Span: 18" Kit S-21

**THUNDERBOLT**... Span: 18" Kit S-22 **\$3.95**

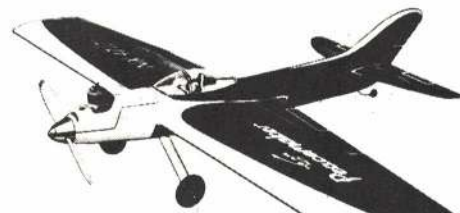
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**COMBAT STREAK**... Span: 42" Eng.: .19-.35 Kit N-5 **\$9.95**

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**COMBAT CATS**... Two complete models in one box. Span: 39½" Eng.: .19-.35 Kit N-8 **\$10.95** (2 models)

**COMBAT KITTENS**... Span: 22¼" Eng.: .049 Kit N-9 **\$7.50** (2-models)



# aam tests

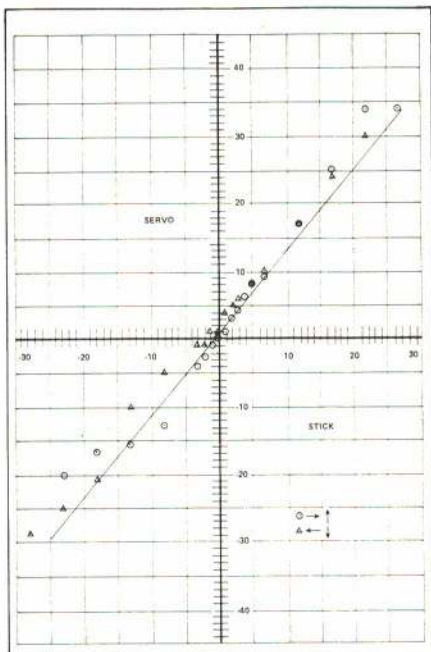
## CANNON GRAND PRIX 6 CHANNEL JIM McNERNEY

This is Cannon's top-of-the-line radio. Several features show additional effort over other Cannon sets tested. The unit came with a certification (signed by Bill Cannon himself) that it had been flown for 32 minutes, including takeoffs, landings, aerobatic maneuvers, and was tested for extreme range, precision, and stability.

**TRANSMITTER:** Housed in a light tan, vinyl-clad, aluminum case with the antenna sloped upward for best radiation pattern. The meter is a true indication of RF output. D&R stick assemblies with cermet pots are used for primary control functions. A switch at the top right is provided for retract operation and another auxiliary channel is operated by a wire-wound pot below and between the sticks. The master/trainer button is located below the left stick assembly. Power is provided by eight 500 mah AA-size NiCads housed in a plastic box behind the RF board. The whole works is held in place by two bolts through the front of the transmitter case. A separate RF board is mounted to the case top and the antenna is bolted directly to it. The charging plug in the bottom of the case also accepts the master/trainer chord. A light is provided to indicate whether the system is charging.

A word of caution: The charging plugs are the same as those used by other manufacturers. The plugs are wired differently, however, so don't try to use other charging equipment or try to use master/trainer with other makes. It won't work and serious damage could result!

**RECEIVER:** The single deck receiver



## SIG "KWIK BILT" CHIPMUNK DUANE W. LUNDAHL

Last fall the Sig Manufacturing Co. introduced a new technique in model construction with the "Kwik Bilt" series. The Chipmunk was the first in the series which now includes the P-51. The "Kwik Bilt" technique involves the use of vacuum-formed plastic fuselage halves which disguise what is basically a profile model. The resulting plane is amazing in that no one who has seen the finished plane has guessed its ancestry. However, I've had many, many raves on its appearance. In addition to the vacuum-formed fuse halves, there are also wheel pants, tail cone, full engine cowl and wing tips formed of plastic. The fuselage structure consists of a 1/2" thick balsa plank cut to profile shape which is reinforced from the wing trailing edge to the engine mount. This is the complete load-bearing structure of the fuselage. The radio, servos, linkages, and fuel system are now added to this directly and very easily.

The wings are foam core and balsa sheathed, a simple process because of the excellent Sig instruction book. Because of the unique assembly there are no plans per se, and you don't need them. Only after completion of the wing, tail surfaces and radio installation do you mount the exterior fuselage halves. (I

didn't do it until after the painting was done!) Because these carry no loads, they are simply mounted using double-stick servo mount foam tape.

The model was finished with automobile acrylic enamel in red, white, and blue. Painting took longer than building, incidentally. The wing surfaces were prepared using surfacing resin and 1/2 oz. fiberglass cloth.

The plane flies well, performing any maneuver a sport flier like me can do. An Enya 60 III B gives more than adequate power. I should note that the plane handles very well on the ground because of the wide gear track and steerable tail wheel.

Criticisms? Very few and of minor consequence, but—the decals were some of the worst I've seen: they tore, cracked and generally frustrated me. The tail cone did not fit as it should; however, it was usable.

My overall impression of the kit is very positive. I think Sig has a great idea in their "Kwik Bilt" construction method.

**Specifications:** Wingspan—64"; Wing area—660 sq. in.; Flying weight—7 lb.; Power—60; Propeller—11 x 7 1/2; Construction—composite of wood, foam, plastic; Price as tested—\$39.95; Manufacturer—Sig Manufacturing Co., 401 S. Front St., Montezuma, Iowa 50171.

board is housed in a vinyl-clad aluminum case. Deans connectors are used in a three-, two- and one-plug set of blocks for the outputs, with a male plug for the power lead. The RF uses a double-tuned FET front end with three tuned IF stages plus a crystal filter. The decoder uses two IC's. The antenna is color coded to match the frequency (i.e., red and white for 72.240 MHz).

**SERVOS:** The C-E 2 servo is the larger D&R mechanics with both linear and rotary output. The servo amplifier is a bridge type, but uses all discrete components. There are 13 transistors housed on two stacked boards. Fortunately, there are no through wires so that access to components is easy.

**BATTERY:** The airborne pack consists of four 500 mah pencil-size NiCads, each diode protected to provide a bypass in case a cell opens. The switch harness comes complete with charge plug for easy external access in your model.

**CHARGER:** An external charger is provided with the AC plug integral to the charger housing. Both transmitter and receiver battery must be charged together in series. When all is assembled properly and the switches are in the right positions, the light in the transmitter will light.

**Comment:** In viewing the stick/servo graph, note that the servo position is always close to the stick movement in spite of having some crisscross of the average lines. This is designed to be Cannon's top-of-the-line system and surely must be their most reliable.

**Specifications:** Pulse width—1.4 ms ± .5 ms; Pulse repetition rate—60/sec.; Trans power input—900 mw.; Receiver sensitivity—3.8 micro volts; Servo thrust—3 lb. 3.5 oz. at 2.25" or 12.9 oz./in. torque; Servo transit time—0.4 sec.; System temperature range—0°-140°F.; Price as tested—\$499.95; Manufacturer—Cannon Electronics, Inc., 13400-26 Saticoy St., North Hollywood, Calif. 91605.





## COX 049 TD and 09 TD DON JEHLIK

The top-of-the-line TD's are of greatest interest to competitive fliers. Their performance record has placed L.M. Cox in a unique position in manufacturing. There are no competitors in the world market!

There are, of course, reasons for this. Remember the "Build a better mousetrap" line? Roy Cox has done just that in a really competitive industry. You see, all the firm has done is design, produce, and market products of highest (a) performance (b) quality (c) availability (d) standards of advertising and (e) value. In addition, Cox has developed uses (markets) for his engines and related items that had not existed previously.

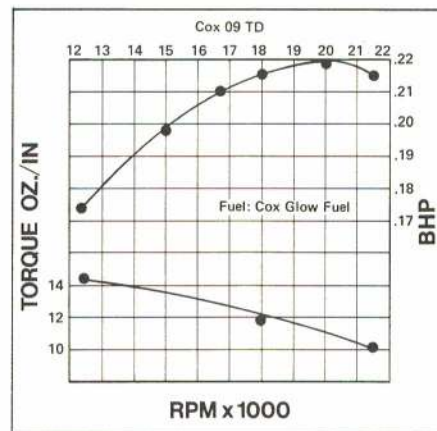
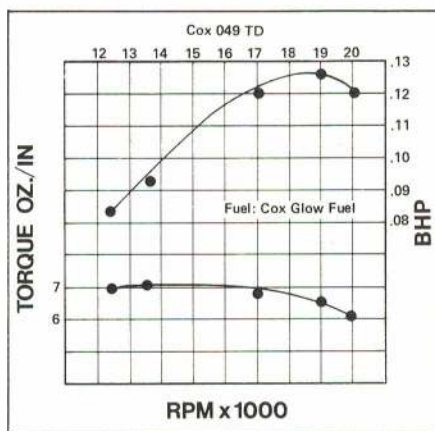
The TD engines in this month's tests need, therefore, no introduction. Of all the engines in my personal experience, they rate highest in every respect. Significantly, quality control

at the factory makes every Cox engine ready to run, clean and free of dirt and metal bits which are so common to almost every other engine I examine.

Break-in for both engines was normal for Cox engines. They ran readily from the first start. Extended running increased power slightly and broadened needle valve settings. 049 and 09 are quite similar in power curves which shows the consistency of Cox design. The 09 developed almost twice the power of the 049.

Both engines should be propped to turn 16,000 rpm or slightly higher on the ground in order to achieve maximum power in flight. The 049 turned a 6 x 3 Cox prop 17,000 rpm. A 7 x 4 seems about right for the 09.

**Specifications:** Price as tested—049 TD, \$16.45; 09 TD, \$18.50; **Manufacturer**—L.M. Cox Co., 1505 East Warner Ave., Santa Ana, Calif. 92705.



## THE QUICK ONE PAT MURPHY

"I shot an arrow in the air and it will come down when I tell it where." The impression of an arrow sailing by is at least one of the impressions that you get when flying the Quick One. The plane is small and has a rather unusual configuration. With a "honking" 40 in the nose, this plane could be used for learning to fly pylon. With a good 29 in the nose for power, it would be a reasonable small-field plane. It is not a trainer.

The kit contains the foam cores and sheeting with machine cut wood parts for the fuselage and empennage. The hardware pack was good and a lightweight landing gear is included.

The instruction sheet is very good. It lists step by step the method of construction. The Quick One lives up to its name—it builds up very fast.

I covered this plane with Kwik Cote and came up with a four-pound airplane. A Fox 36 was used to move things along.

The one modification that I would recommend would be a full width elevator. The rudder on the bottom fin seems to be quite effective. Aileron throw should be a minimum of 3/8" travel, both up and down. Elevator should travel approximately 30° in both up and down.



The plane is very fast and will slow down and give a good sink rate for landing. It is much too responsive to be a model; however, it can be handled easily by someone with intermediate flying experience.

The Quick One will most definitely cause quite a bit of conversation at your field. Try one, we think you'll like it.

Now if I can just get this arrow to land sooooo gently, right there. . . .

**Specifications:** Wingspan—51"; Wing area—382.5 sq. in.; Length—41"; Weight—Approx. 4 lb.; Price as tested—\$34.95; **Manufacturer**—J.E.M. Enterprises, 521 Bies St., Michigan City, Ind. 46360. (219) 872-7690.



## GRAUPNER HI-FLY STEVE KRANISH

The Graupner Hi-Fly is a high-performance, all-balsa, standard-class thermal sailplane that can be launched by electric power, hi-start, or 049 power pod. It is an excellent kit, with all parts die-cut or machined. The instructions are excellent, including a full-size plan (one panel of the wing and stabilator must be built on the back of the plan sheet), an instruction booklet with exploded views, and radio and electric power installation instructions.

The fuselage is a balsa box with factory-installed veneer doublers forward of the wing TE. The fin is built on the fuselage and contains the stabilator mount. A large nylon bellcrank is provided, and must be permanently built into the structure, thus allowing removal of both stabilator support pins. The hatch is built up from several die-cut pieces of plywood, and is held in place with a dowel in the rear and a pin in the front. The landing skid is mostly plywood, and encloses the one-position wire towhook.

The wing is a twin pine spar structure with top sheeting, built as two panels. The TE comes notched, and the LE is partially shaped. All ribs come die-cut and marked, although many needed a slight trimming for a proper fit. The plywood root rib is marked for drilling three mm back from where the required holes must be, and this must be corrected. The wing may be built with either straight dihedral, as I did, or with polyhedral. Parts are supplied for either version, and in both all spars, LE, etc., must be spliced at the taper change. There is only one steel spar joiner pin, in addition to two alignment dowels. Wing attachment is by rubber bands, although anything but a perfect landing will cause the wing panels to shift, and conversion to nylon bolts would eliminate this problem. An undercambered airfoil is used to provide better performance.

The stabilator is a two-panel, symmetrical airfoil surface, supported by two metal pins. All parts come die-cut, and the ribs have tabs on them to facilitate building on a flat board. Optional geodetic ribs for the stabilator, fin, and rudder greatly increase rigidity with little increase in weight.

The fuselage has enough room for installation of most radio gear. My AAM Commander used a 475 mah square pack. The plane required two oz. of lead to balance.

All test flying was done from a 400-ft. hi-start, which provided three-minute flights without thermal help. The Hi-Fly is very maneuverable and quick to respond, even in a strong wind. A turn can be reversed quickly, even in a wind, and turn response is about the same in a climb or dive. Tight circles can be made with little loss of altitude. Crosswind handling is good, and overall handling and performance is excellent.

**Specifications:** Wingspan—90.5"; Wing area—620 sq. in.; Airfoil—9% wing with undercamber; Weight—33.5 oz.; Price as tested—\$49.95; **Manufacturer**—Johannes Graupner; **Importer**—Midwest Model Supply Co., 6929 W. 59th St., Chicago, Ill. 60638.



# PAINT FOR PERFORMANCE



The author's Cutlass, Yankee and Jet Star in a complementary color scheme.

Visual disorientation accounts for a lot of unnecessary pilot errors. It's the proverbial situation of a fellow painting himself into a corner. Plan a good paint scheme and fly better. / by Bob Noll

"Why should I go to the trouble of painting my plane with a fancy paint job? It won't help it fly any better!"

How many times have you heard someone make this statement? Maybe you said it yourself. A good color scheme, with well-defined trim and contrast, definitely can help the plane fly better. Why? Because you can see it better.

Nearly everyone, even the beginner understands the need to build a true plane, without bends and warps, and to pay close attention to the installation of equipment. But many RCers don't realize that their ability to see the air-

craft easily, and to distinguish its flying attitude at all times, is a vital element in the closed loop between the transmitter and the plane.

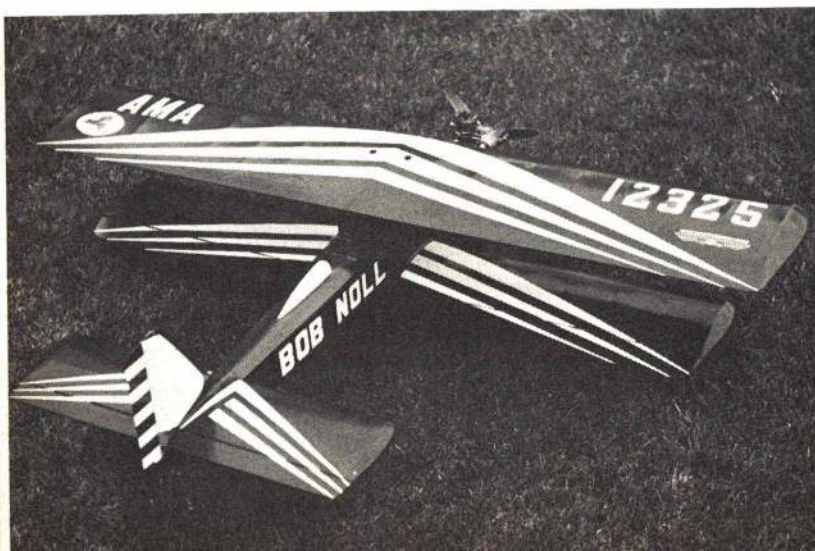
I'm sure that we have all witnessed the flier who got himself into trouble because he wasn't sure of the attitude of the plane, only to claim that his radio failed. . . he was sure he was giving the correct command as it spiraled into the ground. Although this usually only happens to the beginner, there are benefits that can be realized by the experienced and competition flier if his visual communication with his plane is strengthened.

What can be done to amplify the ability to clearly see the plane and distinguish its flying attitude to the greatest degree? Very simply, the paint trim color and design can help solve this problem.

Personal experience, as well as discussions with other RCers, has revealed several basic requirements that a good color scheme and trim design must have. They are: (1) a base color which is easily seen by *your eyes*, (2) at least two colors which provide maximum contrast (white trim is excellent if a dark color is chosen for the base color), and (3) a trim design which clearly accentuates the wing and tail surfaces. Much has been written about the first two items, but little emphasis has been placed upon the third. It is the trim design which I feel has been grossly overlooked.

If you are not one with an artistic touch, simply apply a sunburst or leading edge stripe to the wing. Large bold stripes stand out well, and are best used at the wing tips. I have found that trip stripes aid tremendously in picking up the attitude of the plane in a turn. Also, for the competitive fliers, accentuate the wing leading edge with *narrow* stripes, so that those wings can be kept level upon entering maneuvers—a factor of primary importance to the execution of good maneuvers.

The white stripes on wings and stab add a dimension of forward speed to the otherwise squarish lines of this biplane. The contrasting fin and rudder make a good visual reference point. Biplanes can get awfully confusing in the sky.



(Continued on page 92)



# YANKEE

The perfect airplane? A guaranteed winner? The secret way to the top?  
/ by Bob Noll

**D**on't believe it. There is no pattern design that can provide instant success and overcome a lack of flying talent on the part of the pilot. No matter what you may think, winning is made up of 90% pilot ability, 5% airplane and 5% luck. And in today's highly competitive sport of pattern flying, it is most important that as much effort as possible be put into the 95% that we can control. Practice, practice practice with a good, honest airplane is the answer.

Of course, there are many good plane designs kicking around the country, such as the Tiger Tail, Mach 1, Daddy Rabbit, Cutlass, Kaos, Banshee and others. In the hands of a top pilot, all these designs can be found in the winners circle, primarily because they are sound designs with very honest flying characteristics.

The Yankee is an attempt to achieve a plane which contains both soundness and honesty, as well as a high degree of smoothness in all maneuvers. Having







**ABOVE:** A clean design, the Yankee features proven concepts in solid construction.

**LEFT:** Practice, practice, practice with a good, honest airplane is the only key to success in pattern. The Yankee was specifically designed for longevity and reliability.

**BELOW:** Flying, unbroken lines, accentuated by a striking and spirited paint scheme are essential for high points—the judges pay more attention to a sharp-looking plane.



used these terms, let me explain what I mean.

Soundness in design has to do primarily with functionality and integrity of construction. Good basic construction practices, proven reliable over years of experience by other successful designers and myself, have been applied to the Yankee design.

Honesty in flying characteristics relates to the plane's predictability, with a primary emphasis on repetitive duplication and absence of the unexpected. It's hard enough to master the pattern maneuvers without having to contend with a plane that has some nasty idiosyncrasies.

Smoothness is self-explanatory, but a factor not given enough thought with respect to the plane. Although the pilot's "habits" contribute significantly to the smoothness of flight, the plane, design, and setup are also key factors.

The Yankee definitely meets the criteria mentioned above. It has performed well for me during the contest season, during which time the design was refined through some changes.

As I am not an aeronautical engineer, I can't take credit for developing exotic new airfoils and other aerodynamic breakthroughs in the Yankee. However, being a competitive modeler for quite a few years, I have built this design around some basic good experience that I have had with a Jet Star Mk7 by Ed Keck, and the famous Cutlass Supreme by Don Coleman. In addition to having flown these two designs in competition, I have had the opportunity to fly some of the other popular designs over the past few years, and feel that the Yankee is capable of performing with the best.

Although I will provide some of the significant design features of the Yankee, I want to impress you with the need to build an accurately true and well aligned plane in order to take advantage of the design characteristics. Every competitor who is at, or near, the winners' circle understands the need to have a plane that is exactly true and totally free from warps, surface irregularities and misalignments. And believe it or not, it isn't much more work to do the job the right way; the benefits will be impressive. Each plane I build reaffirms my awareness about the importance of building accuracy.

Now let me go into some of the design features in the Yankee. Both the Jet Star Mk7 and the Cutlass Supreme have the wings 1" below the thrust line. This configuration has worked well in both these designs, so it was retained for the Yankee. Some designers argue that the wing is harder to see as it is moved up toward the thrust line since, in flight, it becomes masked by the fuselage. I have not experienced this problem, however, as I have always used a contrasting strip along the entire wing leading edge to make it stand out. Moving the wing closer to the thrust line can present equipment installation and landing gear problems. The Yankee uses a compromise and, besides, 1" is easy to measure. The stab is 1" above the thrust line, which places it adequately above the wing, thus preventing turbulent air over the wing from effecting the pitch sensitivity and elevator control during the landings.

The nose and tail moments of 14" and 28" respectively are quite conventional, providing a ratio of 1:2. The nose moment may appear to be much

shorter, because of the straight trailing edge wing planform.

Speaking of the wing, its area is 700 sq. inches with a span of 64" and a mean chord of 11.4", yielding an aspect ratio of 5.6. The root section is 15% symmetrical, and the tip section is 15% semi-symmetrical. Leading edge sweep is 7° and the trailing edge is straight, which results in a swept mean chord line. The reason for the straight trailing edge planform is very simple. It adds to the effective wing dihedral in both upright and inverted flight. The need for built-in dihedral is therefore reduced with this configuration, which is an advantage in rolling and inverted maneuvers, such as outside loops. A slightly lifting section is used at the tips to prevent tip stall, so common with swept wing designs when the angle of attack is increased during landings.

The Yankee wing has a sharper leading edge than either the Jet Star or the Cutlass Supreme. This was done to increase pitch sensitivity, in order to have a plane that grooved better than the more blunt leading edge planes. It is true that a blunt leading edge wing provides softer response to pitch control; however, the tremendous resolution of our current servos provides smoothness without the need for the blunt leading edge wings. One of the paramount improvements realized in the Yankee is the way it "locks in" on a heading and stays in the "groove."

The horizontal stabilizer has an area of 167 sq. inches which is 24% of the wing area. It uses 12% symmetrical section, which makes elevator control very smooth but positive, even at extremely slow landing speeds.

One problem with the Yankee, as it



was originally built, was that rudder deflection caused a rolling tendency. This is very undesirable, since the effect of rudder control should be pure yaw, so as not to harm the Four-Point Roll, Slow Roll and Figure M maneuvers. In order to obtain the desired yaw, the rolling effect of the rudder should be equal and opposite to the rolling effect of the dihedral.

There are two approaches to solving this problem. One is to change the center of pressure of the rudder/fin combination by moving it farther above the roll axis. The other is to reduce the dihedral.

Making a new rudder with a constant chord is easier than cutting up a wing, so this approach was taken first. This change was made by a good friend and competitor Larry Detwiler, who was also flying a Yankee, but the results were less than satisfying. The theory appeared to be correct, since the roll effect of the new rudder with a higher area was decreased; however, not enough to meet our objective.

The next thing to do was reduce the dihedral. After considerable research and deliberation, I was convinced that it had to be done. Several nights were consumed carefully planning out the "operation" and finally, the first incision was made. As it turned out, the job was done in half the time it took to think about it. The dihedral was reduced to half of its original amount.

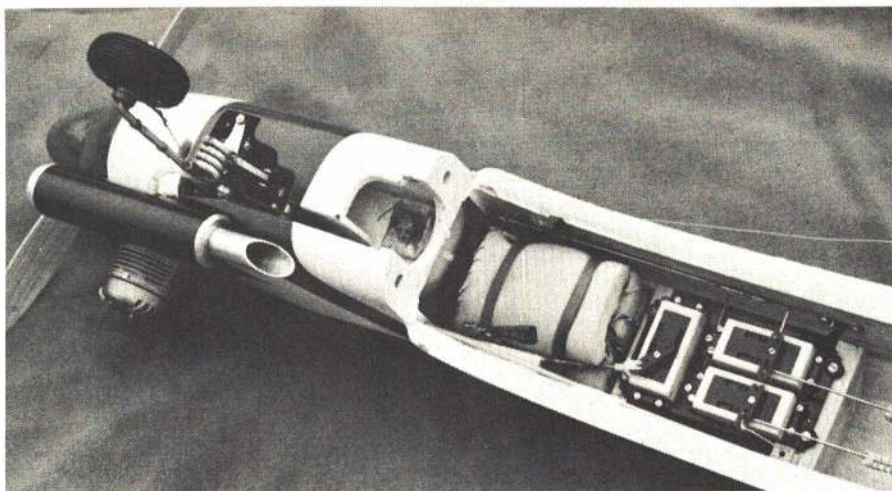
You can probably imagine how anxious I was to get out to the field and find out whether the operation was a success. Well, the results were tremendous. Not only were the Four-Point and Slow Roll maneuvers easier to do, but the Figure M showed significant improvement also. One fear, however, was how the reduced dihedral would effect the tracking in loops. Fortunately, I could see no difference and, in fact, crosswind loops were better since rudder corrections were more effective.

One complaint I had with the Cutlass Supreme was its desire to weather-vane in a strong crosswind. Others have also commented about this problem, and it is caused by the large lateral tail area. Therefore, the Yankee was designed with less lateral tail area. As a result, the crosswind characteristics are very acceptable. The lateral area in front of the CG was also increased slightly for the same reason.

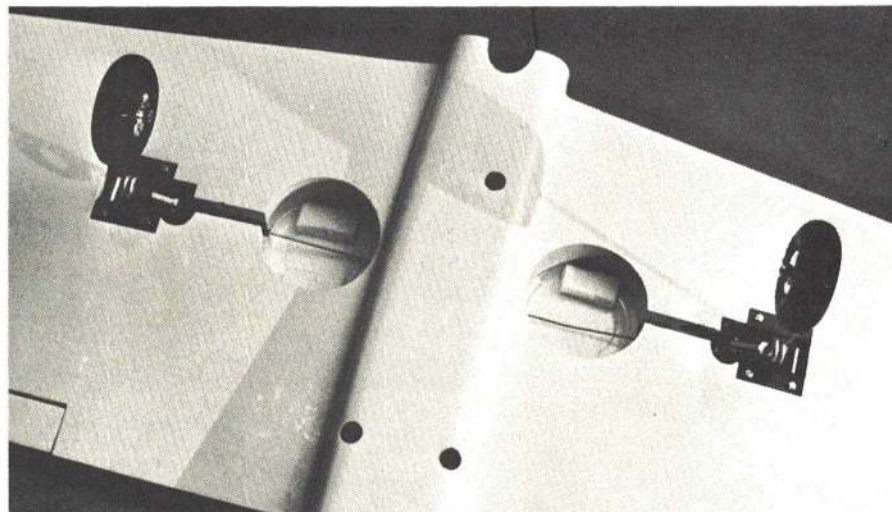
Now let me discuss some of the construction features used in the Yankee, and explain why they are used. I believe they contribute to a "sound" design, and most of them can be applied to any plane design.

Starting at the front, you will notice that the engine is side-mounted and on maple beam mounts. Both these things were done to reduce vibration, a culprit that can mean disaster if it is not controlled. By side-mounting the engine, the vibration forces are absorbed adequately by both the wing and the fuselage. The maple beam mounts are tied into the fuselage sides with pine filler blocks and to the top nose block, so

*(Text continued on page 92)  
(Plans on following page)*



Typical installation.

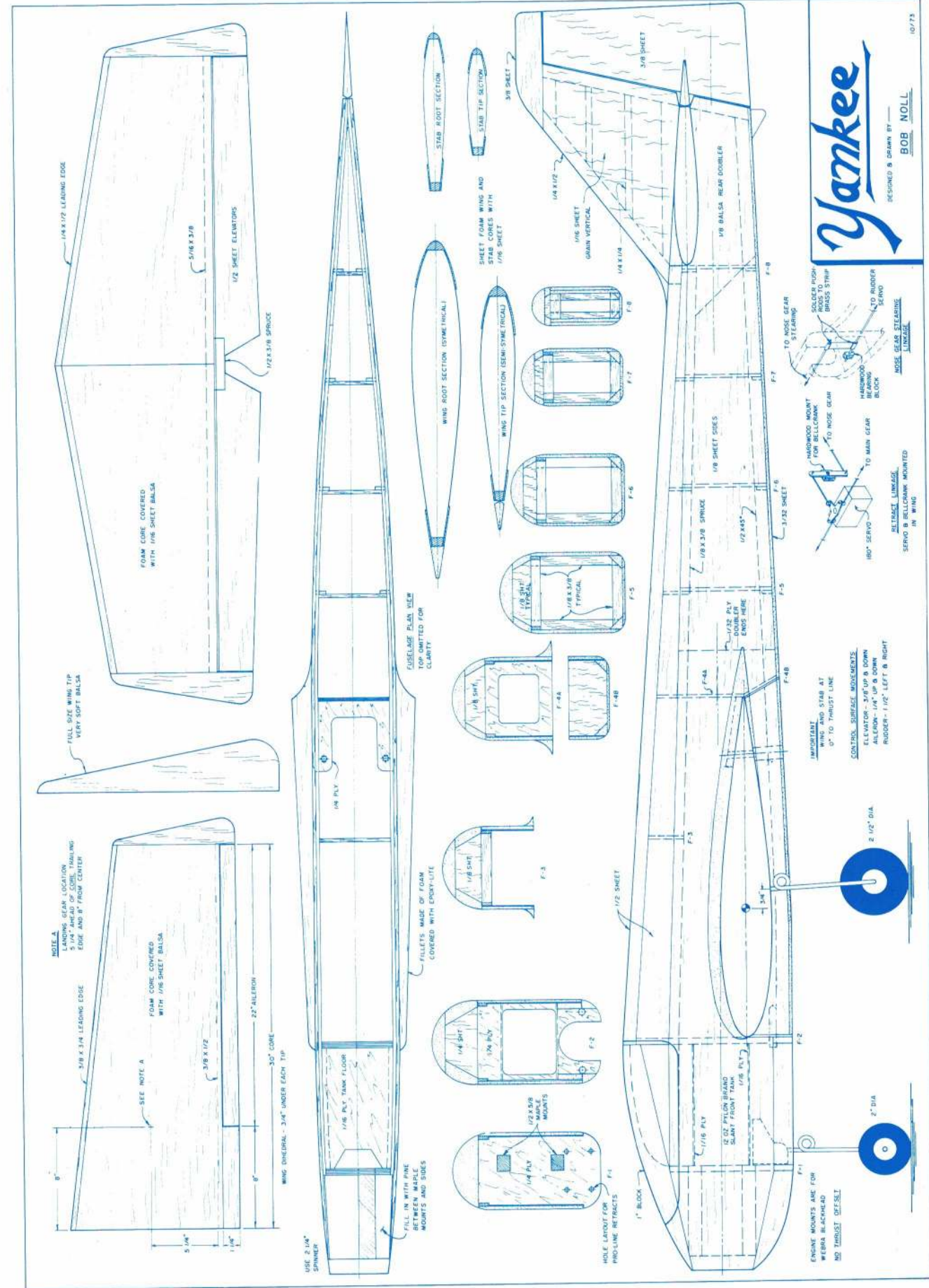


Margarine containers make simple wheel well bottoms. Foam rubber strips absorb vibration. The hole in the belly pan is for access to the nose gear bellcrank.



ABOVE: Up, up and away. A single 180° servo and an unique linkage retract the gear. LEFT: The Yankee in action.





# Yankee

DESIGNED & DRAWN BY  
**BOB NOLL**



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3-Channel Transmitter



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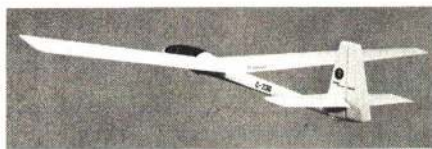
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# new products checklist



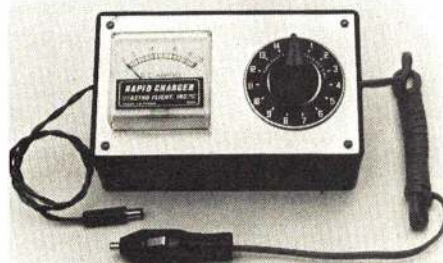
**Peerless/Cirrus 3000.** Startling RC sailplane is close to full-scale, and has a 10-foot wingspan. Designed for two-channel radio, the glider can be modified to use up to six channels. Construction has been simplified for the beginner, yet performance is exceptionally high in both slope and thermal soaring. The front half of the fuselage and major wing parts are injection-molded A.B.S. plastic, and rear half of fuselage is vacuum-formed A.B.S. Kit includes all necessary metal parts, and die-cut and shaped balsa wood. \$99.95. Peerless Corporation, 3919 M St., Philadelphia, Pa. 19124.



**Tidewater Hobby/Counterpart.** Simplified pattern design—ideal for the A&B patterns, this new kit is all wood, and is for 40-size engines. Ship has a 56" wingspan and weighs 4½ to 5 lb. with four-channel control. Accessories such as landing gear, canopy, fittings, linkages and pushrods are included. Easy, quick assembly. \$49.95. Tidewater Hobby Enterprises, 4118 Middle Ridge Dr., Fairfax, Va. 22030.



**Allied Hobbies/Integra.** Versatile pattern and sport flying design has been in development for six years to achieve the best design configuration. The airplane has a 70" span, and is for 45 to 60-size engines. The kit has balsa sheeted foam core wings, and an all-balsa fuselage and empennage. This easy building airplane is made even easier with complete building instructions. Many accessories are included. \$67.50. Allied Hobbies, 8655-2 Belford Ave., Los Angeles, Calif. 90045.



**Astro Flight/Rapid Charger.** For electric-powered flight enthusiasts, this deluxe rapid charger provides a safe and reliable method of quick charging the Astro 5 and Astro 10 batteries while flying out at the field. The charger conveniently plugs into an auto cigarette lighter receptacle. A built-in ammeter allows you to determine both the condition and state of charge of your batteries. The timer will automatically cut off the charging process at any preset time up to 15 minutes. Price is \$24.95. Astro Flight, Inc., 13377 Beach Ave., Venice, Calif. 90291.



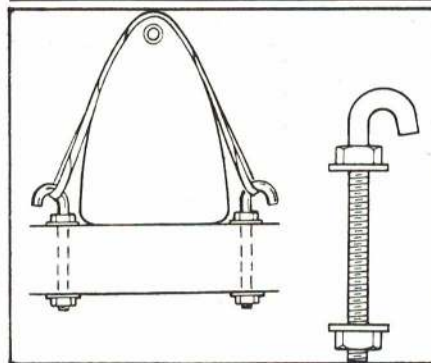
**T & H/Hi Jacker.** New two-four channel slope soaring design is capable of flying the full AMA Pattern, and flies as well inverted as it does right-side up. The kit features a seamed white gelkote fuselage, plus foam wings and balsa sheeting. The new wing design allows flying in winds varying anywhere between five and 50 miles per hour. All hardware is included in the kit. Price is \$49.95. T & H Enterprises, N. 7025 Stevens, Spokane, Wash. 99208.



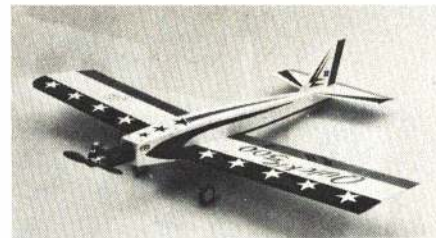
**Pro Model/P-51 QM.** Fast quarter midget racer has clocked times under two minutes on the standard two-mile course. The fiberglass fuselage and foam wing kit also includes such extras as an aluminum motor mount designed for the K&B 15, plus propylene hinges and full-size plans. Wing area of this kit is 309 sq. inches, with a total weight of 2½ to 3 lb. Price is \$34.95. Pro Model Products, Inc., P.O. Box 5182, Ft. Wayne, Ind. 46805.



**Royal Publications/AirCam Series.** Great for the stand-off scale and scale modelers, these new publications contain a wealth of material on specific aircraft, and various groups of aircraft, from World War II. Over 50 books are available in the series, and each book contains over 200 full-color and black and white photographs, and diagrams of the popular aircraft. Printed on heavy gloss paper, they have an extra large format of 7½" by 9¾". Books are durably bound, and sell for \$3.95 each. Royal Publications, Inc., Box 358, Denver, Col. 80201.

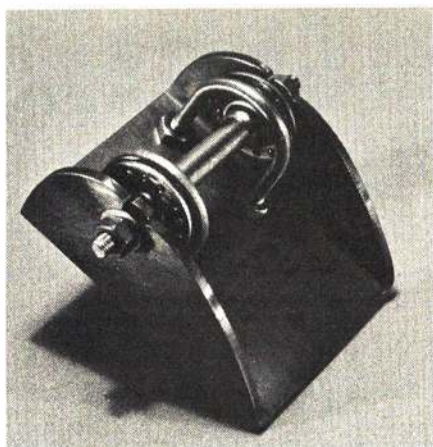


**Goldberg/Long J-Bolts.** New item especially useful for holding on U-control tanks are these extra long 1¼" J-bolts. Designed to be used on profile fuselages, a package of four bolts, eight nuts and eight washers complete the package. The bolts will also come in handy for many applications in RC and free flight models. The complete package of four bolts sells for \$59. Carl Goldberg Models, Inc., 4734 W. Chicago Ave., Chicago, Ill. 60651.



**Glen Spickler/Quickie 500.** The original 500 cu. inch 40-size engine club racer and sport flyer published in AAM is now available in an easy-to-build kit form. Its design permits sport fliers to participate in exciting racing contests without spending a long time building and finishing. Airplane is also excellent for fun type events. Airplane is constructed of balsa and plywood parts for extra strength and fast building. \$39.50. Glen Spickler Radiomodels, 4208 Santa Cruz St., Bakersfield, Calif. 93307.





**Westlake/Turnaround Pulley.** The ultimate in design simplicity, this new glider winch turnaround pulley eliminates any possibility of line tangling. The unit features a gold anodized aluminum channel for strength and durability. Complete assembled unit sells for \$13.95, postpaid. Aluminum tow winch reels are also available. Westlake Manufacturing, Inc., 2205 Hollywood Way, Burbank, Calif. 91505.



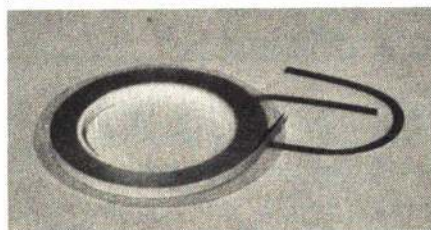
**Competition Models/Easy Riser.** First endeavor into RC kits from a manufacturer well known for fine free flight kits, is this slope or thermal flying RC glider. The Easy Riser is an all-balsa kit with die-cut ribs and plywood parts. All hardware and "Crystal Cover" covering are included in this kit. The ship has a span of 86" with a length of 43", yet weight is only 25 to 30 oz. for good low lift performance. Wing has polyhedral and tail has all moving surfaces. \$39.95. Competition Models, Inc., P.O. Box 8012, Long Beach, Calif. 90808.



**OPS/Glow Plugs.** These 1.2 volt glow plugs are designed especially for performance engines where high nitro fuels are used. The cold version is especially for using tuned pipe exhaust systems, and pylon racing engines. Price is \$1.60 each. A hot glow plug is also available for aerobatic RC motors. From Shamrock Competition Imports, P.O. Box 26247, New Orleans, La. 70126.



**Soaring Products/Thermic Sniffler.** This rate-of-climb sensor measures the up and down motion of your RC glider in a sensitive range of a few inches per second. You can "hear" thermals as the sniffler sends an audio tone to the ground through the radio link. A rising tone means "up," and a descending tone means "down." Two models are available: a standard model measuring 2" in diameter and 3 3/4" long, and a skinny model 1 1/4" in diameter and 7" long. Weight is approximately 2 oz. Thermic Sniffler sells for \$79.00, and a monitor receiver sells for \$24.00. A combination of the two is \$94.00, postpaid. Soaring Products, Box 117, Kensington, Md. 20795.



**Bridi Hobby/Quik Stripe.** New accent striping tape is available in eight colors: Red, Blue, Orange, Yellow, Black, White, Gold and Silver. This tape follows compound curves very easily and is packaged so that the tape will not unravel as you use the tape. Four common sizes are produced: 1/16, 1/8, 3/32, and 1/4 inch. Look into this tape for the final trim on your airplane, car or boat. Prices vary from \$0.00 to \$0.00. B&E Enterprises, 1611 E. Sandison St., Wilmington, Calif. 90744.



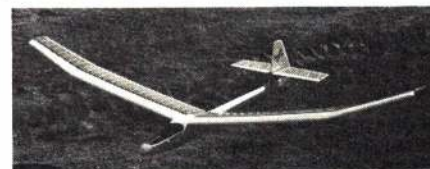
**Lenco/100 Helicopter.** Len Sabato's most recent design has been kitted with many unique features incorporated. The kit is simple to build with all major mechanical components pre-assembled, ready to bolt in place. The tailboom is a foam core covered with balsa, and body is pre-cut plywood. Design uses a 60-size engine, and four-channel control. Rotor head is fully adjustable and can be set fully rigid, semi-rigid or completely articulated. Price is \$285.00, postpaid. Lenco Products, 9219 First St., Buchanan, N.Y. 10511.



**JoMac/Alfa 1/12th Scale.** Jerabee's deluxe, top-of-the-line model is this Alfa car with many racing features. Car includes aluminum flywheel, one-ounce tank, racing pan, bumper, special tires, heat-sinks, and a Cox Tee Dee 049 engine. Available in two versions: ready-to-run, with radio for \$149.95; or the car, less radio, for \$59.95. JoMac Products, 12702-A N.E. 124th St., Kirkland, Wash. 98033.



**Hoja/Pro-Flyte Caddy.** Light, convenient and, most of all, economical field box is constructed of a high-grade, white lined corrugated carton stock. The box is designed to carry much more weight than an RCer would normally carry, and it has compartments for all essential flight accessories such as batteries, electric starter, gallon of fuel, tools and parts. A special compartment is provided for the transmitter, which allows it to be operated without removal, and to hold it tightly for transportation. Price of this caddy is \$2.98. Hoja Mfg. Co., P.O. Box 40116, Indianapolis, Ind. 46240.



**Soarcraft/Centurion II.** This updated standard class sailplane design has excellent thermal ability for its size, yet can be flown with ease in windy conditions. The kit construction features a fiberglass fuselage with built-up wing and empennage. A new, simplified wing attachment method uses nylon screws for crash protection and minimum drag. Span is 100" with 618 sq. inches of area. Flying weight is approximately 28 oz. \$49.50. Soarcraft Products, 12446 Palmtag Dr., Saratoga, Calif. 95070.





# CONTROL-LINE CONTEST

SUNDAY - SEPT. 1, 1974

## REGISTRATION:

8 A.M. - 10 A.M.  
Or In Advance

## CONTEST:

10 A.M. - 5 P.M.

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WINGSPAN: 51"  
WING AREA: 550 Sq. In.



Czechoslovakia's Zlin Akrobat has been a star performer in full-scale World Aerobatic Competition for years. Mike Stott has blended the classic, functional lines of this great aerobatic design into an ideal model for control line stunting. Fast construction with wing loading for top notch flight performance.

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Formed Plastic Engine Cowling  
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Heavy-Duty Branded  
Plated Flap Hardware  
Nylon Elevator  
Complete Hardware

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WING SPAN: 34"  
WING AREA: 250 Sq. In.  
For .15 to .25 cu. in. Engines



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**\$5.95**

### KIT FEATURES:

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All Remaining Parts are Die-Cut Balsa or Plywood  
Shock-Absorbing Landing Gear  
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Ready-Bent Landing Gear and Pushrod  
Hardware Pack Includes Nylon Bellcrank, Elevator Horn and Hinge Material  
Complete Building and Flying Instructions, Illustrated with Isometric Drawings

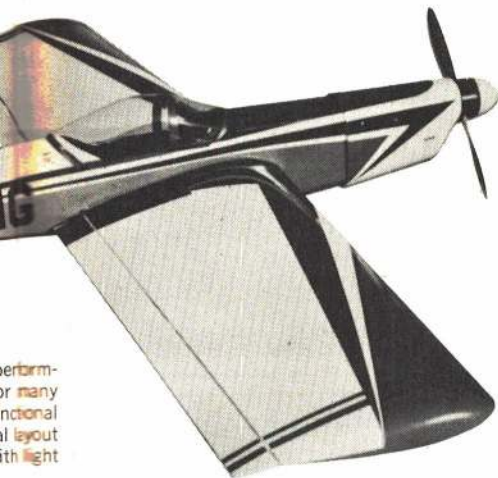


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**BAT**

by Mike Stott

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\$17.95



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1/2A PROFILE MODEL

## BEECHCRAFT STAGGERWING

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WINGSPAN 18"  
ENGINES: .049

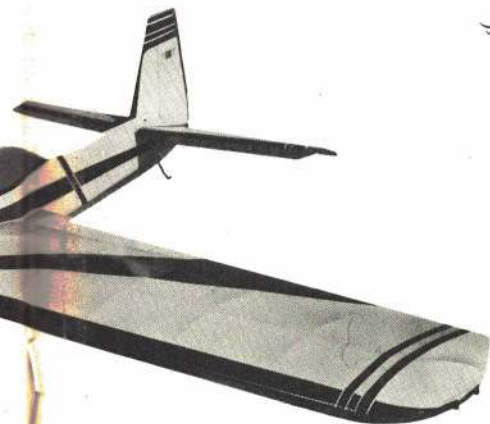
Designed by MIKE STOTT

Mike Stott, World Championship Scale Team flier, has designed the ideal 1/2A Control Line Profile model in this version of that all-time favorite, the Classic Beechcraft Staggerwing. Simple construction and a generous amount of wing area combine to lower the wing loading. This results in out-standing flight performance characteristics. It takes off easily, grooves smoothly around the circle and handles effortlessly. Inverted flight, loops and other aerobatic maneuvers are routine with this zippy beauty of a biplane.

**KIT FEATURES:**  
Shaped Airfoil Wing  
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Wheels Included  
Torsion Bar Landing Gear  
Complete Hardware Including Bellcrank  
Step-By-Step Plans with Complete Instructions  
Full Decal Sheet of Authentic Decorations  
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CL Stunt and Sport Model

Patterned after the full-scale aerobatic design, this compact little beauty is rough, tough and sturdy. An ideal trainer for control-line stunt flying, it will do the entire AMA Precision Aerobatic pattern. Fast building all-balsa construction provides light wing loading, stable flight and high performance.

## THE ULTIMATE IN CONTROL LINE STUNT SUPER CHIPMUNK

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KIT CL-19  
\$17.95



WINGSPAN: 53-1/2"  
ENGINES: .29 to .40

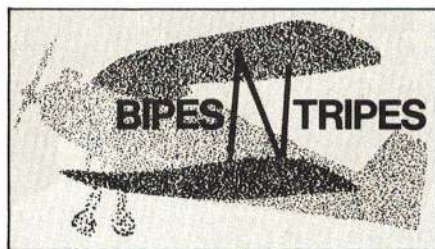
Designed by MIKE STOTT

New Look Molded Plastic Cowling  
Sleek Bubble Canopy With Molded Framing  
Smooth Formed Plastic Wheel Pants  
Handy Printed Sides - Build Directly on the Wood  
Heavy Duty Bellcrank  
Colorful Decal Sheet  
Formed Torsion Bar Landing Gear  
Complete Hardware Pack Including Molded Nylon Hinges  
Die-Cut SIG Balsa and Plywood  
Detailed Full-Size Plans

The latest version of the famous aerobatic airplane follows the lines and color scheme of the modified full-size Chipmunk flown by Skip Volk. The unique lines of the cowl and canopy sets the model apart from the average stunter. Designer Mike Stott has incorporated easy construction with strength and durability to produce a high-performance beauty.



# where the action is



## O.L. (OLIE) OLSON ON MULTI-WINGED RC THINGS

Comrades of the Order of Biplane: Before stepping down from my soap box of last month, I want to add my voice to the anguished cries of the multitude. *It is time that scale and sport scale rules be modified to de-emphasize mechanical scale operations!* Multi-engines, retracts, operating flaps, moving hatches, and all the other mechanical gadgetry are nice, and should not be discouraged. But, they shouldn't be a passport to a first place award either.

It's tough enough having to contend with judges who do not (or can not) differentiate between the scale-like flying qualities of a Nieuport 17 and a supercharged P-51 Mustang. Current rules are too restrictive and are unfair to biplane and other vintage aircraft scale fliers. Nuff said—Arise, again, and remind your District Scale Contest Board member that you're not happy, and that he can be replaced if he doesn't shape up. Be sure to send a copy to Claude McCullough, Chairman of the Scale Board. I hear he's working up a new scale biplane for Sig. It should be a beauty! Watch for the Steen Skybolt.

I am now off the soap box and ready to start this month's Bipe column. Except it's not going to be a Bipe column—it's going to be a people column. There is a fellow RCer to whom the bipe lovers of the world owe a great debt. This man was born when the hottest ships in the air were being built by Fokker. He grew up in the biplane era of the '20s and '30s. He experienced the birth and lived the history of our hobby—from the rubber-powered pusher to Baby Cyclone, Bunch, and Brown D powered free flight models, to Jim Walker's revolutionary U-control aircraft, to the hard tube (then gas tube) single-channel radio days. For 16 years he was chief designer for Paul K. Guillow, Inc.

Fortunately, in July of 1964, he decided to become his own boss. AAMCO was born. Next year will mark the 10th anniversary of the introduction to our fraternity of the grand-daddy of all RC biplanes. . . . If you haven't guessed who and what we're talking about, it's L. Jay Lou Andrews and his Aeromaster.

Without the 25,000 Aeromasters that he has cranked out during those years (and, believe me, that was not enough) there would be no National Multiwing RC Championships, no bipe contests; in fact, very few bipes. In over 25 years of being involved in this hobby/sport as a participant, a manufacturer, a distributor and a retailer, I've come across, and in contact with, a fair number of model airplane people. Lou Andrews and his Aeromaster represent the frosting on the cake—a generous energetic

This choice VK Nieuport 17 took third at the '73 Multiwing Championships. (photo by Larry Quigley).



man with great integrity and an airplane design and kit of equal performance and value. Thanks, Lou, we're glad you happened along.

Oh! Dad received a note from Dick Graham the other day, with some photographs of his new bipe. It's a scale-sport scale model of an EAA ship called the Scamp. Dick has made a little RC biplane history himself with his Liberty Sport now being kitted by Sig. This ship has placed third at the NATS and first more than once at Chicago Scalemaster meets, competing against the best of the Hot and Mechanical WWII stuff. The Scamp has about 900 sq. inches of wing area and is powered by a K&B Veco 61. The trike gear, wide wing gap, mono cabane strut and T-tail make it a striking looking ship. Dick reports that it's a lovely and docile thing that lifts off in under 15 feet and is a joy to behold in the air. There are rumors about that you may have the pleasure of seeing this featured in a future issue of AAM. (Affirmative! See Claude McCullough's column for a photo.—php.)

Now, Children, The Lesson of the Month: "When flying a triplane, never, never forget it!" Tripes will hang in pylon turns and do inside maneuvers like nothing else under the sun. However, the outsides leave a bit to be desired—a big bit. This poor soul (whom I know extremely well) knew all this. He knew that a high center of drag, relative to the thrust line creates big, sloppy, sluggish outside maneuvers. He had been flying the thing over a year. Momentarily, just for a split second, he forgot what he was flying, and tucked the nose down for a low and snappy outside loop just to give the boys in the gallery a little thrill. See ya next month, gang. I've got to get down to the shop and start repairing the damage.

Bipes are Beauteous! One look at Mark Frankel's Senior Aerosport tells the whole story. A full article will appear in a forthcoming AAM. (photo by Jim Lipschutz)



Ralph Brown's Sperry Messenger was one of the few casualties at the first Multiwing Championships. . . . He's coming back this year with a new one. (photo by Larry Quigley).

Greater Florida Biplane Championships: The Remote Control Association of Florida, in cooperation with AAM, is hosting a big bipe bash (no, they're not planning to bash a lot of big bipes!) on October 19-20. According to Walt Schoonard, CD, Saturday will be a full NSPA bipe schedule. Only the Sportsman and Advanced Classes will be flown. Sunday morning will be Stand-Off Scale, and it is anticipated that most of the bipe fliers will want to get in some double duty in this event.



## JOHN BURKAM ON HELICOPTERS

Alouette from Switzerland: A fine example of Swiss watchmaker craftsmanship, as seen by Ed Sweeney while visiting the Kavan factory in Germany: two identical Alouette helicopters (HP 61-powered) with approximately five-foot Schlueter-type rotors. The builder (name unknown) flew them very well. The fuselage structure was welded steel tubing. All gearing, except tail rotor gear box, was in one

## AMERICAN aircraft modeler

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THREE PLAQUES IN SPORTSMAN CLASS  
PLAQUE - MOST OUTSTANDING AIRCRAFT  
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NSPA RULES

WRITE: Walt Schoonard, CD, 2080 Sharon Drive, Winter Park, Fla. 32789 PH: 305-647-1431  
Contest produced by the Remote Control Association of Florida, Incorporated





Maybe the original inspiration for Kavan's Alouette was this HP-61-powered version seen in Germany.

aluminum sand casting just above the clutch and blower housing. Could this have been the inspiration for Kavan's new small Alouette?

Note: The Alouette II and the Lama look very much alike. I asked a Frenchman from Aerospatiale (at the National Forum of the American Helicopter Society) how to tell them apart, and other differences. He said that, in order to obtain a high payload capacity helicopter, they took an Alouette II, lengthened the bare framework tailboom and installed the entire dynamic system (engine, drive system, rotors and upper controls) of the larger Alouette III. Thus, the easiest way to recognize a Lama is by its uncovered tailboom, which sports a three-bladed tail rotor.

Gazelle: Speaking of tail rotors, Dieter Schlueter's beautiful Gazelle is not necessarily out of scale for lack of a "Fenestron," or shrouded tail rotor. The first prototype Gazelle also sported a conventional tail rotor.

More on Rigid Rotors: Two of the worst features of hingeless rotors were not mentioned last month. One is the strong nose up pitching moment of the rotor at forward speed, as collective pitch and/or rotor angle of attack increases. The other is gyroscopic coupling between pitch and roll motion.

Most rotors do pitch up in front with increasing forward speed, due to higher air velocity over the advancing blade. However, the hingeless rotor transfers this resulting moment directly into the fuselage, because it has no flap hinges to relieve the bending moments in the blades. Then the fuselage pitches up in front, which tilts the washplate up, which further increases the rotor pitching moment. On an articulated or a teetering rotor, the blades would flap up in front but the fuselage would probably stay horizontal, as would the washplate, without further increasing the pitching moment.

Then the gyroscopic effect of a rigid rotor messes things up, exerting on the fuselage a moment proportional to pitch or roll velocity, but 90° from the original motion. An all-mechanical gyro stabilizing system is being developed which will be contained within the fuselage, and which will be adaptable to any type rotor.

Test Results on Four-Bladed Rigid: My five-foot diameter rotor with two-inch chord blades weighed 16 oz. and lifted the 6 lb. 10 oz. model at just over 500 rpm.

With a six-foot wide training gear installed and cyclic pitch authority set at  $\pm 8^\circ$  the model behaved as follows:

Incredibly fast! As long as the takeoff was correctly trimmed and the model was level, it stayed that way. But let the least disturbance occur, and the correcting control was too much, causing the model to bury its nose or tail in the driveway. A scant five seconds was my longest flight in that configuration.

Cutting down the cyclic authority to  $\pm 4^\circ$  calmed things down a bit, but extreme concentration was required. The model didn't seem to care which way was up. A noticeable improvement resulted from sweeping the blades back about 2°. Now the model seemed to correct some of its own deviations without my having to move the stick so much. Thirty seconds was the maximum hovering time, with luck. No forward flight was attempted. If one really wanted to learn to fly that rotor, I suppose it could be done, but it's like walking a tight rope.

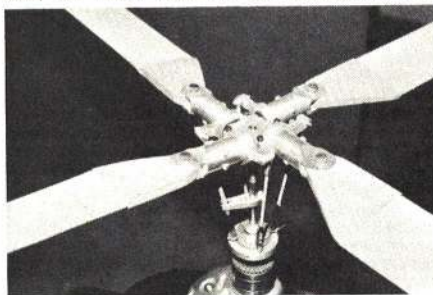
It did seem to behave better in very slow forward flight, about walking speed. But gusts hitting it caused severe pitching up motion, and gyroscopic coupling made correction difficult.

Control phasing of about 75° seemed about right. That is, for forward tilt of the

rotor, maximum negative cyclic was put into the blade 75° before the blade was pointing straight ahead. A quick forward blip of the stick made the nose go down, etc.

A bad feature of connecting blade pitch arms to the servos via the swashplate is that it puts extremely high loads into the servos in a crash. Even with a 10:1 ratio between blade pitch and servo rotation, some of the gear teeth in one of my servos got stripped once.

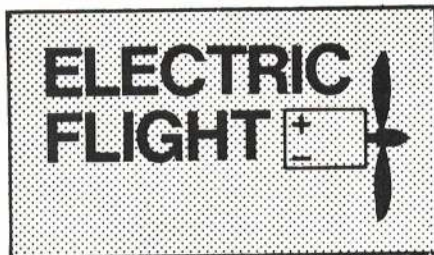
Two of the good features of rigid rotors are: It was the smoothest rotor I had ever flown. Even when the blades were slightly out of track or pattern, no vibration of skids or tailboom occurred while it was flying. Also, with all the bad landings and sudden maneuvers, no blade ever hit the tailboom. This



The rigid rotor system which this columnist has been exploring for the last few installments.

means that almost any maneuver will be possible with rigid rotors; e.g., back flip, forward somersault, standing snap rolls. . .you name it.

Loops: They aren't that difficult. I have done four (one was unintentional). All it takes is a somewhat streamlined helicopter, and guts. Fly at maximum speed in level flight and smoothly pull the stick all the way back and wait. Oh yes, better have a clunk in your tank or the engine will cut. Pull the stick back too fast and all the kinetic energy will be dissipated in stalled blades. Pull back too slow and the model will stop moving before it gets on its back. A horizontal stabilizer (about 1% of main rotor area) will insure that the nose will drop, once the model gets on its back. Keep rotor rpm up so that the blades will be less likely to hit the tailboom during the pull-out.



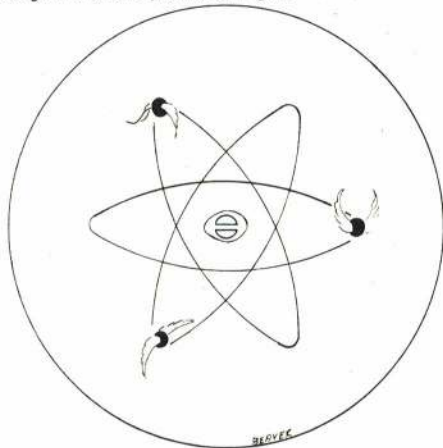
### MITCH POLING ON ELECTRIC FLIGHT

Vacation Time Is Here! The next month's column will be handled by Henry Pasquet, as I will be on vacation. Henry is well qualified for the job, as shown by the photo of his fleet of electric planes. Henry ran the test program on the Astro Pup, which included the four-channel Jr. Skylark shown here. So, until November, good flying!

Nicky Nicad, Novice Pilot: George Beaver sent this amusing cartoon of Nicky learning to fly. Henry Pasquet's air fleet includes an Astro Pup-powered Jr. Skylark, Jr. Falcon, Ranger 42, and an Astro 25-powered Skylark 56. (Photo by Henry Pasquet)



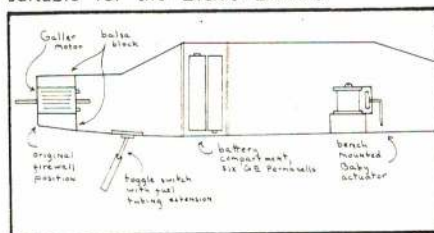
fly. Nicky looks like he's not sure who's supposed to be the pilot! The little airplane is the electric Dick's Dream, the second part of which is appearing as a separate article in this issue. George is co-author, incidentally. The decal design by George is the atomic symbol, modified to show electrons with wings, in orbit around an ecology symbol. This would make a good design for a club, or, perhaps, a league of silent powered flight.



Direct Drive Alpha II: The Alpha II unit was recently featured in an article by Ken Willard, who designed the Alpha Roamer for it. I have flown several of Ken Willard's designs, and they have all been outstanding. However, the Alpha Roamer was too big for me, so I ordered an Alpha II motor (available as a separate item, \$14.95 plus \$1.75 shipping, from Galler Electronics Industries, P.O. Box 87, S. Walpole, Mass. 02071).

This was installed in one of my favorite Willard planes, the Schoolboy (Top Flite Models), as shown in the sketch. The all-up flying weight was 12.5 oz. with the Ace Baby pulse RO radio. Initial rpm was 15,000 with a 4 1/2 x 2 Cox gray prop, using six GE Permacell pencils at six to seven amperes drain. The Schoolboy was built stock, with no firewall (a balsa block was used), with Solarfilm covering. A trip switch was used as in the electric Dick's Dream, and a bench motor was used for the actuator as in the RC SuperStar.

The plane climbs out rapidly, and has quite a lot of power. The plane is still in the trimming stage—so far the flights have been in the three to four minute range, with altitudes up to 200 feet high. This will improve with better trimming of the plane. An added bonus is that the motor has broken in, and now produces 17,000 rpm on the 4 1/2 x 2 prop, or about the power of the Tee Dee 020. The Galler motor would certainly power the 020 Old Timers on direct drive, and may also be suitable for the Dick's Dream.





Electric YAK 12: Ed Toner flies a free flight 48" span YAK 12, originally a rubber-powered plane, with the Alpha II; and a scaled down 32" YAK 12 with the older Mattel SuperStar unit. Ed recommends beefing up the landing gear for these; the 48" YAK flies well with the Galler unit. Plans are available for \$3.75 from Buzzer Model Airplane Company, 52 Newbury Rd., Lakewood, N.J. 08701. I have a set of these plans—they are quite thorough.

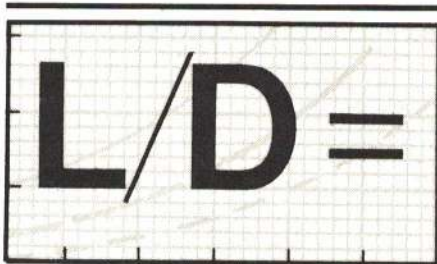
The washer motor or the Galler on direct drive should also fly this well—it looks like a good subject for free flight scale. Ed also mentioned that the motor units for the Mattel Sizzler cars might fly Peanut scale planes. If anyone has tried this, I would be interested in hearing about it. The motor plus battery weigh .5 oz., so it looks like it could be done.

Mabuchi Motors: I receive questions now and then about different types of Mabuchi motors, since they are readily obtainable and inexpensive. There are several series of Mabuchi motors. I recommend those with the RS prefix. This is the heavy-duty series, with cantilevered carbon brushes which are capable of handling high current loads (in the five to ten ampere range). The RS 260 is used in the SuperStar, and produces about 010 power. The RS 34 weighs two oz., and produces 15,000 rpm at ten amperes on a 4 1/2 x 2 prop with four Permacell pencils—about the power of a Pee Wee 020.

The RS 360 is about three oz., and was used in the Mattel Signal Command. I estimate its power is in the 035 range. The RS 85 weighs eight ounces, and was used in sit-on kiddie cars on six volts—estimated power in the 09 range.

The other commonly encountered prefixes are FM and RE. The RE series are lighter duty motors with copper wire brushes, and are suitable for free flight, but do not last as long as the RS motors. The wire brushes may also cause enough radio noise to cause problems in RC planes. The FM series are earlier motors, similar to the RE motors. The same comments apply. The FM 25 was used to power the Electra Fly, a 3.5 oz., 19" span foam plane sold (circa 1967) by AristoCraft. It used two sodium chloride cells, and flew well. Two Mattel 100 ma cells from the SuperStar or the Sizzler cars would probably do as well.

Polks Hobby Shop, 314 Fifth Ave., New York, N.Y. 10016, is the exclusive importer of Mabuchi Motors.



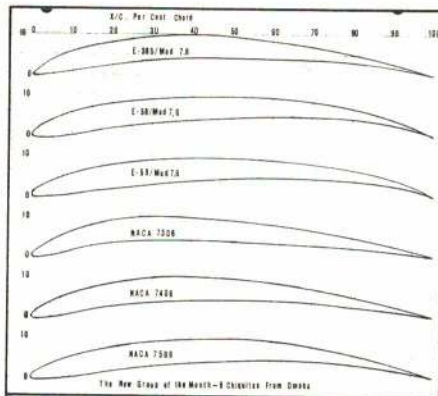
### THE OMAHA CHIQUITAS TAKE ON THE GRAND FUNK

ERIC LISTER

That's a pretty funny title for this month's column, but it's well chosen. The purpose of this month's effort is to give you six new, slim, highly curved airfoils (The Omaha Chiquitas) and a new design 1/2A FF ship with a funny-looking but aerodynamically clean fuselage (The Grand Funk-320) that was used as a flying test bed. Since the combination worked out to my satisfaction, it's worth talking about, so lets get to it.

The six new airfoils shown are intended for light wing loadings and slow-flying, thermal-seeking ships—like Nordics, RC thermal soarers and powered endurance models (Couples, Wakefields, Unlimited Rubber, and 1/2A Free Flight). All 6 have 7% max camber (which is pretty high) and 6% max thickness (which is pretty thin). Three of them are brand new derivatives from the Eppler series.

The remaining three are extensions of the NACA 4-digit series of airfoils. Each and every one is intended for use where somebody wants to try something in the way of a new airfoil that has a good chance of succeeding in competition. To increase the odds on this being the case, the one airfoil that seemed to be



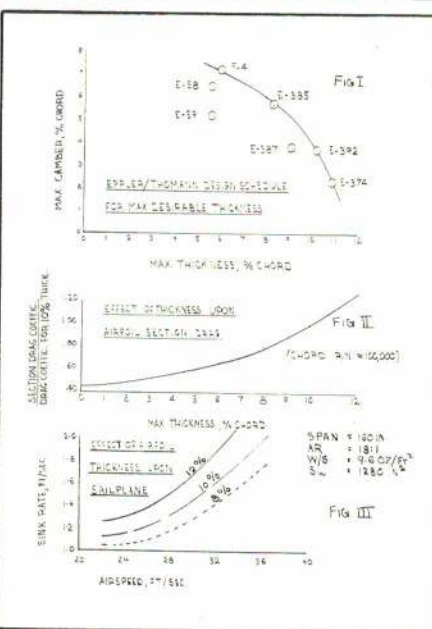
the biggest departure from conventional design was built into a new design 1/2A FF ship (the Grand Funk-320) and it worked out great. While this doesn't prove that the remaining five will be the greatest thing since fried rice, it doesn't say that they'll be poor designs either.

The new airfoils were made up by the same methods of the last few L/D= columns. This means that the Eppler derivatives were made by proportioning the parent Eppler sections to have a 7% max camber and a 6% thickness. The NACA sections were made up similarly by taking the standard 63, 64 and 65 meanlines, raising them from 6% to 7%, and then wrapping the symmetrical NACA 0006 airfoil around the meanline. The six new sections (the Omaha Chiquitas) and their coordinates are given in the table below.

X/C	E385/Mod 7.6 % Chord	E58/Mod 7.6 % Chord	E59/Mod 7.6 % Chord	NACA 7306 % Chord	NACA 7406 % Chord	NACA 7506 % Chord
0	0	0	0	0	0	0
10	1.9	4.2	5.9	1.9	1.9	1.9
20	2.3	1.26	2.3	2.3	2.3	2.3
30	2.3	0.48	0.48	2.3	2.3	2.3
40	2.3	0.24	0.24	2.3	2.3	2.3
50	2.3	0.12	0.12	2.3	2.3	2.3
60	2.3	0.06	0.06	2.3	2.3	2.3
70	2.3	0.03	0.03	2.3	2.3	2.3
80	2.3	0.015	0.015	2.3	2.3	2.3
90	2.3	0.0075	0.0075	2.3	2.3	2.3
100	2.3	0	0	2.3	2.3	2.3

In past articles I've tried to make at least a wild guess as to which sections should be better than others. But with these 7% cambers, that's really squeezing the technology, so no preconceived notions regarding "goodness" or "badness" will be offered.

The table below, however, lists some of the properties of these airfoils, which might well describe the big factors that will decide how well these new sections are going to perform. Whether they turn out to be really good sections or just so-so for competition will most likely depend on how important the factors below are.

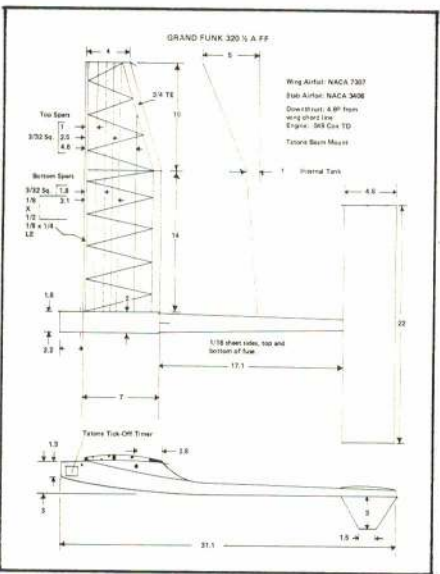


Section	LE Radius % Chord	Location of Max Thick % Chord	Location of Max Camber % Chord
E-385/Mod 7.6	.4	30	40
E-58/Mod 7.6	.4	25-30	50
E-59/Mod 7.6	.4	25-30	50-60
NACA 7306	.4	30	30
NACA 7406	.4	30	40
NACA 7506	.4	30	50

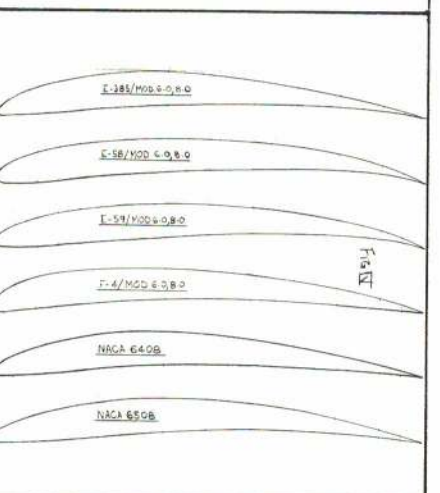
Just from the information presented, the big difference among the six is in the chord location, where the max camber is located. This ranges from 30% up to about 60% At this 30% extreme, we have the NACA 7306, and at the other extreme of 60% we have the E-59 Mod/7.6. For what it's worth, there are several high-performance, contest-winning Nordics and Wakefields that use thin, highly cambered airfoils where the max camber point is over the 30% chord location. There are also some where the max camber point is at 50-60% chord location. The most common choice seems to be around the 50% location. This doesn't make the 50% location the best, just the most common. The best location could be something different than an aft location.

The only other big difference among the six can be seen by looking at the airfoil drawings. If you look at the sketch, you'll see that the Eppler-derived sections have a meanline that stays up high in its aft portion, and does not fall back to the trailing edge as

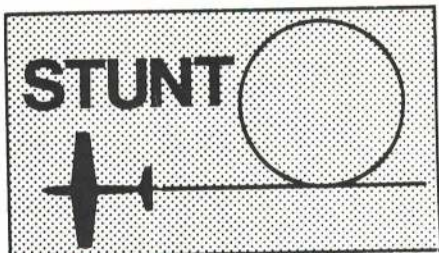
(Continued on page 105)



Because of severe space limitations, the airfoil plots and graphs from last month's L/D= were omitted. Here they are, just to keep the record straight.





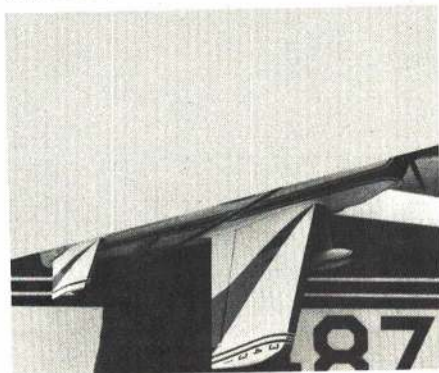


## DON LOWE ON RC

**Pattern Trends:** If you have looked at the AMA and FAI RC aerobatic judge's guides lately, you will note some requirements relative to maneuver size and positioning. Both guides are very similar in regard to statements concerning maneuver size. Therefore we will concentrate on the FAI guide.

Basically, it states that maneuvers are to be placed not more than 100 meters out, and shall not exceed 100 meters in vertical size. Adding to that the 45° angle requirement (maximum elevation), one gets an idea of a fairly well prescribed box that the rules encourage. Statements also encourage closer and smaller maneuvers than these maximum dimensions. When you add to this prescription the definition of some of the new FAI maneuvers—the Top Hat, for example—things start to get tough for the present aircraft and flying techniques.

For years now, we have been moving toward faster aircraft, more powerful engines and naturally bigger maneuvers. This trend is natural, since it is simply easier to fly precision maneuvers (especially in the presence of wind) with a fast, sleek airplane. Maneuvers have been getting so large that it is difficult to judge the track of three loops, for example, and rolls start in the distance and end in the next county.



What is it? All of you who guess a model airplane can go back to sleep. See Lew McFarland's CL column for the surprising answer. (pg. 64).

Now, don't get me wrong—I'm not knocking big maneuvers because, to me, they are pretty and impressive, and I like doing them as well as the next guy. However, with the new rules staring me in the face, I (and a lot of others) am reconsidering my approach to pattern flying. There is no question that the large maneuvers will continue to be accepted and graded accordingly at local contests. However, if the rules stick, a trend will persist (and must) in the direction of the FAI lead... particularly for those who aspire to advancing in pattern flying and shooting for the FAI Team goal.

Unfortunately, the FAI guide sticks us with size requirements and, at the same time, adds some maneuvers that almost prohibit compliance. For example, the FAI Top Hat now requires a full vertical roll prior to push over. It is almost impossible to meet the size criteria with present aircraft without an extremely fast roll rate. This maneuver also requires a healthier engine to get cleanly through the maneuvers, and a lot of speed help.

The maneuver is actually easier to accomplish than previously, and to me that's not good. I would classify this maneuver as "poor" and recommend that we return to the old form, using a half roll in the vertical and pullout to inverted position on top. This form is easily more confusing to the pilot in terms

of control direction for flight path corrections and is therefore more difficult.

The new Figure M, with its four half rolls in the vertical legs, creates a very difficult maneuver and is, therefore, the correct trend. Unfortunately, it also requires more vertical height, and tends to violate the apparent move toward smaller and slower maneuvers.

The Rolling Eight is another poor maneuver, in my estimation, since you must start the maneuver low in order to meet the altitude limit... that means facing the very real danger of ground clearance during the second loop—a lot of guys are going to run into the ground on this one! It also requires an extremely fast roll rate for the two half rolls in the middle in order to assure maneuver symmetry.

What can be done about all this? Well, in order to compete, for now, we must adjust our aircraft setup and flying style. At the same time, it would seem prudent to prevail on the FAI to bring things more in balance, i.e., change the criteria. Basically what we now need is a lower wing loading, faster roll and pitch rates, and engines that really are throttle responsive and torque well when loaded. At the same time, we need aircraft and engines that will really go, in order to clean up those rolling maneuvers, and there are a lot of them!

I have been experimenting with several of the new engines, and they all fit the bill. Engines such as the new Webra Speed 60, the Supertigre 60 ABC and Lou Ross' Schnuerle 60 all meet the need. The ST 60 Bluehead, also, continues to do a good job, but is slightly shaded by the Tigre ABC.

Flying technique requires a lot more use of throttle in order to create smaller and closer maneuvers. We also have to exercise more care in vertical size in order not to exceed the vertical 45° requirement. We recently did some checking on maneuver placement while watching buddies perform the pattern. Believe me, the old technique places maneuvers a lot further out than we imagine. Several also found it difficult and a bit unnatural to move things in.

At Fort Huachuca, New Mexico, this Praire II is Philco-Ford's latest experimental mini RPV. Powered by a 5-hp twin, it is flown with both standard RC equipment, as well as via the TV monitor behind the model.



**Additional Trends:** Now that I have my neck waxy out, let's look at a couple of other pattern trends or norms. Ships have gotten faster due to sleek design, retracts and much more powerful engines. They, on the average, are prettier—with beautiful paint jobs because of the builder's pride and the desire to impress the judges. They are heavier due to the addition of gadgets such as retracts, larger fuel supply (12-16 oz.), fiberglass/foam construction and automotive type finishes. The extra weight is a bonus in windy conditions.

Wing area and size shrank for a while, but they are on the increase again due to the need for reasonable wing loadings with the additional weight. Some have tried valiantly to push a smaller airplane, such as a 40 size, but this has been generally unsuccessful. This is true simply because the larger aircraft flies better and more realistically, especially in windy weather. I would expect that a pattern ship twice the size of present designs would fly better, but this would be rather unreasonable.

In our own Teleplane project at Wright Patterson AFB, the larger craft always flies better and can accept higher wing loadings without complaint (did you ever hear of Reynolds' Numbers?). Some are experimenting with flaps, in order to slow down the sleek fast beast for landing. Others are fighting torque with ducted fan engine designs. How about contrarotating props or twins?

Where the Action Is columns are what you readers are doing, making, or flying. Support your columnist with articles, photos, and ideas. Sketch your neat gadget. We'll draft it for presentation. Each item earns you a \$5 bill. Submit to the writer, c/o AAM.

## LEW MCFARLAND ON CL

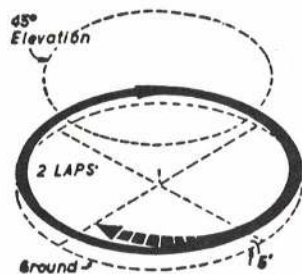
**Book On Stunt:** Because of my position as a Contributing Editor and the resulting inquiries and correspondence, I have concluded that there is a need for a book or booklet on the fundamentals of Stunt Flying and Construction. Many fine articles treating all of the ramifications of our sport have been published. However, these have been published over a considerable period of time in several different magazines. The only compiled listing I have seen: appeared in PAMPA "Stunt News," November 1973, thanks to Wynn Paul, Editor. I suggest Bob Giesecke retire and start on this project "immediately."

Seriously, in my position, you begin to feel redundant and repetitious, and yet space is lacking to thoroughly cover subjects such as: finishing, foam wings, control systems, fuel systems, fuel mixtures, variation in designs, etc. IS THERE A NEED? Our hobby constantly has new faces, those who have not eagerly read each stunt article and picked it apart for the past twenty years. These "new faces" seek information.

**Maneuver of the Month (From the AMA Rule Book):**

**13.5 INVERTED FLIGHT (Two Laps).** Correct inverted flight is judged when the plane makes two smooth, stable laps at normal level flight altitude.

Maximum 40 points. Minimum 10 points. Errors: Altitude is not 4-6 feet. Altitude varies more than two feet.



This is certainly a maneuver which needs little explanation but, without doubt, a great hurdle to perfect for the aspirant stunt flier. The learning of Inverted Flight can be approached in a semi-scientific manner, or just flip it over on its back and "try" to remember that the controls are reversed. The number of planes demolished will vary depending on the individual; there are those "natural" people who can do this. However, most should first become very proficient with (1) level flight (2) climb (3) dive (4) inside loop (5) outside loop and (6) "lazy" (elongated) horizontal eight.

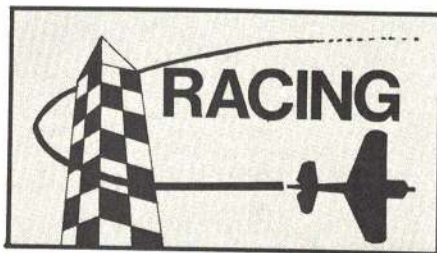
The "lazy" horizontal eight gives experience in both entry and exit, and need only be elongated as proficiency improves. When you do an eight which takes a full lap, you may have just mastered inverted flight. Dick Mathis' *How to Fly U-Control* makes a good point that can be applied to other maneuvers: "Make a dry run practicing walking backward in a circle the other way, since it is going to feel really strange to you at first with the airplane out there also. Play like you are giving reverse controls at home just to get used to the idea."

After a lot of inverted flying, you will get to be automatic in a control response. You may ease the situation somewhat with the hand (and handle) turned more parallel to the ground. A well designed and balanced plane will groove just as well inverted as in the upright position, but you must anticipate a tendency to climb as the plane comes into the wind and to dive on the down wind. . . .





The other half of the riddle (see page 63), Lew McFarland with his CL/RC Akromaster. Lew suggested, since the model flies both ways, that half of it belonged in Don Lowe's column, and that's just what we did. Lew's model will appear in the October issue of AAM.



### BOB STOCKWELL ON RC

Formula I at Sepulveda Basin: It has become customary for the modeling publications to associate themselves with major contests around the country. In Formula I Pylon Racing, the Winter Nationals at Tucson were co-sponsored by *RCM* Magazine. *MAN* has co-sponsored the Bakersfield Race the last two years. And now *AAM* has associated itself with perhaps the most active pylon group in the United States, the Valley Flyers of the San Fernando Valley in Los Angeles, in sponsoring their annual Formula I Race at Sepulveda Basin.

On the first occasion of this happy union there were 83 entries—51 in Standard Class and 32 Experts. That's not as big as Bakersfield with 104, but it's bigger than several NATS have been, and it demonstrates at the very least that Formula I, in spite of the speeds, is anything but a dying event in Southern California. So much so, indeed, that there is now talk of holding separate contests for the Standard and Expert Classes to provide more heats for each class.

This was truly an exciting race. After seven complete rounds, there still had to be several fly-offs for final standings. The contest took place in magnificent weather (for a change) over the June 7-8 weekend. Most of the entries were local, but three came from Mexico, several from Northern California (where Formula I racing has been withering for several years—a real pity since three or four of the best in the country live up there, including Joe and Ed Foster, Ron Sheldon, and Paul Benezra), and one from Phoenix.

Given the weather, many of us thought that the blistering speeds turned in during the chilly Bakersfield race would be bettered, but only the winner, Terry Prather, managed to get under 1:20. Terry turned in a 1:17.3 and a 1:17.6—and never in the entire contest went slower, according to my records, than 1:23.

Terry has finally got his Supertigre X-40 running with perfect consistency: Early in the season (even as early as the Tangerine over New Year's) it was perfectly clear that, if he could add consistency to his otherwise brilliant performance, he was going to be unbeatable this year. He deserves an enormous amount of credit for his hard work, obstinate persistence, and endless experimentation with his engine, fuel, props, and airplane to put together a flawless winning combination.

He is flying an airplane that he designed (and is now producing for the rest of us, the Prather Products Li'l Toni), an engine that he

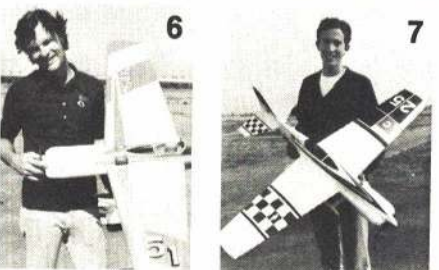
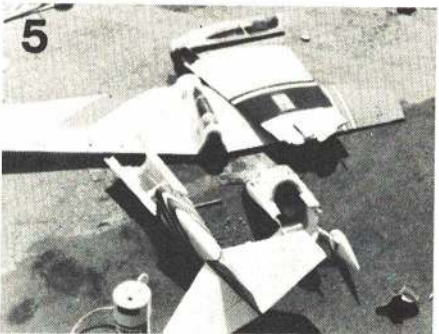
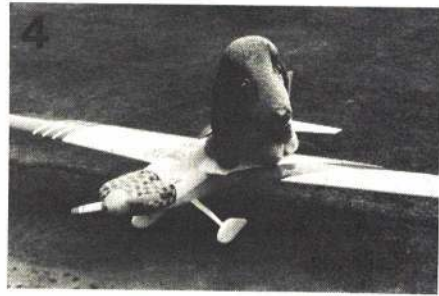
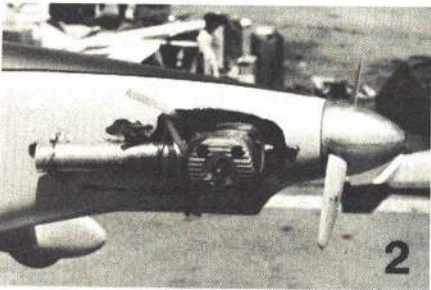
customized himself, burning his own mix of fuel, with props that he slaves over by the hour. Let's face it: That kind of initiative and excellence deserves to win. It seems to me that Formula I breeds a very special kind of excellence: Bob Smith, Kent Nogy, Larry Leonard, Cliff Weirick, Bob Violet, and Joe Foster all have it. Terry Prather has it to a surpassing degree.

In general, there are two aspects of this race that deserve special comment, besides the specific accomplishments of the winner. First is that the Supertigre X-40 has clearly arrived. Wes Morris' X-40 which was customized by George Aldrich looked to be every bit as fast as Prather's. Wes, who is a Frontier Airlines pilot, flies the big ones several cuts better than he does the toys, which is a good thing for his passengers, since he crashed his Miss DARA in a fantastically close and exciting fly-off with Dan McCan. Joe Vartanian flew a Tigre customized by himself and Jim Jensen. He was obviously fast enough to beat even Bob Smith in their heat, though Bob won it with his flawless course when Joe flinched coming down the back straight and overcorrected to get outside the pylon, losing half a lap before he got back on the course—still, Joe ended up in fourth place, his best finish ever in a major contest). Other hot STs were those of Tom Tusing, of young Mike Atzei in Standard Class (a very impressive early teenager who will be one of the big names in this game within, a year or two), of Roger Owens

(extremely fast, though he's had rotten luck hanging onto airplanes, losing one in each of the first three contests this year), of George Flynn (who was in that fly-off for eighth place with Wes Morris, Dan McCan, and Don Powell, and who also crashed around the No. 3 pylon in the heat and excitement of the race).

At the moment of this writing, it is apparent to me that a well-customized Tigre has a slight edge over an equally well-customized K&B, though not as much as the G-40 had over the earlier K&B's, and certainly nothing like as much of an edge as the infamous K&B 100 had over everything else in 1972. I honestly don't expect that K&B will stand still for this edge. If anyone knows how to rise to a competitive challenge, it is the Brodbeck and their advisers, like Clarence Lee.

The other general aspect of this race which I have to point out reluctantly, but nevertheless accurately, is that crashes due to pilot error among the experts were at an all-time high. Most of these crashes were pulling around the No. 3 pylon in tight races—and just listen to this list! Wes Morris, George Flynn, Chuck Smith, Mike Atzei, Roger Owens, Ed Allen and Jack Lee all crashed this way.



(1) Prather was the only flier to break 1:20, with his Li'l Toni, a Prather Products kit. (2) The "Prather Pipe or Exhaust Extension." Efforts to prove that it boosts power showed that it either lost rpm or held steady on the ground. Some very red faces. (3) Dick Sonheim needs new vocal cords to replace the ones he wore out. Announcing greatly enhanced the spectator appeal. Bleachers provided seating for 1000. (4) Bob Bleadon's Miss DARA with the hound dog, who's expression foreshadows the events shown in photo. 5. (6) Out of retirement, but just barely, is Whit Stockwell, son of AAM's intrepid race reporter. With lots of luck, and no speed, he placed seventh. (7) The most beautiful paint job on a racer is Dan McCan's Super DARA. Two shades of green and white—the colors are the same as Bob Hoover's Aero-Commander, of which Dan has built a beautiful model.



# AMERICAN aircraft modeler

PRESENTS  
WESTERN STATES PYLON CHAMPIONSHIPS

OCTOBER 12 & 13 1974

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Pete Storrie launches after a phenomenal eight-second pit stop. Kerry Turner assists.

40-powered 300 sq. inch profile proto?), 1/2 A Mouse racing and Formula V. The main factors are speed on a limited budget and fun for every one.

After all, isn't speed (mph) relative? Beating a guy by a second or two at 120 mph must be as much fun, and as much satisfaction, as it is at 180 mph. I'm not advocating that everything must be slowed down, but where does a beginning speed flier get his start? Not with a 175 mph B job, that's for sure.

The events being run by all these clubs are filling a great hole in our competition ranks that has been empty for all so many years. If clubs in your area run such an event, try it out. It just might be fun.

Consider Speed: While looking over the contest calendar in Competition Newsletter, edited by Carl Wheely, I can't help but wonder why there are so few Speed and Racing Events scheduled by the clubs. It seems that there are certain areas where speed really grows, and these same places have, over the years, always been hotbeds of racing activity. The L.A. area, some of the southern states, as well as North Carolina, Texas, Alabama, Ohio and New York have, over the years, furnished almost all of the speed competition for the entire U.S. More CDs ought to look in on us. We don't eat much, all we need is a few timers, a good pylon, a nice flat place to fly from and, in return, we'll give you crowd interest, along with a large entry of happy fliers.

Newsletter Editors Attention!: Of all the newsletters I receive each month, it is surprising how many of you don't have a return address on your masthead. Although I don't have the time to write to each of you every month, I do read all of your papers and digest every word. Some of you really call your shots regarding product reporting, some serious, some very funny. Some of the club names I don't really understand—for example, the *Cholla Choppers*. What is a cholla, and why is it chopped?

The *Crash Crew News* is self-explanatory. They fly lots of combat. The *Southern California Control Line Association News* always reads like a comic book. From a writer with the name of Charlie, The Tuna, what else could one expect. I know you're out there Charlie. Put me back on your mailing list. I'm still looking for club patches. If you have an extra, send it to me and I'll wear it with pride. Thanks again to all of you.

Cox Pipe: In a recent issue of *AAM*, Cox Mfg. had an ad regarding a "pipe" for the T.D.s that would give an increase in power. A call to Cox tells me that it indeed does increase power but, since it is a muffler type unit, the pipe only raises the power back to the unmuffled engine level. This is still better than any other muffler design for the smaller engines.

Look Us Up: Glenn Lee and I will be covering the Speed, Rat Race, Team Race, Goodyear, and other related unofficial events at Lake Charles, so if you have anything of interest we may have missed, let us know. I would especially like to hear your feelings on rules changes, shortcomings of our present rules, ideas that will help our sport grow—anything that will perpetuate speed flying and racing. Look us up, we'll both be good listeners.

## 200 MPH BARRIER SHATTERED

On 15 June, Jan Marsh, Mike Langlois and Charles Schubert flew their C Speed ship to a new U.S. record. Flying in a contest in Winston Salem, N.C., the team set a new mark of 200.37 mph, this being the first time that a speed model broke the magic 200 mph mark. This modified OPS 64 held up for a back-up flight of 196.64 mph.

On the same day, Mike Langlois set a new Sr. Jet record of 199.04.

Johnnie Smith will have further details in a future *AAM*.

In addition, both Larry Leonard and Kent Nogy came within six inches of crashing in the same way. Jeff Bertken, in the top of the standings with Nogy up until this race, chewed up Jim Witt's tail in a spectacular mid-air in the seventh round. Charlie Shaw and Kent Nogy mid-aired on a simultaneous takeoff, or Nogy would certainly have had a chance to fly-off with Prather for first (it happened that he was not matched against Prather in the regular heats, by luck of the draw).

Bob Bleadon busted up his Miss DARA on landing, and Tony Brown managed the same trick on takeoff. In fact, "DARA row" looked more like "skid row" by the end of the contest. There were enough mangled DARA's around to open a junk shop.

Other losses included a radio failure for Ron Sheldon, who also knows how to make a Tigre purr, one for Tad Sato, a folded wing for Manuel Sierra, and a crash induced by either a mechanical or electronics failure in Johnny Brodbeck's Minnow. Indeed, the

(Continued on page 106)

## JOHN SMITH ON CL

Fuel fixins' are getting scarce: A call the other day from a major fuel manufacturer confirmed rumors that alcohol is on the hard-to-find list. He says he may have to curtail production until a large amount is found. (Like half a million gallons!) So don't be fuelish, as the ads say. Make it last as long as you can.

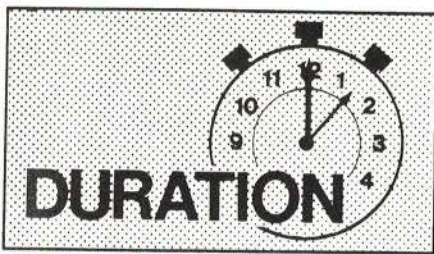
Formula V: A note from Bob Sargent (Cleveland, Ohio) tells me that Formula V Racing is still growing by large leaps. Even though the CLCB put the 1" scale size in the rules ('74-'75), the requests for plans and rules are very high for the 3/4" scale, Formula V planes. Plans have gone out to every state in the union, including Hawaii, and even some to South America. The Cleveland Aeromodel Society will again hold the "V" races at the NATS this year as an unofficial event. Last year, the winners drove from Washington, D.C., just to compete in Formula V. Most guys are running Cox Black Widows in them.

Racing is Fun: Putting fun back in racing seems to be the "in" thing these days. Of all the many newsletters I receive from all over the country, most are stressing low-cost, easy-to-fly (and regulate) speed and racing events. Everything from Slow Rat, Slow Proto, (would you believe 120 mph with a



In the true spirit of racing, Jeff Bertken (alias The Sound and the Fury) shows his true feelings about the mid-air which demolished his Super DARA. The servos are still in that fuselage!





## CARL MARONEY ON RC

What Is LSF?: You're in good company if you're curious about the LSF. Many are these days. The LSF is attracting the attention and interest of RC sailplane enthusiasts throughout the world. The League of Silent Flight is an association of and for the individual sportsman. It is not a club. . . it is a program. . . and participation neither conflicts with, nor requires club membership. However, many clubs find that group participation in the LSF can excite new interest and bring new growth.

Membership can only be earned. Membership cannot be bought; there are no membership dues or fees. To become a member, an RC sportsman must fulfill the requirements of Level 1 of the LSF Soaring Accomplishments Program: a five-minute thermal flight; a 15-minute slope flight (or a second five-minute thermal flight); and five spot landings within three meters (9.84 feet) of a target point.

LEVEL	Primary	Intermediate	Advanced		
REQUIREMENTS (I)	(II)	(III)	(IV)		
THERMAL DURATION	5 min.	15 min.	30 min.	1 hr.	2 hrs.
SLOPE DURATION	15 min.	1 hr.	2 hrs.*	4 hrs.*	8 hrs.
PRECISION	5 landings 3m (9.84 ft.) 30' less	10 landings 1.5m (4.92 ft.) 11' 0" less	None	None	None
SPOT LANDINGS	None	None	1 m (3.28 ft.) (0.82 m.)	2 m (6.56 ft.) (1.24 m.)	10 m (32.81 ft.) (16.21 m.)
RETURN	None	None	1 m (3.28 ft.) (0.82 m.)	2 m (6.56 ft.) (1.24 m.)	10 m (32.81 ft.) (16.21 m.)
COMPLETION	6 contests with 1 place or 3000 points	5 contests with 2 places or 4500 points	5 contests with 2 places and 1 win or 6000 points	5 contests with 12,000 points, including 4000 points	3 wins

\*A second thermal flight within limits of the slope duration requirements, however, the second thermal flight may not be flown on the day of the slope duration requirements.

Advanced levels in the program are progressively more challenging. Level V, for example, requires a two-hour thermal flight, an eight-hour slope flight, a 10 km (6.21 miles) goal and return flight, as well as considerable success in soaring competition. Members—sportsmen who have achieved Level 1 or higher—are privileged to display the distinctive LSF insignia. The LSF emblem on a jacket or sailplane is a symbol of proven performance. It is displayed with pride, and is recognized anywhere in the world. The LSF is a personal challenge, and serious sportsmen are invited to associate with the League. The first step? Declare your intent. Use the coupon reprinted here.

**Slope Opera:** (by Cas Pels, AAM's Midwest Correspondent): For years, we soaring enthusiasts in Chicago and surrounding environs had been envious (to some degree) of the slope soaring sites enjoyed by Californians.

After exhaustive exploration encompassing a radius of 125 miles, we of SOAR have discovered a site that has lain dormant almost at our doorstep. . . Lake Michigan. Although

there are no bluffs in the immediate Chicago area, the little town of Cudahy, located just south of Milwaukee, offers the slope bluff sheer rises up to 150 feet on the lake front. When easterly winds of 10 mph prevail, slope soaring becomes a reality.

An expedition was formed to try this fabulous sport. That day turned out to be one of the best encountered yet and proved to be an immediate success. Those of us who were there were instantly hooked.

By 10:00 am, the residents of Cudahy became alarmed when reports were made of aircraft seen plunging into the lake. There have been times since, when the local gendarmerie converged upon the lake shore to check out these rumors, only to find a bunch of nuts from Chicago with their airplanes.

Now, the kind of slope soaring such as that found on the bluffs of Cudahy, or the cliffs and ridges of California's coast, can rarely be equalled in extended length. This wide expanse can accommodate any number of flyers simultaneously, whereas the inland variety of hills and bluffs has a limited breadth and a resultant area of limited true slope lift.

Usually, on the inland slope sites pilots will climb the slope lift to maximum altitude and then strike outward in search of thermals. In this way, more gliders can be airborne as the space in the lift area becomes available to them.

As often as we have flown the Cudahy bluffs when conditions were ideal, we have never ceased to be impressed. I would stake my questionable reputation on the fact that a well designed beast of six to seven feet in span, with acrobatics in mind, could perform many stunts which, till now, remain in the province of powered ships.

It was once stated that flying a good slope site is like flying in a giant boomer which just won't quit. . . that even your lemon can be respectable there. To such a statement I will indeed subscribe!

However, to those of you who have never been exposed to slope soaring and have been regaled thus far with tales of the thrills and excitement which awaits you, I feel I would

(Continued on page 110)

## BOB MEUSER ON FF SPORT

**Catapult Capers:** During our severe Northern California winters, when the mercury has been known to drop as low as a bitter 40°, the more "serious" forms of Free Flight give way to the kookier events, among which is Catapult Glider. At the More-Or-Less Annual Catapult Conclave and Sandwich Social of the Oakland Cloud Dusters, there usually appear about equal numbers of well-worn has-beens (gliders, that is) and shiny-new hopefuls. Most of the gliders conform to the standard format: a beamed up, sometimes overgrown, hand-launch glider.

But, occasionally, there appears something a bit far out. This year it was Dave Parson's model, which had a closer kinship to FAI Power model technology than to the lowly hand-launch glider. Dave's model was a big devil, sporting a built-up wing, a Tatone timer-operated auto-stab—the mechanism is identical to that used by Dave on his

FAI-Power models—and a gross weight of half a pound. When launched, the model would follow its nose along a straight line until its momentum waned, then the trailing edge of the stab would pop up about 1/16", putting the model into a floating responsive glide pattern.

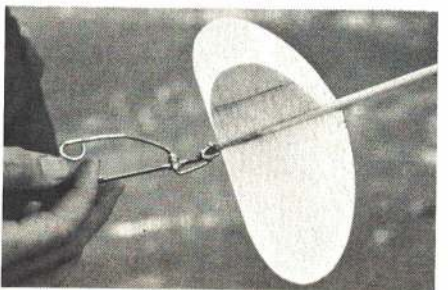
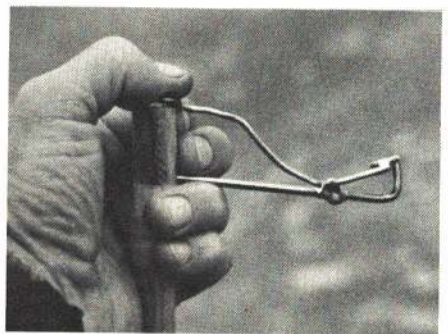
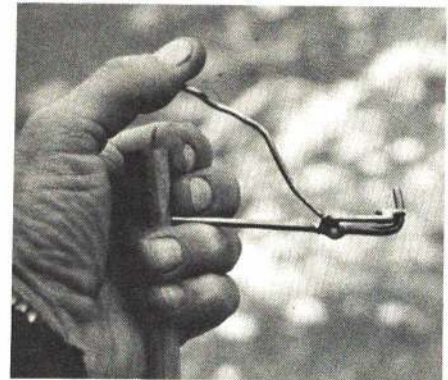
But for a bad recovery on his last flight, when the timing was off, Dave might have won. He had to settle for second place to John James, who put his rather small conventional model up to extreme altitude with great consistency. In the Juniors department, 13-year-old David Bowser, who has only been flying a few months, showed some of the old-timers the fine art of trimming one of the cantankerous beasts, and came out top man (or rather, boy).



Dave Parsons gives Davie Bowser an assist with the launch of his catapult glider. On the following flight, the rope slipped. Davie was last seen flying low over Sacramento. Mather Field reported an UFO sighting at about the same time.

The catapult consists of an eight-foot pole, anchored by four guy wires, to which is attached an eight-strand loop of 1/4" rubber about three feet long, the tail end of the

(Continued on page 110)



To: LSF Executive Board  
P.O. Box 39068  
Chicago, Illinois 60639

I, \_\_\_\_\_ (please print), will support the philosophies, concepts and criteria set forth in the Bylaws of THE LEAGUE OF SILENT FLIGHT and give notice herewith of intention to attain Level 1 of the LSF Soaring Accomplishments Program, and by so doing, earn full recognition and privilege of membership.

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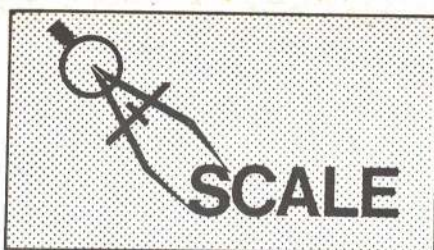
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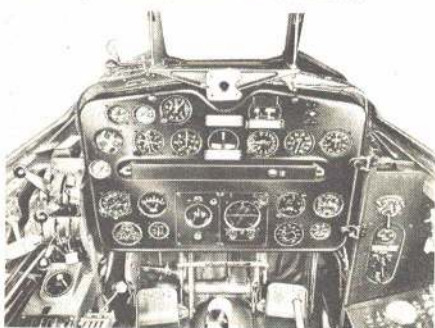
## CLAUDE McCULLOUGH ON RC

**Photo Finding:** A good collection of pictures of the prototype is essential in designing and building a scale model. If it is to be used in competition, AMA rules also require photos of the actual aircraft modeled. Several years ago, this column featured a section called "Scale Date Sources," which listed some government agencies and other places from which photos could be obtained. Since a lot of this material is now obsolete, an up-dating with additional information should be of value to both old and new readers.

In writing for photos or information, it is important to provide as complete a description of the subject as possible. Some of the file researchers are not aviation oriented, so list full aircraft designations, with serial numbers if available. Include number or letter codes of the particular group or squadron, if known. State the year or approximate time span of the plane's operation. The more the choices can be narrowed down, the more likely the exact shots you need will be delivered.

Although the government files have good sections on individual aircraft types, there are generally other shots of the same airplane listed under other titles, such as crews names, unit designation or in connection with an historical event.

Coverage ranges from extensive to non-existent, depending on the subject. For instance, when I asked the National Archives for photos of the rare (two planes built) Douglas TB2D, they reported they had none, but said "several thousand" could be provided of the Douglas TBD, which was an operational aircraft. This is not indicative of lack of coverage of experimental types, however, for they had many shots of the Douglas TBD, including close-ups and cockpit views.



In line with the recent government trend to make users of public services pay all the freight (and more!), prices of prints have risen steeply. Since they are of usually excellent quality and obtainable no where else, the dedicated scale nut will find them worth the money. The photo labs are busy and delays of three to six weeks and more are common.

To be absolutely certain of getting exactly the photos needed, nothing beats calling in person and picking them out yourself. If you live near the facility or are in the area on vacation, go to the address, state that you are doing aviation historical research and sweat out the minor amount of red tape necessary to get admission to the files.

If it is not practical to do this, the National Archives are most notable for their excellent file search report given in reply to mail inquiries. A form is returned listing photo numbers (with a full description of the subject) that seem to meet your requirements. Select those wanted and return the form with payment. Be reasonable, and don't ask for descriptions of dozens of photos if you are only planning to buy a couple.

A main attraction is their huge collection of Navy aircraft photos, since the entire files

of pictures taken prior to 1964 have been turned over to them. On some planes, sparkling clear photos of every detail, external and internal, are catalogued. Many other civilian and military types are covered, some in color. Write to: Still Photo Branch, National Archives, 7th and Constitution, N.W., Washington, D.C. 20408. 8 x 10" glossies are \$2.25 each. Photo copy per page is only ten cents each, so a selection could be previewed by requesting a photocopy of a particular photo before ordering a print.

The Air Force provides photos at a cheaper cost, but the hitch here is that no research service is provided. Money must be

*(Continued on page 111)*

**NEW AEROLYMPIC TEAM MEMBER:** Tragically, Bob Karlsson recently lost (crashed) his Scale Team entry, a rivet-for-rivet model of a Corsair. Bob spent a year patiently refurbishing this third place NATS' entry, using a full-size Corsair as a guide. We're sure that Bob will be back with an even better model real soon.

Because of this, Bob is relinquishing his berth on the U.S. Scale Team. First alternate, Walt Moucha has other commitments, so he will not be able to fly at Lakehurst. Therefore, Bob Wischer gets the nod as the third member of our team. Bob is a seasoned veteran, and will assuredly do well at the contest.

**We mourn the demise of this beautiful masterpiece by scale maestro Bob Karlsson.**



## WALT MOONEY ON FF

**A Journey:** In the first week of June, I was able to make a trip which, for an old time model builder (40 years yet), was like a pilgrimage to Mecca. The job at which I make my living sent me to Pennsylvania. While there, I was able to meet, for the first time, an old friend.

Bill Brown, the designer of the first successful model gasoline engine and the producer of CO-2 engines, lives in Pine Grove Mills, Pa. I gave him a call and was invited up to see Bill's operation. Bill's charming wife invited me to supper and, during the meal, I was introduced to the history of Brown Jr. Motors.

For the Juniors in model building, Bill Brown's story should be an inspiration. His father was an engineer and allowed Bill to use machine tools. However, when Bill decided to build a small gas engine, his father tried to convince him that it was an impossible task. Every evening he would tell Bill to quit wasting his time. If it could have been done, someone would have done it already, etc.

As Bill puts it, "You can imagine my father's chagrin when he came home one afternoon and I had it running in the basement." This engine was the beginning of the gas model airplane hobby. The important part of this story, from the Junior standpoint, is that Bill Brown was only 13½ years old when he made the first successful engine!

Bill is now in the midst of a production run of 1000 two cylinder CO-2 engines. He kindly took me through his shop and showed me the tools, and the way that they are used to make the little jewels. His operation is only a two-man shop, so getting tooling up for production has taken some time. Most scale modelers are impatiently waiting for the results.

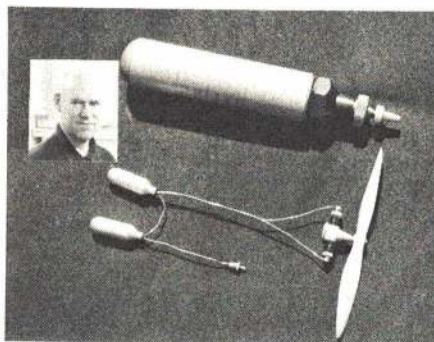
The evening that I visited Bill, the State College RC Club had a scheduled meeting. Although Bill has never built an RC, he says he'll always be interested and has been a member of the club for 12 years. He loaded up his car with CO-2 models to demonstrate

in the college gym and off we went to the meeting.

There are no finer people than model builders, and that the members of this club all love and respect Bill was at once obvious. Several members had scale models at the meeting. George Gurney had an almost complete 50" span Taylorcraft, based on the Comet kit. He intends to power it with the new CO-2 twin and fly RC indoors. Al Neissner has a slightly smaller, lightweight Aeronca built for the same mission.

After the meeting, Bill Brown demonstrated his models. A Piper Super Cub, powered by a single cylinder CO-2, did over a minute under about a 25' ceiling. A kit-built Piper Cherokee flew well. Then came the really great Comet kit-built Piper with the twin cylinder CO-2. This is at least a 30" span model—much larger than I would have thought you could fly in a gym. Bill let it ROG and it flew in smooth stable circles for almost two minutes, coming down to a smooth landing and roll out.

Besides the CO-2 twin, Bill is also trying to develop a more convenient loader than the seltzer bottle cartridges which the present loader uses. These are good for six-ten flights with the single cylinder CO-2. Bill's charger of the future uses a CO-2 reservoir from a fire extinguisher. It will give a couple of hundred flights. This, Bill says, is still under development and not ready for production.



The man who built the first practical production model engine. Bill Brown is still at it with CO-2 power.



Peck Polymer has added a classic to their Peanut line. The Nesmith Cougar is a smooth, stable flier.

**Fresh Peanuts:** Bob Peck has two new kits on the market. Both are well tested Peanut Scale designs. One is the Andreason BA4-B sport biplane and the other is the Nesmith Cougar.

The Cougar was designed by Clarence Mather whose original always flew superbly, until it finally did 9:29 (flying O.O.S.) on an official flight at a Peanut Scale contest. The Peck kits are good. Their plans are very complete and include a scale three-view. The wood is carefully selected. Plastic props and

*(Continued on page 112)*

Bill Stroman flew this well-detailed DH 5 at the Las Vegas New Year's Contest.







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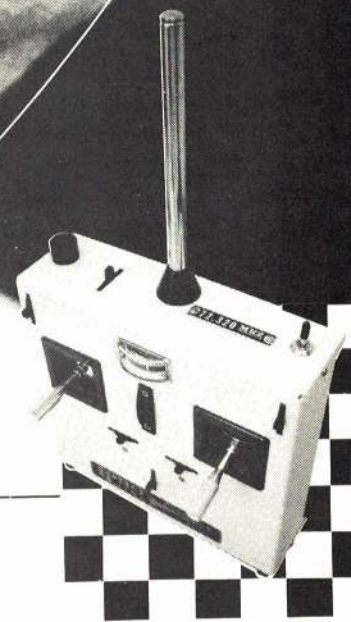
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**BEAM 5"**



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BY DAVID ILLSLEY





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*...And Especially the Newcomer  
to .60 Radio Control Flying*

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AND ABOUT THE KIT ITSELF . . . Fuselage sides are one piece with ply doublers back past the wing. Only a few bulkheads and a shaped top make for almost "instant fuselage." Torsion main gear & sprung nose gear (or fly it as a tail dragger). Aluminum

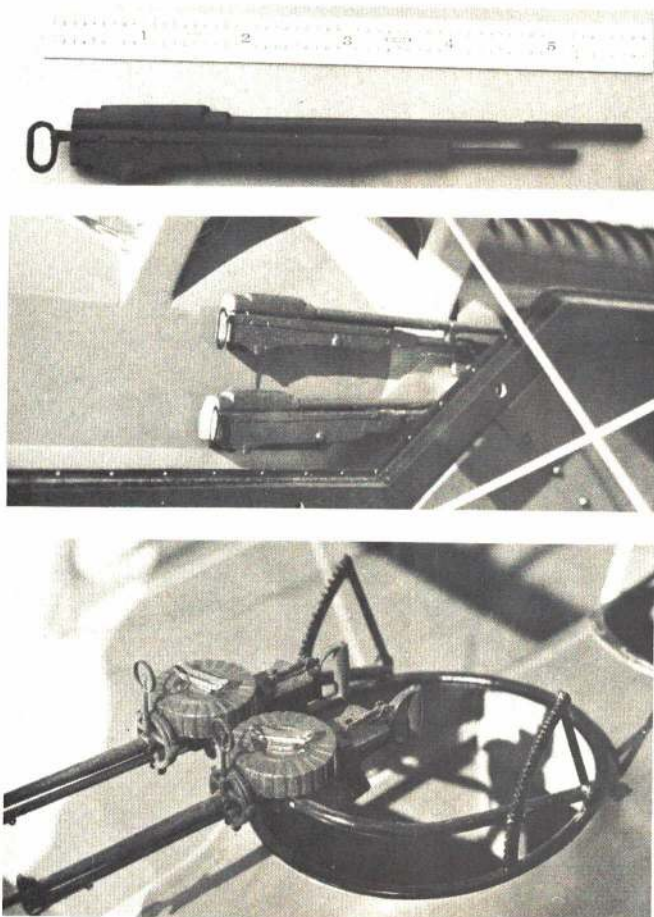
engine mounts, etc.

The complete wing is built on the work bench without having to remove it which eliminates warps — All parts are die cut, carved, etc. Balsa sheet cover keeps warps out and makes for a tough wing . . . Tapered Strip Ailerons are simple to install. Wing is installed just like the low wing jobs, using dowel pins and nylon-screw in maple nut-block, like it ought to be. No rubber bands to deteriorate or slip or tear up.

Elevator and Rudder are sheet. Stab & Fin is built up and sheet covered to keep it flat . . . so that's it, a fine kit of a fine ship.



**\$49.95**



## LEPERE L. U. S. A. C.-11

*(Continued from page 21)*

ing blocks to a building board, so that the spars rest on the blocks. Now slip the ribs onto the spars and temporarily fasten the spars to the jig blocks. Glue up everything at one time, aligning the ribs with a T-square to keep everything straight. All four wing panels are the same length and shape, except for the angled trailing edge on the top wing. This is cut after the basic structure is assembled.

Laminate the tip bow over a plywood form, which is cut to match the inside curve of the wing tip. Use four pieces of balsa, which have been soaked in hot water. Both the front and rear spars on all wing panels extend into the fuselage, where they are bolted to plywood plates fitted with blind nuts. Cut out the ailerons, add the 3/16" balsa caps and hinge them to the wing panel.

The curved parts of the tail group are made like the wing tips. When laminated and assembled, sand the horizontal tail feathers to a lifting airfoil shape. Because the tail group cross section is so thin, spruce is cautiously used in some of the construction.

The nice thing about the Lepere rigging, which is also unique, is the one-piece wing struts. These insure proper incidence between the wings. Make these from plywood, faced on all sides with balsa. Epoxy the struts to the spruce compression members between the spars.

It is the scale details and "add-ons" which make the Lepere so interesting. Make the top radiator from aluminum tubing. It is removable, to gain access to the top wing bolts. Make the windshield frame from .020 aluminum, and rivet .010 acetate on the inside of this, using Sig scale rivets. The corner posts, at the frame bends, extend into the fuselage for greater strength.

The Lewis machine guns are assembled from the popular Williams Bros. plastic kits. There are no such kits for the

**ABOVE:** The Marlin .30 cal. machine gun, to scale. **CENTER:** This awkward placement of the Marlin guns might have made pilots wonder just whose side the installer was on. **LEFT:** A pair of Lewis guns for the observer.



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Marlin guns. Make these from brass tubing, brass sheet and balsa, using the photos as a guide.

Because of the large wing and thin airfoil, the flying wires provide necessary bracing. To simulate the flat wires, use strips of .020 aluminum sheet, sheared to 5/32" width. Proctor streamline wires are slightly small, but could be substituted.

Covering was done with the old-stand-by, silk and Aero Gloss. The fuselage should be completely covered, except for the metal and fiberglass parts. The undercambered wings require adhesion of the silk to each rib. Do this by poking through the silk with a pin dipped in glue. The tiny holes will cover after a few coats of dope.

After brushing the first coats of clear, spray the remaining fill coats. When the silk begins to fill, dope on the simulated rib reinforcing tape, which is cut from light silkspan tissue. The photos of the original indicate that these strips are not as shiny as the rest of the covering, so don't use too much clear on them.

The roundels and stripes are masked and sprayed first. The Aero Gloss colors are Swift White, Fokker Red and Curtiss Blue. Mix the Light Earth color from white, Cub Yellow and Camouflage Tan. The photos show a shiny finish even though, later, these same colors were matte finish on war planes.

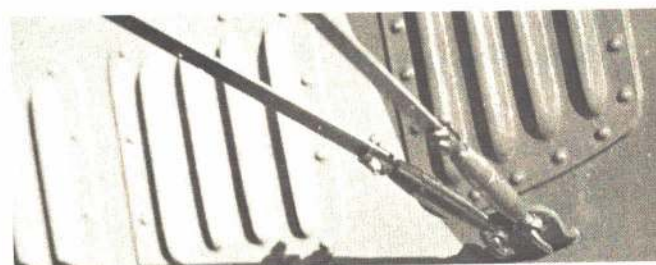
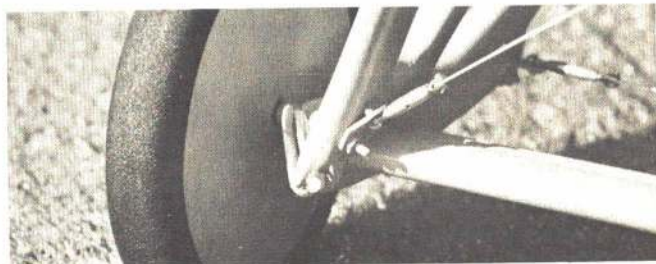
After all color painting, wet sand the model with 600A, and spray two coats of Aero Gloss Clear. The rub-on lettering is Para-Tipe 33064, 11321 and 11072. Spray a light coat of clear over the lettering for protection.

The instrument faces were cut from an actual Lepere cockpit photo, which was enlarged to scale. Some of the dials are vertical reading—quite an innovation for 1918. Frame the vertical dials with 1/32" plywood and set the round instruments in brass tubing.

#### FLYING

The first flight of the Lepere indicated some tail-heaviness. The CG was located per the prototype airplane, but this

*(Continued on the following page)*



ABOVE: Real bungee cords spring the landing gear. Wire wheels are covered with sticky Cover-rite. CENTER: Detail of the metal louvres and flying wire attachments. RIGHT: With so few breathing ducts, the engine needs a heat sink.





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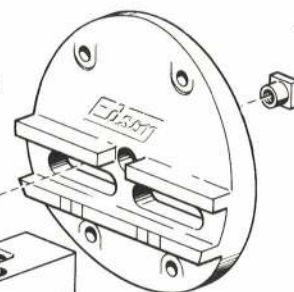
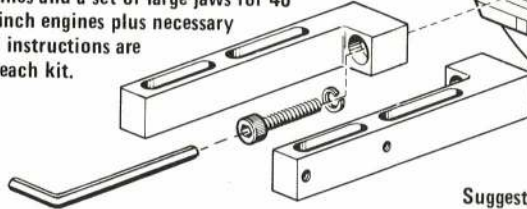
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## LEPERE L.U.S.A. C.-11

(Continued from page 73)

was apparently in error. After correcting the balance, no other changes were necessary.

It is interesting to note that the ST 71, swinging a 14 x 4 prop, is more than enough to fly the model, so most of the popular 60-size engines should be adequate. The Lepere has shown no unusual handling problems. Because of its size, the model should be flown with a smooth touch. The massive wing has a tremendous lifting capacity, so try to avoid sharp pullouts from dives and spins.

The Lepere has proven to be an excellent performing scale machine. Its large size and low wing loading contribute to slow, graceful maneuvers, which are easily placed exactly where you want them.

WHAT'S THE NEWEST SPORT?  
SEE PAGE 11 FOR THE ANSWER

## A LA RECHERCHE DU LEPERE

(Continued from page 20)

and stopped. Now, re-settling in the seat and pulling on heavy leather gauntlets against the biting cold, Cottrell gave the panel and the sky a final once over. And gently eased the throttle forward.

Turning out of the pattern, Cottrell headed the Lepere for 3000 feet, and took his time about getting used to the feel of the ship. *Ailerons? Good. Not stiff. Good response. Elevator? O.K. there, too. Rudder? Oh nice. What th-- Uh uh, vibration!* Instinctively, he snapped a look behind him. *Construction problem? Rigging problem?*

But, reassured that nothing was in any danger of falling off, he turned his attention back to the instruments. And became fascinated by a slow, steady rise on the oil temperature gauge. *Don't like the looks o' that!*

He put the Lepere into a shallow dive to see if a little more cold air across the radiator might help the situation.

The engine cut out.

He tried it again.

It cut out again.

*O.K., have it your way.*

Although Cottrell decided he could live with the situation, he couldn't stop thinking about it, and the possibility of fire. As a precaution, he cut the fuel to the carburetor. And waited. *Too slow! Too slow!*

Then, letting the fuel flow again, Cottrell and the oil temp continued their slow, steady rise over Paris. The oil temperature levelled off at 100°; Cottrell at 3000 feet.

Now, with air combat in mind, pilot considered airplane: *Visibility overhead? Good. To the side? O.K. Down? Marginal!*

Blind to what was directly below him, the reconnaissance pilot in Cottrell labelled that a distinct disadvantage. He looked around the fuselage and wings for a likely place to stow his precious cameras.

Forward visibility wasn't anything to shout about either but, since he'd been

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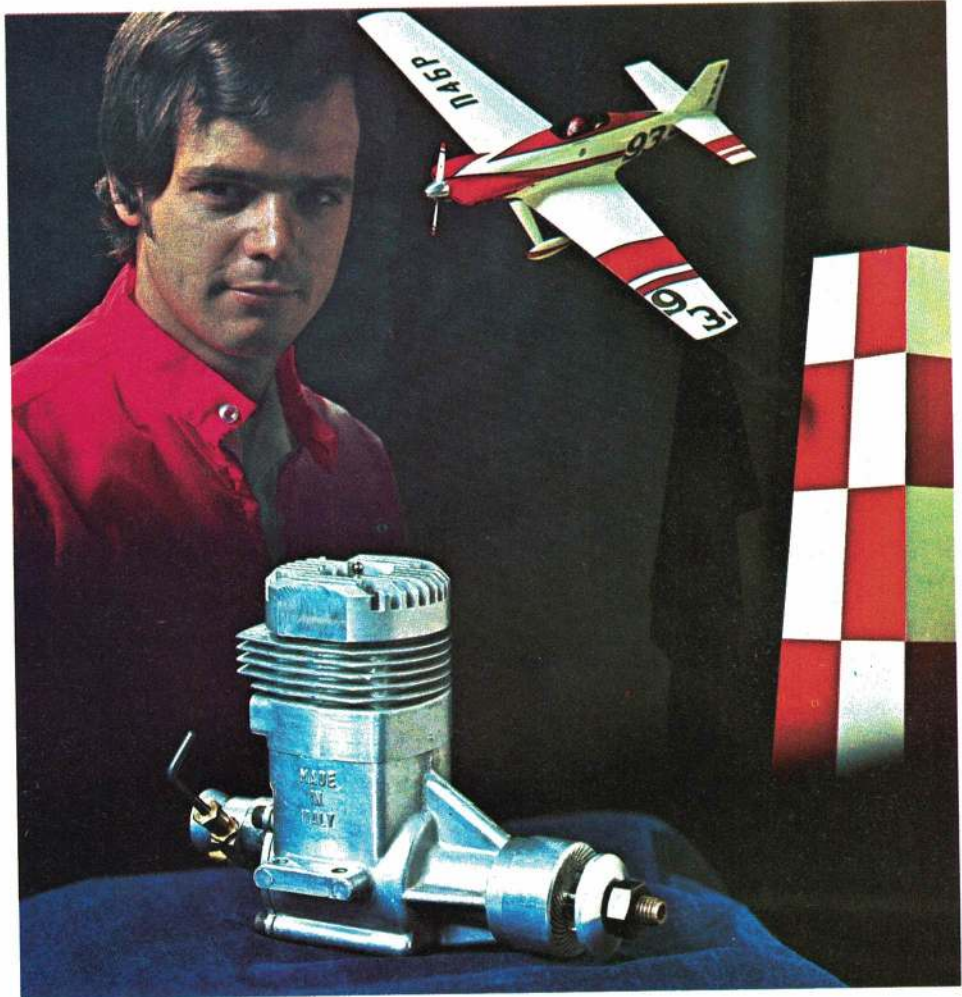
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## TERRY PRATHER

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"Dear John:

The following is a summary of the success I have had this year using the Super Tigre Engines.

1st Place Tangerine	Orlando, Florida
1st Place Valley Flyers	Oxnard, Calif.
1st Place Birds Club	Whittier, Calif.

2nd Place San Gabriel Club	Whittier, Calif.	
2nd Place N.M.P.R.A.	National Championship Race	Van Nuys, Calif.
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Sincerely,  
Terry Prather

Terry Prather set a new speed record for Pylon at the "73 Tangerine. Time: 1:17.2.



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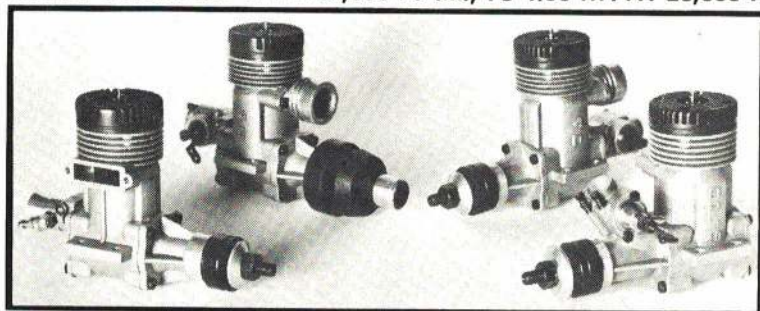
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The basic idea of "Project 40" is to enable the production of different versions of engines with interchangeable parts.

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In addition, two different piston and sleeve assemblies are available for the .29 and .40. Both are ABC design and permit or prevent the use of the tuned exhaust system. The only difference in the sleeves is in the timing of the exhaust ports.

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FRONT INTAKE / REAR EXHAUST	SPA-RC	REAR INTAKE / REAR EXHAUST	SPP-RC
REAR INTAKE / SIDE EXHAUST (PYLON)	SLP	REAR INTAKE / REAR EXHAUST (WITH COOL CLAMP)	SPP-MARINE-PIPE
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flying Salmsons most of the time, he figured perhaps he was spoiled.

Spotting an unsuspecting bird and sighting in on the "bogey," Cottrell gave the Lepere full power. Instinctively reaching up to clear the guns, his hands beat empty air. In their present location, he had to strain outside the fuselage to reach and grasp the handles. Unruffled, the "bogey" flew on.

Then, settling down to simple flying, Cottrell tested for stability, control and maneuverability while flying a lazy pattern in the sky. Everything felt comfortable and easy. If only the oil temperature gauge wasn't such a worry, he'd give it a good wringing out. But, best not to chance it.

Time passed swiftly, until he realized he'd been up almost 30 minutes. Quickly spotting on the Eiffel Tower, he made a wide turn over the city and sighted in on Orly for a slow glide into the field.

**P**leased with his wheel landing, Cottrell taxied toward the waiting group. As he drew near, he recognized the form of General Mitchell standing with another man, and talking to the boys from the 24th.

Cottrell climbed out and saluted, but Mitchell quickly dismissed ceremony: "Nice landing, Lieutenant."

Then, turning back to the others, he said, "Now gentlemen, I do not wish to influence your reports, but I cannot emphasize strongly enough how important this airplane is to us. After you've all had a crack at it, write up your reports. But remember—someday you may be flying your opinion. So be sure it's there. When you're finished, you're free to return to your unit. Thank you, Cottrell, let's take a walk!"

When they were comfortably away from the group, Mitchell leaned up against an airplane. "Well, Lieutenant?" "Sir?"

"The Lepere. . ."

"Well, sir it flies well. I felt perfectly at home in it. It's very stable, maneuverable, easy to handle. Really not a bad airplane at all. There are a few. . . Well, I suppose my chief criticism is with the motor—overheating and all—but I don't think these problems should take too long to correct. Nor should. . . well, the guns, sir. They're in a rotten place! And there's some very noticeable rudder vibration. But these things are small enough. They can be taken care of in production. . ."

But production was not to be. And, whatever hopes Billy Mitchell may have had for the Lepere vanished. The temporary suspension of hostilities—the Armistice—stretched gingerly from day to day. So, instead of the nearly 3500 ordered, only a few pre-production Leperes were built. And rather than as a highly regarded combat machine, the remaining Leperes lived their service lives as test beds—experimental aircraft—fitted and re-fitted, torn down and re-assembled to perform tests of one sort or another. . . high altitude experiments, testing new super chargers, variable pitch propellers, new aircraft paints, experimental camouflage schemes, any-



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thing the Air Service was working on. By 1924, Wright Field files were silent as to their whereabouts. And today, the only remaining Lepere (SC-42133) is in France's Musee de l'Air.

There was a little-known civilian version of the Lepere built in 1920, by Waldo Waterman, for L.C. Brand of Los Angeles.

Consider this. In 1920, the U.S. Army's Lepere L.U.S.A.C.-11 was to military aviation what a late 1960s fighter is today. And the fact that a wealthy businessman could have one built is somewhat like the wealthiest man in your town having someone lay up, say, a Grumman Tom Cat just to toddle around in.

In 1920, Waterman Aircraft Company was located at Venice Airport, not too far from Los Angeles. In those days, Venice, as a community, was a real estate developer's dream of Venice (Italy cum California), with canals and housing developments, parks, terraces, the whole 1920's schtick. Venice Airport was an early day version of a fixed

base operation, and "home" to a varied assortment of struggling airplane builders, attached and un-attached fliers, test pilots, barnstormers, sky writers, stunt pilots and happy hangers-on.

**A**t the time Waterman got the order from Brand, he hired L. Morton Bach to help in the project. (Mort needed the money in order to complete an airplane of his own that was going up in another corner of the airport.)

Although he's not positive, Mort feels pretty certain that Waterman bought the Lepere plans from the Packard Company, the original prime contractor on the airplane. Mort worked on the project for about three or four months (until his own OX-5 powered airplane was finished, and then he and Clarence O. Prest, in line with the times, took off from Venice Airport to attempt a Mexico-to-Siberia long-distance flight).

Mort recalls that the L.C. Brand Lepere (as it became known) was built

around the same Liberty 12 as its military counterparts, and followed essentially the same overall plan-view as the military version. Obviously, there was the exclusion of ordnance in order to adapt it to civilian use.

About the time the airplane had been roughed in, Bach and Prest took off for the frozen north. Then, perhaps a month or so prior to the completion of the airplane, Waterman hired another airport resident to do the testing. This was Gilbert G. Budwig, who, since quitting the Air Mail the year before, continued gambling with life by doing experimental test work. Until actual testing began, Budwig worked as a mechanic installing the fuel system on the airplane. It probably saved his life.

One of the modifications to the Lepere plans had been a considerable increase in fuel capacity. The pilot's seat was, actually, a huge gas tank shaped like an arm chair—the "arm rest" part being more fuel (not unlike the Albatros CVs). This seat-tank system was connected to an air-driven pump located

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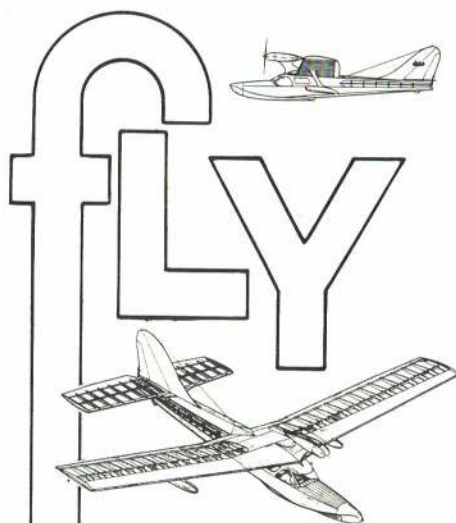
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under the fuselage.

Also, in front of the pilot, and extending to his lap and down to his shins, was a second "main" tank. This tank was connected to another air-driven fuel pump under the fuselage. The pilot was encircled in gasoline. (All this added weight aft of the CG made the airplane a notorious ground looper.)

Anyway, based on the drawings given to him, Bud installed a flood-and-return fuel system into the Lepere. Depending on which of the tanks was in use, one or the other of the fuel pumps (two handles located on the floor) would pick up fuel from the tank and pump it up to a tank located in the center section of the airfoil. From this airfoil tank, there was a fuel line leading down and turning forward to the Liberty's two carburetors.

On the test flight, Bud was perhaps 30 feet off the ground when the engine quit with a sound that indicated to him that it was not getting fuel. Assuming that one of the air-driven pumps had failed, he immediately ducked down into the cockpit to turn on the second pump.

The engine re-started immediately, but—

The center section airfoil tank burst, spraying out of the trailing edge of the tank. The exhaust pipes, located about 18 inches below, began shooting out four or five feet of flames. Oh, happy day. And, because the area around the airport was considerably built-up with housing, there was no place for Bud to go but up.

Carefully climbing to 2000 feet, he levelled out and throttled back (in order to cool the engine off as much as he could), and hoped that, when he switched off the engine, it wouldn't backfire on him.

When he dared chance it, Bud held his breath and switched off the ignition. He was living right that day. There was

no backfire, and he was able to glide to a dead-stick landing. (And, it was here that he found out about its ground looping tendencies!)

What had caused the accident was that during roll and lift off (with the fuel from the airfoil tank flowing straight down and forward to the carbs as it did), the momentum of takeoff prevented the fuel from reaching the carburetors. This problem was corrected by the installation of a small two-gallon tank placed forward of the engine and used during the takeoff sequence.

**B**y the time this and other deficiencies were corrected (although it would always be 400 lb. overweight), Budwig was hired as L.C. Brand's personal pilot. While the plane was delivered with this corrected fuel system, within a month of delivery to Brand, a whole new fuel-line system was installed by Ed Barnhart (later, builder of the Barnhart "Wampus Cat"). This new system, for the following two years, never gave Bud any trouble.

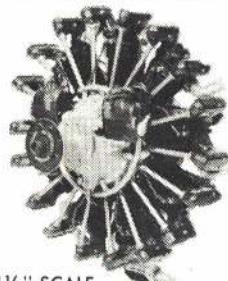
Barnhart also fabricated a new and larger tail, but its ground looping habit was never resolved. However, Budwig found a way to live with it. After touch-down, and as soon as it started in on its here-I-go-again turn, he'd hit full power, full rudder, and eat up more ground than a 707.

The Waterman (L.C. Brand) Lepere was a beautiful airplane—mahogany finish with six coats of varnish hand rubbed, a warm contrast to its buff-colored linen wings—but definitely not one man's favorite airplane. When Brand died a few years later, he willed the airplane to Lowell Smith, one of the Douglas World Cruise pilots. Kinda makes ya wonder why; doesn't it?

Grateful acknowledgements to: Clifton C. Cottrell, for the use of his test report (Although the 24th Aero Squadron, as a unit, was considered too inex-

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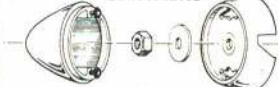
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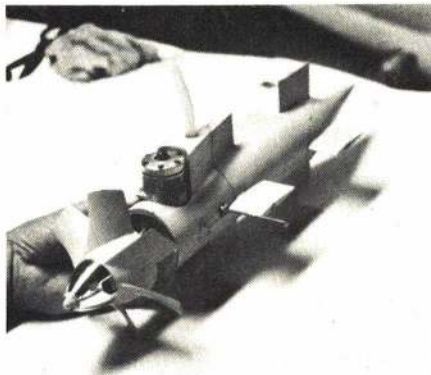
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perienced to participate in the St. Mihiel Offensive, Lt. Cottrell, on loan to the 91st, was among pilots of the 24th who flew reconnaissance preliminary to the opening guns of the Offensive, and for the Meuse-Argonne Campaign that followed.); L. Morton Bach; Gilbert G. Budwig; Northern California Chapter, Cross & Cockade.

**A DUCTED FAN ME 262 A-1a**  
(Continued from page 4)



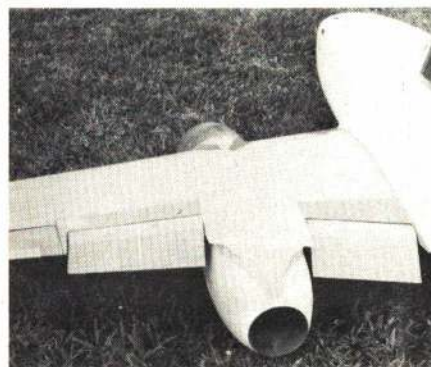
The HP 40 fits neatly in a tailored inner pod. The pod accommodates a 10-oz. tank. The fan is hand-carved from basswood.

from the fiber blades in a ply hub route favored several years ago) we got reasonable thrust quite readily, and the 6.2 lb. mentioned in the column was achieved two years ago, with an HP 40, running on Fox 40-40 fuel (40% nitro). This was with a regular small-bore RC carburetor and no pressure, and, here's the vital thing, this was measured while mounted *inside the model*, a 62" long Hunter.

We experimented at great length with different carburetors, to find the greatest bore area (and thus power) the engines would tolerate without using pressure. Ultimately a bore around .290-.300" was found to be optimum. Idle speeds of 4500 are normal when fanned for a top end of 19,000-19,500: this with the HP 40 engine and Mag III carburetor bored to .290".

We also flew a CL model, with our engine mounted on top in order to time the speed. This showed which intake/efflux area ratios, fans, etc., were the most efficient under actual flight conditions. This same model, and also an RC test ship, was flown using pressure with a larger bore carburetor (.340"). Both were considerably more powerful.

The Fowler flap mechanics are a direct copy of information from Luftwaffe service manuals. They move aft over 1" before lowering.



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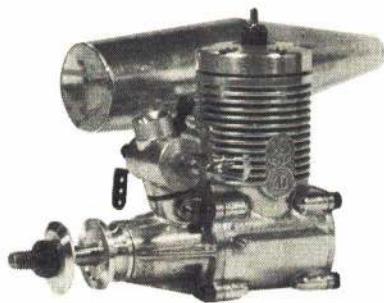
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Eventually, we came to the conclusion that regular suction feed provided plenty of power to fly a model and that the increase given by pressure was not worth the extra hassle of critical settings, difficult idling, etc. If we ever had a situation where more power was vital to the success of a model, we'd know where to get it.

With the latest motors and the current interior design, we can get over 7 lb. of thrust. Using pressure, larger carbs, more nitro and still more interior-design research, I believe that 8 lb. is not beyond possibility.

The pictures give an idea of the possibilities of models. Unfortunately, the 262 will not be ready in time to fly at the NATS as earlier hoped, but... next year?

I definitely will endorse Bob Violett's remarks concerning the excellent flight performance now possible with ducted fan airplanes, and look forward to a great surge of interest in this type of model.

### TORREY PINES

(Continued from page 8)

weed stubble would be to the planes, disced it the week before. His excellent intentions were almost disastrous. Every time someone put his foot down on the power-dry soil, he sank in ankle deep.

CD Kelly Pike managed to find a cat tractor, and at least had the paths down to the turn-arounds dragged. This didn't help much, but people could walk on it without too much difficulty. I will say that Kelly took a lot of good-natured kidding. However, it should be stated that during the previous winter when the site was selected, the field was great.

First launch was about 9:00 a.m. Saturday, which, by the way, was a beautiful sunny Southern California day. The event, a triathlon, is a six-minute maximum flight, with landings permitted on any minute. Points decrease, in accordance with the AMA rules, from the exact minute, to zero points for the 1/2 minute. All landings are measured from 300 points for an exact spot landing. So there are (1) flight time points, (2) precision landing time points and (3) precision landing distance points for each of six flights. Now it is evident why it is called a triathlon.

The first landing set a precedent. The pilot made his final turn into the wind. Time was counting down 4 - 3 - 2 - 1 - 0; he was three feet above the spot. Zaaap, full down elevator. A cloud of dust, and a hearty Hi-Ho Silver Mono-Kote. When the dust had cleared away, there he was, right on the spot, buried clear up to the wings.

Sun and dust for the rest of the day. The camp shower was a popular place that afternoon and luck was with those who got there early—they got all the hot water. A first-class banquet, followed by some extremely beautiful color flight films of full-size gliders took up the evening hours.

Sunday, a standard Southern California winter day dawned gloomy and misty. At 9:00, the sun dried out the clouds for about 30 minutes. There was nothing but up during this time,





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and everyone who got into the air maxed. Then the wind came up and blew the clouds back in. Doug Boyd lost his Grand Esprit in the clouds three times, and still made a six-minute max. There was an amazing amount of lift under the clouds. The sun came out about noon and it turned out to be a beautiful day.

By 3:00 p.m. the contest was finished; everyone was heading over to the campground to collect the kids, dogs, sleeping bags, take down the tent, sweep out the trailers and RV's, wash faces and hands, and head for home: Los Angeles and surroundings for Harbor Slope Society, SULA (Soaring Union of Los Angeles), PSA (Pacific Soaring Assn.), San Fernando Valley Silent Flyers and the Long Beach Glider Guiders. The Arizona Soaring Club started east and the Torrey Pines Gulls southward to San Diego. Boy! Would that hot shower at home feel good.

"A great contest," I heard, "will you have another campout contest soon?" The camp owner confided, by phone the next day, that he really enjoyed us being there—he sold out every toy glider in his store. The reason for the phone call was to tell us that the owner of the contest site was so impressed by the gentlemanly attitude of the contestants, and the manner in which the site was used and left, that he is seriously considering planting the site in grass, watering it, and using it for grazing during the year. Next spring, he will mow it just for the contest.

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## THE COCKPIT

(Continued from page 16)

After painting the components of the box, simulate wear by either dabbing silver paint (dry brush) or using Rub-n-Buff or similar material on areas that would be subjected to wear through service. Work which is systematically performed will provide an authentic "lived-in" interior. Care should be exercised, since "overaging" comes quickly, and even quicker if this is your first attempt. It is easy to get carried away as you create realism. Subtle, yet authentic, is the keyword. For instance, on military aircraft the bucket portion of the pilot's seat shows far more wear and chipping than the back, since it is generally used as a step when the pilot climbs aboard.

Likewise, the cockpit floor on both sides of the control stick will show more bare metal than the areas directly forward or aft of it. Civilian cockpits or cabins naturally are more lavishly appointed, and generally consist of upholstered seats and carpeted floors with an overall clean appearance.

The exact scale cockpit follows everything said so far but much more stringent requirements exist, since we are duplicating everything that appears in the full-size aircraft. Photographs and/or drawings are absolutely essential. The approach to construction remains the same as for stand-off/sport scale, but is far more elaborate and exacting. Absolute scale requires the application of a great deal of ingenuity to accomplish accurately. Patience and luck help also!

Since designers of full-size aircraft don't construct a square box for insertion into a fuselage, we can't for exact scale either... or can we? Sure we can, but now we've got a few more minor hurdles to overcome. Since cockpit sides generally have a slight radius to them, we can reproduce them by building our "box" with radiused sides, or create them visually by adding card stock or thin plastic bulkheads to the flat sides of the "box." Stick a few exposed stringers on and you're in. (See Fig. 3.) This method allows the use of a flat-sided box, while achieving the desired effect.

Many of the handles, levers and switches will have to be fabricated from scratch or by modifying parts you have

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lying around in your junk box. For example, my Mustang, pictured here, has among its cockpit parts the following: throttle quadrant (plastic tube heated with hot knife), aileron and rudder trim wheels (re-shaped hub caps from an old car kit), prop and mixture controls (glass-headed pins), control stick (carved balsa), park brake and flap selector (T-pins), gun sight reflector (clear plastic from old parts container), rear view mirror (headlight from old car kit), electrical harnesses (fine gauge solder, painted), oxygen line (4-40 threaded rod, bent to shape), shoulder harness (flat shoelace).

This is just a partial list to set you in the right direction, and to point out that nearly anything can be used in detailing.

Military cockpits present more problems than the average civilian one, primarily because interior structure also must be duplicated. This means exposed wiring, system lines, stringers, bulkheads, and the like. The civilian cockpit is, in most cases, our "box" system. Most structure is hidden and the cockpit is very sanitary and pristine in appearance, such as Walt Moucha's Spezio and John Roth's Volksplane—two marvelous examples of scale building.

Accurate representation of warning placards, lettering and stencils are best achieved by photostating to the size required. Extremely small lettering can be simulated by small paint dots of the proper color. Most cities have printing or photostat houses that can reduce or enlarge just about anything you need for a nominal fee.

A few of the pitfalls in cockpit building that you are likely to encounter, but should try to avoid are:

—*Improperly positioned instruments*, such as a tachometer where the clock should be, altimeter in place of directional gyro, and air speed indicator in place of stand-by compass. Don't sham here, a sharp judge will pick it up. You worked from the same documentation from which he's judging, so make it accurate.

—*Unnecessary additions*, which are unnecessary if you stick to your reference material. You'll have to submit it with the model anyway, so duplicate what's shown, nothing more. Telling a judge, "Well, it's not in the picture but

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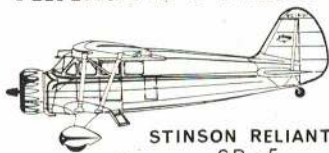
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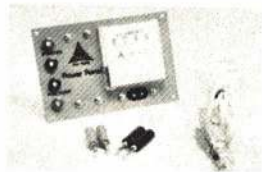
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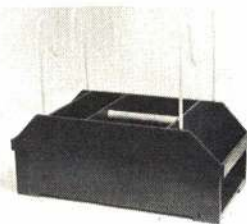
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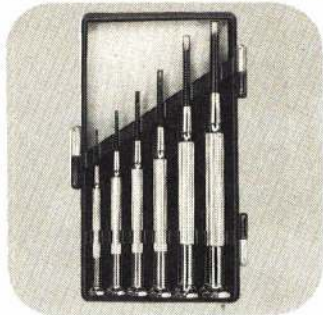
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I've got 10,000 hours in the full-size bird, and I *know* the bomb salvo handle was on the left console!" won't get you anywhere. Document it or forget it.

—Sanitary cockpits, in military aircraft. I've seen scale ships where the exteriors were beautifully executed with exhaust burns, oil stains, faded paint, all done very convincingly. But the cockpit looked as though it had never been stepped in, worked on, or approached by anyone or thing. In service, these aircraft take a good deal of abuse, in and out. If you're modeling a factory-fresh bird, okay, clean it is. An operational machine *looks* worn. Just remember, carry the aging process throughout. The seat bottom is nearly always chipped by pilots or mechanics standing on it. The stick is chipped too. Paint fades; simulate it!

I usually finish my cockpit interiors with Pactra Military Flats. I find them easy to work with, reasonably quick drying and very brushable. The range of colors is excellent, and tints can be mixed to the proper shades, as required. Of invaluable aid in painting will be the use of a quality airbrush. The Binks "B" or Thayer-Chandler are ideal. They'll cost from \$25.00 to \$40.00, but will be worth every cent to the serious scale modeler. (Justify the purchase to your wife by telling her that now you can touch-up all your scratched furniture and chips in her car. Make an honest effort and, when the paint doesn't

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Weight	7 lbs.
Engine	60

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match, she'll have the furniture and car refinished. She's happy, you have your airbrush and she won't ask you to touch-up anything again.)

In summary, the basic ingredients you need to do accurate cockpit modeling are: (1) As much reference material as you can collect; (2) Scrap materials, balsa, card stock, plastic, wire, leftover kits; (3) A good range of paint materials; (4) Perseverance and desire to produce a scale cockpit using a minimum of purchased materials and a maximum of your ingenuity.

I have highlighted here some of the basic methods for getting the job done. You will find, however, that once you start, things start happening. Pieces fit, ideas come to mind and Voila!...you have your cockpit.

Bear in mind that there are no secrets or magic involved. It is not as complex as it appears and well within the capabilities of any modeler. If I can be of any help with projects you might be considering or in which you are already involved, drop me a line.

## AERO SPORT

(Continued from page 30)



of Silver Trim MonoKote. (This was my first experience with this material and it went reasonably well). On the fuselage, the four rear deck panels were covered individually, and I had some difficulty in covering the compound curves around the nose. To accomplish this, a number of small overlapping pieces were heated and stretched, while ironing into place. The edges of the MonoKote in the engine compartment were epoxy coated and sprayed with red dope.

The landing gear and pushrod entrances were sealed with R.T.V. Silicone rubber sealant, an excellent material to keep the castor oil outside the plane.

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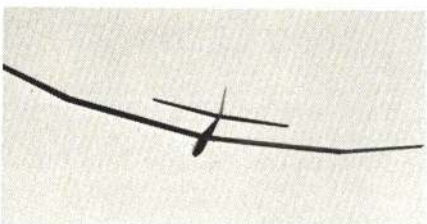
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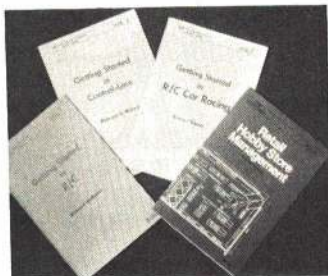
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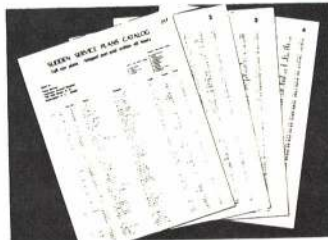
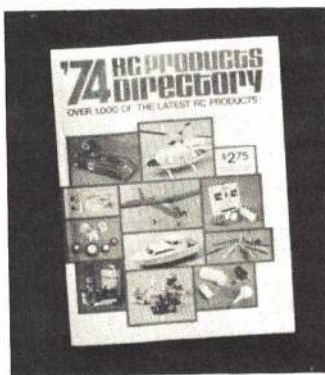
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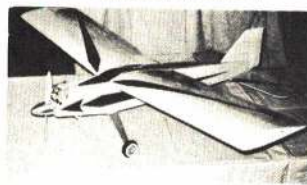
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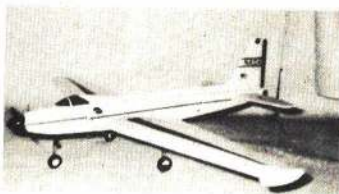
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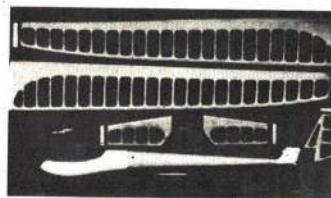
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.15 III TV	25.25	19.95
.19 V TV	27.50	21.40
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.36 RC	29.95	21.25
.60 RC Eagle	69.95	47.25
.78 RC	84.95	56.50

## H.B.:

.61 RC w/muffler	\$130.00	\$80.00
------------------	----------	---------

## K&B:

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.40 RC w/Perry	45.00	32.00
.40 RC Schnuerle	82.00	57.50

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.61 RC Schnuerle R.V.	157.00	102.20

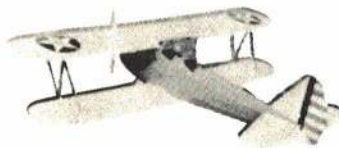
## YS:

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NOTE: ENYA AND WEBRA PARTS IN STOCK!

## LONG ISLAND HOBBYCRAFTS

### the PT-17

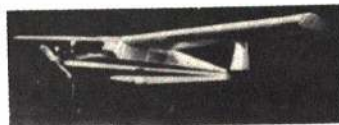


This excellent kit can be built 3 ways: the Army PT-17, The Navy Trainer N2S-3, or as Sammy Mason's famous stunter "Checkers". Everything is furnished including decals for all 3 versions and dummy engine cylinders.

Span: 51" Engine .40 to .60  
RETAIL \$65.00 TOWER \$47.25

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Span: 52" Engine .40 to .60  
RETAIL \$55.00 TOWER \$39.95

### GRUMMAN F8F BEARCAT



Span: 52" Engine .40 to .60  
RETAIL \$55.00 TOWER \$39.95

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To determine current availability and price of anything in this ad or in our catalog just call our toll free numbers listed below!

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Fournier RF4	34.95	29.00
Malibu	25.95	22.00

## AIRTRONICS:

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## X-ACTO

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LONG ISLAND CITY, N.Y. 11101

## GETTING STARTED IN R/C

(Continued from page 32)

wire very carefully where it is attached to the plug. Frequency mechanical movement fatigues the strands of wire. If there is sleeving over the wire, pull it back to expose the connection. Look for loose connections, frayed or broken wire strands. Gently tug on the wire to verify integrity. Particularly after a crash, these connections, as well as the full length of the wire, should be carefully inspected for knicks, cuts or crimps. If you find several broken strands, replace the connection. In the case of crimped pins, most manufacturers will sell a replacement length of the appropriate colored wire with the pin installed.

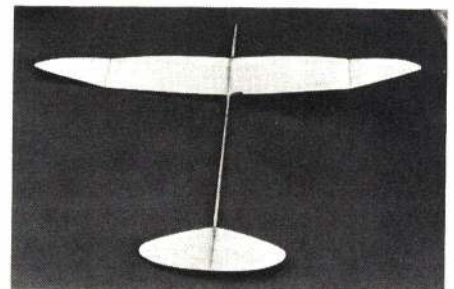
Make it a habit, when you insert or remove a plug, to put the force on the plug shell, not on the wires themselves. This will drastically cut down on maintenance. Don't break and re-make plug connections unnecessarily. Anchor plug blocks in the model by wrapping with foam and securing in the fuselage. This will reduce the effects of vibration on the plug connections.

If you experience a glitch or twitch of one control function and the range checks good, check all the wires and plugs next. You may well find one wire hanging by a few strands.

When all else fails, read the information provided by the manufacturer for your radio. He will probably have a few words on proper care of connectors.

## SUPERSWEEP

(Continued from page 35)



through it, when he has the part to the thickness he wants. But, in order to duplicate Ron's Supersweep, you will have to measure the thickness somehow. A one-inch micrometer caliper would work, except for the fact that the throat of the mike is often not sufficiently deep. The throat can be ground deeper, or a 1/4" extension can be cemented to the fixed anvil so that the deepest part of the throat is utilized.

A less expensive alternative is to use a machinist's outside spring caliper and a ruler with fine divisions. To prevent the tips from gouging the glider parts, balsa "feet" may be epoxied to the tips. Still another way is to measure from the work surface up to a straightedge laid across the top of the wing (equalize the measurements on both sides). The proper thicknesses of the various parts are indicated on the plans.

Fuselage: Sand the fuselage to an oval cross-section. Be sure not to round the edges in the regions where the wing

**\$3.25 EA.**  
POSTAGE INCLUDED

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and stabilizer are to be glued. Here is how you can check to determine whether the fuselage has been sanded down enough—or too much! Clamp the fuselage to a table with the trailing edge of the wing mount at the edge of the table. Hang a 100 gram (3½ oz.) weight on the tailboom at the stabilizer LE position. The extreme end of the boom should deflect no more than 1/2".

The next step will be the most difficult. Take all the finished components, put them in a safe place, and wait for the October issue of AAM. Don't attempt to glue anything together, since there are subtle techniques involved, especially Ron's "magic potion" finishing techniques. If you are impatient, make a duplicate set of parts and complete an SS your way. Next month, finish one Ron's way and compare them. You'll be shocked at the difference proper methods can make in better flight time. Until next month, happy hand chucks!

### THE 'ELECTRI-FLYING'

(Continued from page 41)

The meter/storage box and transmitter caddy are made of 1/4" plywood and masonite. The meter box is a 3¾ x 4¾" piece of masonite (to serve as a meter panel) across two 3¼ x 7-3/8" plywood strips which serve as box sides. The box ends are tapered to fit the launch box and placed at the end and midsection of the meter box. The end piece, located in the midsection, serves as a divider between the meter and storage area. The end adjacent to the battery pack is left open to provide easy access to the wiring and clip system. Holes are drilled in the masonite panel to accommodate the D.C. ammeter, variable resistor and charging terminals (4-40 x 1" machine screws). The box is finished with contact paper, and the charging terminals are color coded to correspond with the poles of the battery pack. (See sketch for color codes.)

The transmitter caddy is a box construction and is designed to hold the transmitter without interfering with the stick or trim tab. You might be able to find a plastic box at the local discount store which will serve the same purpose. I mounted the caddy on the launch box with 1/2" wood screws in such a way that it serves as a counterbalance to the battery pack.

The kitchen timer is mounted by drilling holes through both timer and lunch box and fastening with small bolts. Make sure the timer is positioned in such a way that it is easily read and that it does not interfere with the batteries, meter or terminals when the box is closed.

Wiring the launch box looks difficult, but it is really quite simple, as the photo and drawing show.

#### Correction

The AAM Weathermaster in August erroneously showed a light bulb in the diagram (page 48). The bulb should not appear anywhere in the circuit.

# Introducing... ECONOMY PAK SILKSPUN COVERITE

# 3<sup>50</sup>

## per pak: 27x38



Coverite, 119 York Rd., Jenkintown., Pa., U.S.A.

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**EXCUSE US IF WE STRUT A BIT!**

**PARALLEL STRUT**

Made of high tensile strength extruded aluminum

**\$295 ea.**

Complete with:  
2 Nyloner Bearings  
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1¼" Depth 1/16" Boss  
1" Depth 1/16" Boss  
7/8" Depth 1/16" Boss  
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**SHAFT—steel**

**\$150 ea.**

3/16" DIA. PROPELLER SHAFT & DRIVE DOG COMBINATION

3¼" long

To be used with any of Parallel Struts at left.

Drive Dog—Hardened, plated steel supplied with 8-32 cup point set screw

**LOWER UNIVERSAL JOINT**

**\$235 set**

3/16" Bore  
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Hardened, plated steel

Use with Parallel Strut

3/16" to 3/8" shaft—OC610 F & M—7/16"

3/16" to 3/8" shaft—OC509 F & M—3/8"

**BALL THRUST BEARING**

**7/16" O.D.—\$1.80**

**STREAMLINED TAIL NUT**

plated

1 3/16" long,

10-32 thread, **75c ea.**

OC6PN—7/16"

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**139** 4 oz. **199** 8 oz.

The construction of the launch box is simple and inexpensive (under \$20), and very little time is needed to complete the project. Not only does the launch box charge your flight power pack, carry extra gear and tell you when you are ready to fly, but it charges your transmitter and flight pack batteries, fires the estes rockets (if you are a rocket fan) and carries a sandwich or two and a pack of potatoe chips for those short ten minute charging breaks between flights.

## PAINT FOR PERFORMANCE

(Continued from page 50)



Larger and slanted membership numbers with angled color bands give a whole new look to this wing.

Don't forget to put some trim on the tail surfaces, particularly the fin and rudder. You will find that your ability to see the tail clearly in combination with the wing will assist in determining the pitch attitude and, again, improve flying performance.

That's about it and I must admit that it all seems obvious. However, too many fliers neglect this "Paint for Performance" factor and handicap themselves when they get to the flying field. Whether you are a beginner or an expert, your flying performance will be improved if you keep these suggestions in mind when painting your next plane.

## "FLITE LIFE" AUTOMATIC BATTERY ANALYZER

This invaluable tool will assure many hours of trouble free flying!



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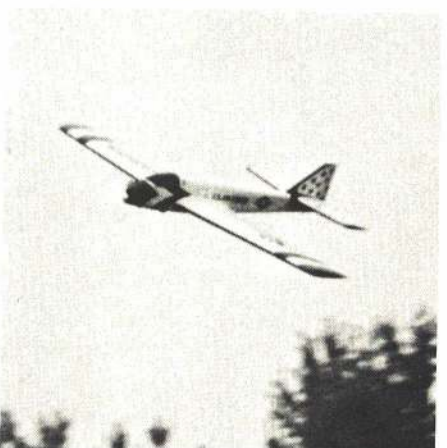
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## YANKEE

(Continued from page 53)



that a minimum of power is lost from the roaring power plant hanging on the front. Not only is it smart to reduce vibration so that a maximum of power is obtained, but also to protect the radio equipment and integrity of the fuselage. No one likes to have cracks show around the firewall half way through the season.

I am using muffler pressure. A small

## THE "CLEAN" MACHINE

THE ALPHA POWER UNIT- Electric Propulsion System for Model Planes

- Clean, quiet, always starts
- Flies many kit planes, not just one
- Flight tested on both R.C. and free flight planes
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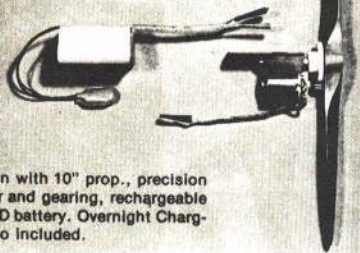
**PRICE ONLY \$54.95 including Recharger Completely Assembled**

ALPHA TIMER-Pushbutton control for free flight

Price \$22.95 completely assembled

MO CONTROL R.C. MOTOR CONTROLLER-Two channel control from a single channel Price \$18.95 assembled

## THE ALPHA POWER UNIT



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bonus to a side-mounted engine is that the tank pressure line does not have to be disconnected from the muffler when filling the tank. Just let the overflow drain out the end of the muffler.

Tank location is critical for optimum performance, and the Yankee's fuel tank is located so that its center line is exactly in line with the engine carburetor center line. This location of the 12-oz. tank does prevent the nose wheel from being completely hidden in its retracted position, but first things first, and that means tank position before looks. Two other features of the tank installation are that it is removable for service without a hatch. An access hole in the front of the tank floor allows inspection of fuel lines to insure they are not restricted in any way.

Next to the tank, and mounted inside the fuselage side, is an important feature of the nose gear steering linkage. I have shown a pictorial view on the plans to help explain the construction. A problem with designs in which the wing is pushed up into the fuselage nearer the thrust line is to provide an adequate steering linkage to the nose gear, since it can seldom be accomplished with a straight line pushrod. A common solution is to use flexible cable in tubing but I have found this to be inadequate, because a zero slop condition cannot be obtained.

The linkage in the Yankee provides the precision of a single straight pushrod, while accommodating the misalignment between the rudder servo and the nose gear steering arm. It is very simple, and only two factors must be achieved. One is that the 1/16" wire from the rudder servo must be rigidly supported at two bearing points no more than 1/2" apart. These bearing points are the plywood former F-2 and a hardwood block glued to the fuselage side, both of which have clearance holes for the 1/16" wire pushrod. The second factor is a 1/2" wide strip of sheet brass of .032 thickness which is soldered to the ends of the wire pushrods. Bend the ends of the brass strip around the wire to insure a solid joint. I think you will find this linkage rather simple to make and free from unwanted play.

Moving toward the tail, the next thing worth mentioning is the fillet construction. Large wing fillets are important in reducing turbulence, as well as providing a good bearing surface for the wing—not to mention their aesthetic value. I've made fillets from balsa blocks and completely from fillet materials such as Epoxo-lite or micro-balloons in epoxy or resin. The technique used on the Yankee, however, has proven to be the most simple and lightest in weight. These fillets are made of foam covered with a thin coating of Epoxo-lite. After the wing is properly aligned to the fuselage and secured with the conventional dowels and 1/4-20 nylon screws, a fillet saddle of 1/64" plywood is layed on the wing and butted against the fuselage side. Then several rough-cut blocks of foam are glued in place. A few minutes with coarse sandpaper wrapped around a large dowel and then a light coating with Epoxo-lite is all that is required.

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DIGITAL PROPORTIONAL SYSTEMS**  
LIGHT ENOUGH FOR .010 — POWERFUL ENOUGH FOR .60's

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The lightest and smallest system available with 2 servos

### RECEIVER-SERVO BLOCK:

Twin servo unit offers even more versatility than TINI-BLOCK. Size 1 1/2" x 1 1/2" x 2". Weight 2.7 Oz.\*

## The TINI-BLOCK

Still the smallest system for single channel operation

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Fast, precise servo action. Extra-range I.C. receiver. Size 1 3/8" x 1 1/8" x 1 1/8". Weight 2 Oz. . . . Weight with additional servo 3.2 Oz.

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N.A.		2 Channels	1 Servo
2 Channels	2 Servos \$109.95	2 Channels	2 Servos \$134.95
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4 Channels	4 Servos \$224.95	4 Channels	4 Servos

Factory assembled only. 27 MHz prices shown. Add \$10.00 for 72 MHz.

Write for brochure on entire line of CANNON R C SYSTEMS.



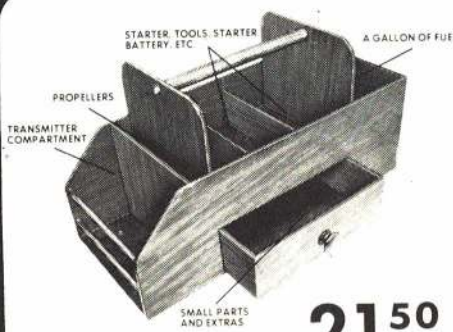
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3 Channel Transmitter Shown

Dual Stick Transmitter Furnished with 4 Channel System

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The main landing gears are mounted on 3/16" plywood plates, which are recessed into the foam wing core. In the past, I have spent much time with maple rails and plywood ribs to provide a main gear mount. Not only is the 3/16" ply plate totally adequate, but it is lighter and faster than the inlaid hardwood rails. If you are accustomed to making hard landings, or flying from extremely rough surfaces, you may want to drill through the plates at two locations and insert 1/4" dowels through the plates to

the top wing surface. I have not found this to be necessary, however.

All three Pro-Line retract gears are operated by one 180° servo mounting in the wing. This can also be a problem when the wing is near the thrust line, since the nose gear is considerably lower than the top of the wing, where the main gear linkage and retract servo are located. My solution to this problem is to use a straight bellcrank to transfer the nose gear pushrod action from the servo at the top of the wing to the lower

nose gear. The homemade bellcrank is mounted to a substantially large maple block, which is glued directly into a hole in the foam wing core. This hole extends completely through the core, from top to bottom, and is large enough to accommodate the bearing block and the motion of the bellcrank. The bellcrank extends from just beneath the top wing skin through the bottom wing skin. The 1/16" wire pushrod from the nose gear attaches to the bellcrank below the wing and within the center filler

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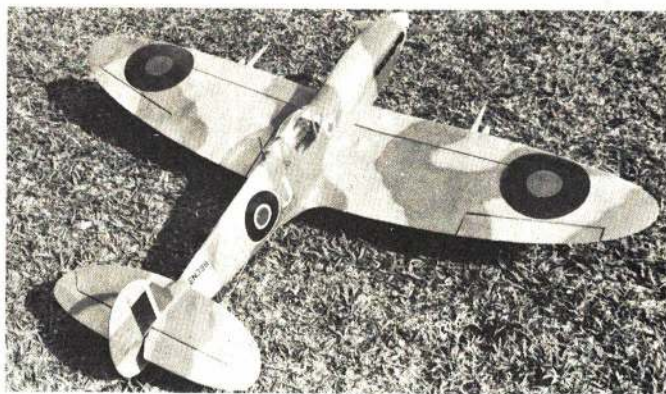
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piece. It exits the wing through a hole below the leading edge. A pictorial sketch is included on the plans for clarification.

While on the subject of landing gear, I will mention two other items. One is to be sure to place pieces of foam rubber in the wheel wells to absorb vibration when the wheels are retracted. This vibration is a significant cause of retract gear wear, since more time is spent with the gear up when the engine is running than with the gear down. The second item is a simple way to provide a neat appearance to the bottom of the wing wheel wells—if you really care, that is. I found that the bottom of plastic margarine containers gives a nice finishing touch to the wheel wells. They are very lightweight.

Very important factors in achieving a plane with smooth and precise control response are the way the control surfaces are fitted and hinged. Ailerons, elevators and rudder must be shaped so that they are an exact continuation of the mating surfaces. Also, hinge line gaps must be kept to a minimum, preferably zero, since the slightest gap will cause a reduction in control response, along with increased drag.

In order to achieve a perfect fit for my control surfaces, I use the following procedure. I always start with sheet balsa of adequate thickness. Trailing edge stock is never the correct taper and, what's more, it's more expensive. Cut the sheet to the proper width or chord, then insert at least three hinges

per surface, being sure that they are in a straight line. Do not permanently glue the hinges at this time. Now tack-glue the sheet stock in place with hinges inserted. Shape the ailerons, elevators and rudder with a razor plane and sanding block until they are to the same contour as their respective mating surfaces. When the shaping is complete, break the surface loose and remove the hinges. With a straightedge and razor plane, shape their leading edges to a V so that the correct amount of control deflection can be obtained. When the surfaces are finally hinged in place you will find that they fit precisely and will provide maximum performance.

As I said earlier, keep the hinge line gap to a minimum when securing the hinges. I find that this is best accomplished by using the "no-pin" hinges. However, if a pinned hinge is used, be sure to recess the hinge enough to eliminate the gap, and be careful not to get glue into the hinge point.

It may not seem important to most builders to worry about hinge line gap. However, I can assure you that its importance is very significant in obtaining good control response on your plane. The whole idea is to prevent air from flowing through the hinge line, thereby reducing the control response. Have you ever had a plane that required a large amount of surface movement before a satisfactory degree of control was obtained? If so, check the hinge line gap and if you're too lazy to re-install the hinges properly, place a strip of tape or

MonoKote along the hinge line and see the difference. You may be surprised to find that the necessary deflection can be reduced by half, while maintaining the same control response. This greatly reduces the drag from the deflected surface.

For those of you who are interested in specifications, I have tabulated the following information:

#### WING

Area—700 sq. inches  
Span—64"  
Mean Chord—11-3/8"  
Root airfoil—15% Symmetrical  
Tip airfoil—15% semi-symmetrical  
L.E. sweep—7°  
Dihedral—3/4" each tip; 1 1/2" total  
Aspect ratio—5.6

#### STABILIZER

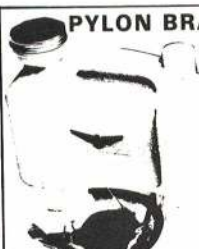




Area—167 sq. inches (24% of wing)  
Span—26"  
Mean Chord—6 3/4"  
Airfoil—12% symmetrical  
Aspect ratio—3.9

#### FUSELAGE

Length—46"  
Nose moment—14"  
Tail moment—28"

#### WEIGHTS

Wing—2 lb. 2 oz. without servos & landing gear  
2 lb. 12 oz. with servos & landing gear.  
Fuselage—2 lb. 2 oz. without engine,

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<p><b>Best Radio Buy on the Market</b></p>  <p><b>WORLD ENGINES EXPERT SERIES!</b> Pictured! 7 channel, complete with 5 servos (1 Retract) List \$399.95 Only \$249.95 5 channel, complete with 4 servos List \$330.00 Only \$199.95</p>	<p>Send 25¢ for latest catalog</p>  <p><b>RC SPORT TRAINER</b> LIST \$37.95 INDY SPEC. \$27.00</p>	<p>*Coming Sept. 15th - Midwest Pitts Spec. Send self-addressed envelope for more information!</p>		

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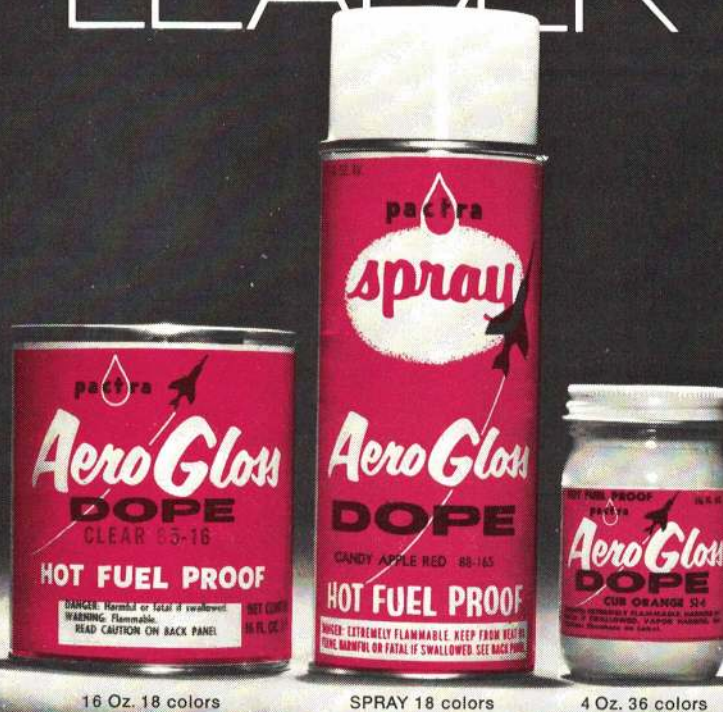
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SEE PAGE 86

radio & L.G.

4 lb. 12 oz. with engine, radio & L.G.

Total flying weight—7½ lb.

### CONTROL DEFLECTIONS

Aileron—1/4"

Elevator—3/8"

Rudder—1½"

### MISCELLANEOUS

Landing Gear Thread—16"

Incidences—Wing 0°; Stab 0°

Power—Webra 61

Everyone has his own favorite finishing techniques, and I'm no different. Since the procedure I use may be different from most, I'll explain it briefly. First of all, there is only one coat of dope on my plane and that is used for the sole purpose of attaching the silk to the fuselage and the silkspan to the wing and tail surfaces. I start by sealing the wood with one coat of clear epoxy paint. When this is dry, it is sanded lightly to remove all whiskers. Then the silk and silkspan are attached with one coat of thinned clear dope.

After the dope has thoroughly dried for at least 24 hours, two more coats of clear epoxy paint are brushed on and scraped to a smooth finish with single-edged razor blades. Now you are ready for the epoxy primer and then color (sprayed, of course). I use this finish for several reasons. It is light, the absence of dope prevents shrinking and therefore seams don't show as much and, lastly, the finish is very durable and fuelproof. It's great if your wife can't stand dope fumes, too.

Well, that's about it. I hope you will build the Yankee and join in the fun of pattern competition. Build it carefully, and then practice—your contest experience will be rewarding. I also hope that the few construction tips that I have mentioned will help you be a better modeler and build a better Yankee.

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# After You, Mr. daVinci

by Robert Lopshire

## Leonardo Would Have Loved Aero-Crafts '74!

Rumor has it that Leonardo DaVinci was the first business man to get away from it all by going bananas over model airplanes. Today model builders get away from modeling by going into business to sell their wares to other modelers, and while "Lenni" went heavily into museums, it seems only fitting that the cycle should continue and find modelers today going into museums too . . . the thought of which would have created laughter almost anywhere not too long ago when you stop to think about it.

Then along came an idea. Robert Nobel, Curator of The Museum of The Philadelphia Civic Center, saw a show that AMA had run at a large Philadelphia department

store—all to do with radio controlled miniature aircraft. Fascinated, he inquired, as did large numbers of other viewers of that show, where such devices were manufactured, and where one might purchase such a fun machine. Told that all were *hand made*, he became ecstatic. His wonderment at finding actual handmade artifacts, made by the natives here in America, led to his idea of showing his find to other Americans. He would seek out these practitioners of the dying American art of craftsmanship and bring them all together in one great show. His find would be recorded by history, and curators across the land would be appalled and properly amazed at his ingenuity in rooting out and staging such a wondrous show.

After great diligence, Mr. Nobel found the cult to which these craftsmen belonged—the American Model Association, the name usually given AMA by those

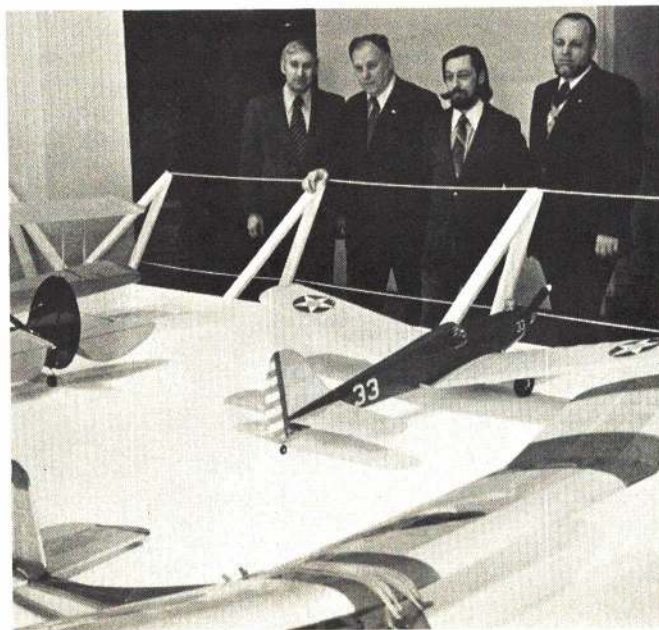
around the country whose ears tend to clog at the true title of the organization. However, once he found the true identity of the organization to be the Academy of Model Aeronautics, Mr. Nobel went to Executive Director John Worth and PR Director Bob Lopshire with his idea of showing modeling to the American public as one of the last surviving art forms in a nation obsessed with buying things made in Japan . . . or Germany.

So it was that "Aero-Crafts '74" came into being . . . or at least *somewhat* along these lines . . . and, too, the reader should realize that in his quest, Mr. Nobel did indeed achieve a mighty first—he reached out and took the work of modelers to show it as an *art* form.

Art? Before you take a disdainful view of that term, stop to consider the facts. When a sculptor sculpts, he works with clay, wood, or stone. He creates in three dimensions. So does a modeler. When a



Above: The Aero-Crafts '74 winning Free Flight Soaring entry, an A-2 Glider, was constructed by Yolanda Mapp, MD (left). She's shown telling how it was done to Ronald Barber, assistant director of the Philadelphia Civic Center. Right: Dignitaries on hand for the opening reception of Aero-Crafts '74 included (L-R) John Pierron, executive director of the Philadelphia Civic Center; John Worth, AMA executive director; Ronald Barber; Earl Witt, AMA secretary-treasurer.





painter paints, he works with form and color. So does a modeler. When an artist or photographer makes his final interpretation, he shoots for form, realism, excitement. So does a modeler. When a Wyeth does a painting he works for total realism and mood. So does a modeler. We could go on for pages on this idea. Mr. Nobel saw it all in his first glance at his first viewing of models . . . and created the first-time-ever showing of model building as an art-form . . . the very precise category in which it belongs.

That will serve for openers. How did the show go? Smashingly! Leonardo would have loved it . . . Philadelphians **did** love it. Media coverage of the show went forth to the over eight million residents of the Delaware Valley by way of radio, TV, and newspapers, and the crowds who came to see the show were heavily impressed with what those "secret fellows" among them were up to. They were also impressed with the fact that entries in the show had come from as far away as *California*. A Californian had in fact won five awards in the show . . . (an *amazing* feat for someone from the wild-west . . .).

The museum gave a reception on opening night for contestants, museum supporters, trophy sponsors, and "other dignitaries." The most impressed group attending were the trophy sponsors, many of whom were those who had escaped modeling by becoming manufacturers for other modelers, obtaining their supplies, for the most part, in places like Japan and Germany.

The evening went well for all . . . all but one little old lady. She was overheard on the way out, telling a museum guard that it was an incredible disgrace that the Japanese could get away with not clearly labeling their products these days. She had personally picked up every plane in

*continued on page AMA 7*

**Below:** John Pierron admires the handsome plaque and finely finished and detailed Grumman F3F which won the Control Line category for A.W. Schaeffer (R). **Right:** Models were artfully displayed—out of reach but close enough for good inspection.



## AWARDS

### AERO-CRAFTS '74 MARCH 23-APRIL 18, 1974

MUSEUM OF THE PHILADELPHIA CIVIC CENTER

CATEGORY	RADIO CONTROL	CONTROL LINE	FREE FLIGHT	SPONSOR
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Pattern	W.F. Moffa	R.L. Steck	W.C. Hannan	Kraft Systems, Inc. R/C Midwest Products Co. C/L
Sport	W. Patterson	T. Prasol	H. Haffke	SIG Manufacturing Co., Inc. C/L & F/F Central Bucks Aero R/C
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Helicopter	A.L. Doucette			Piasecki Aircraft Corporation
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Between Wars	G.S. Bussman	A.W. Schaeffer		Naval Air Engineering Center, Philadelphia
WWII	G. Redmond	W.C. Koster		SIG Manufacturing Co., Inc. R/C Sullivan Products C/L
Post WWII	G. Peterson	R.M. Gransback		Valley Forge Signal Seekers R/C
Overall Best Scale	G.J. Bussman	W.C. Koster	R. Stab	S.P.A.R.K.S. R/C Club—R/C The Franklin Institute C/L
Seaplane Amphibian	M. Zeller	H. Haffke		Perelman Antique Toy Museum
Oldtimer	W.F. Moffa			KLM Royal Dutch Airlines
Best Fokker any Year	F.P. Stanton	W.C. Hannan		Naval Aviation Museum, Pensacola R/C
Best Marine or Navy Aircraft any Year	G. Cannon	A.W. Schaeffer		Sterling Models
Best Sport RC Plane	C.P. d'Abreu			Ransome Airlines
Best Model Pitts Special In U.S. Aerobatic Team Colors	M. Katz			Trans World Airlines
Best TWA From Tri-Motor to Tri-Star	G. Bussman			Museum of the Philadelphia Civic Center C/L Bucks County R/C Club R/C
Most Outstanding Craftsmanship	G. Bussman	A.W. Schaeffer	W.C. Hannan	Lufthansa German Airlines
Best Lufthansa Aircraft 1924-1974			W.C. Hannan	
<b>BOATS</b>				
Post WWII (Naval Vessel)	K. Mosby			Commandant Fourth Naval District
Antique Ship to 1900	P.E. Sieg			Philadelphia Maritime Museum
Most Outstanding Craftsmanship	P.E. Sieg			Museum of the Philadelphia Civic Center







# A Happy Band of Gypsies — U.S.F.F. Championships

## PRESIDENT'S MEMO

A three-day diet of sand, sun, and smiling faces just completed one of the most interesting experiences of my long air modeling life! What a pleasant thing it is in these uncertain times to see a group of dedicated people gather together to "do their thing," to enjoy each other, to help each other, to enjoy simple things in a complex world, and to strive to become better at something without shoving someone else down to do it. To be a part of something this pleasant and handsome will quickly make you forget the sand, the sun, and the miles traveled getting there. The reward is well worth the price.

It is possible that the Free Flighters will be a bit shocked at being referred to as "gypsies," but gypsies are generally thought of as a happy nomadic people who wander through life seeking the new place, the new experience, the new friend, the colorful, the pleasant, and all at the minimum investment of material things, but with the bit of daring gamble that Free Flight always provides.

The place for the happy drama that I enjoyed is generally known simply as "Taft." To nail it down more closely, the flying site for the U.S. Free Flight Championships was about four miles out of Taft, California. Taft is a friendly little community of about 4,300 souls in the oil fields of the desert some 30 miles southwest of Bakersfield. It is in a dry valley between two mountain ranges and is barren except for some sagebrush, some tumbleweeds and a few astonished prairie dogs. The flying site was a piece of the desert loaned by Standard Oil and has a rectangular space of about 50 acres from which the local area AMA'ers had removed the brush. Did I mention that it is dry? It is so dry that to try to spit is a complete waste of time and effort. While we were there the humidity was from 4% to 6%, and the temperature one day got up to 106 degrees. The only way you can send mail is to staple the stamps on the envelope. And the only thing around except just desert is a kitty-litter factory!

In Free Flight there is a challenge that is unique to this type of flying. Everything must be completely pre-adjusted, because once the model leaves the fingertips there is no further means of manual control. All flight paths and stability must have been very carefully predetermined. Unlike Control Line and Radio Control flying, it is not possible to make continual corrections. This demands that Free Flighters thor-



"Gypsies" all, including AMA President John Clemens, left, who has represented AMA at more functions than any other president in history. This photo by Judy Mead from the U.S. Free Flight Championships at Taft shows Johnny chatting with traveling companion Duke Horn, also of Dallas. The contest had 784 event entrants.

oughly learn and apply the science of aerodynamics and do everything very carefully—or the reward is a crash. The demand for knowledge and skill is greater in Free Flight than in any other category. There must be an extremely careful use of available power in these models because of the combined problems of thrust, torque, and necessary stability. The aircraft itself must be a happy compromise between the power-on trim when it is climbing, and the power-off glide portion of the flight when endurance or "stay-up ability" is at a premium. Both of these problems must be solved with a model which cannot be changed at will between the two phases of flight. This can be accomplished only through careful study and experience, and never just by a happy chance.

Efficiency of applying proper aerodynamic principles brings up yet another problem. How do you get 'em back? Since they are not correctable or directable in the air, they have no steering gear. They will land somewhere downwind but in no predictable given place. It used to be that we always chased them on foot. However, modern technology has blessed us with the motorbike, so now it has become both practical and fashionable to chase the models by this mechanical means. That is, if it lands more than a hundred or so feet away. The Taft championships were a great expression of this new retrieving art! I would wager that there were nearly as many motorbikes of one kind or another as there were contestants. Just for example, there were seven motorbikes hauled all the

way from Dallas, Texas. That is roughly 1,500 miles each way. And with all this fantastic motorbike traffic on the field and off, I was astonished at the lack of a serious accident. Dedicated and careful people, these Free Flighters.

If you were not impressed at watching 340 contestants come from as far away as Pennsylvania to a California desert to compete for only trophies and glory, then you had to be impressed when they strapped lights on these same high-performance planes and flew them in competition in the pitch-dark of a desert night! They used a special glo-lamp taped to the plane, and it was awesome to watch. With the air full of these screaming high-flying fireflies, the sight might have cured alcoholism for miles around!

To summarize the meet at Taft, it was several thousand people drawn together by the magic of miniature aeronautics, gaining health from the sun and the outdoors, gaining the warm glow of friendships made from a mutual interest, enjoying a trophy won in competition or the experience and sportsmanship gained by being a non-winner, the gypsy lure of tents and RV vehicles, the lunches of sandwiches, pickles, boiled eggs, Vienna sausages, and a million canned cold drinks, but above all, friendship and fun. Isn't that the goal and purpose of the Academy of Model Aeronautics? The Free Flighters at Taft were expressing it to the fullest!

*John E. Clemens  
AMA President*



# NEWS

# bits

## Easy I.D.

A dual-purpose identification system has been instituted at the flying field of the AMA chartered 495th Squadron (Mass.). Members have been issued plastic pin-on holders for their AMA license cards with the intent that they be worn while flying. This procedure, reported Thomas DiMilla (AMA 46079), editor of their newsletter, will necessitate compliance with the club bylaw which states that all flyers at the field must have current AMA licenses, and will also give new members a better chance to get acquainted.

## Maxing Apples and Oranges?

The DC Maxcutters Club has challenged the DCRC Club, both AMA chartered and located in the suburbs of Washington, D.C., to a glider contest. The proposal for three-man teams from each club to participate, the challengers flying in accordance with FF Nordic A-2 rules (three-minute maxes) and DCRC flying with 1973 FAI RC Thermal Soaring rules (10-minute maxes). Each team would fly seven rounds of one hour each, and the score for each flight would be determined by dividing the actual flight duration by the max duration (three-minutes or 10 minutes) and then multiplying by 100. The losers would buy the refreshments. This unusual challenge, reported by Jerry

Barnette (AMA 12554), editor of the Maxcutters' newsletter, *Max Facts*, will make for interesting comparisons should the event materialize. Now let's see, would you put your money on the RC combo of a 984-ft. launch line, the ability to steer into a thermal, and a 10-minute max—or the FF's 164-ft. towline and three-minute max?

## Stars of the Silver Screen

The AMA chartered South Shore RC Club (Mass.) has found a way to encourage attendance at meetings. Sammy Frey (AMA 9407) has been bringing his movies of flying sessions to each meeting, and it seems that the members have found it hard to resist seeing their models being put through their paces. Warren Shadrick (AMA 1526), club president and newsletter editor, also reported that he had named Frey "Official SSRCC Photographer" and asked him to take lots of pictures on the weekends to be shown at meetings throughout the year.

## Sign of the Times

Sue (AMA 87281) and Bob Crysler (AMA 24548), co-editors of *Flying Times* (Fla.) recently set up a display at a local bank that included models, parts and the inside of a transmitter, all with appro-

priate labels, as well as articles about modeling activity taken from local papers. And all of this in a mere six days from conception!

But Art Johnson (AMA 2374), who contributed to the show, pointed out that though they were quite well prepared in the way of airplanes and other goodies for "instant PR activities," they were missing one vital thing: a good sign saying "Gold Coast Radio Controllers." Their problem was adjusted promptly, but how many other clubs would find themselves in a similar situation?

## Benefit Show a Success

Last year the AMA chartered Long Island Aero-Radio Society (LIARS) held a benefit show for the Association for the Help of Retarded Children (AHRC), and raised \$850, reported William Roser (AMA 55693) and the AHRC's newsletter, *Lamplighter*. The show included displays of models, both fully built and under construction, plus flying demonstrations.

At the nearly continuous airshow, spectators were impressed with aerial chases and aerobatics, and they also found helpful members of the LIARS who were eager to discuss RC modeling. A popular feature was the chance (for a dollar contribution) to try a hand at model flying via a buddy-box.

The club planned and coordinated the event within the short period of two months. Members, and their families and friends, contributed considerable effort for a worthwhile multiple achievement—showing many people what RC modeling is all about, and raising a good chunk of money for a worthy cause.



Above: Profits from the sale of AMA items (from the Supply & Service Section) at the 1974 Model Expo were donated to the American Cancer Society—for whose benefit the show was staged in April by many southern California clubs at Mile Square. Manning the booth when this photo was taken by Dick Tichenor were (L-R) Alex Chisolm, Jan Sakert and Marlene Chisolm. Alex is AMA District X V.P. Right: The Heidelberg (Germany) Aero Modellers Club was just forming when Executive Director John Worth was visiting his long-time friend, Walt Good, at the time of the annual CIAM meeting late last year—but this group, composed mostly of military men, is now 34 strong. Shown (L-R): Sgt. Joe Hill, CW2 Bob Curtis, Capt. Wayne Murray, Dr. Walter Good, Major Bill Peele, Capt. Curtis Harvey, John Worth, CW2 Bill Brooks. Maj. Peele is commander of Heidelberg's Aviation Unit.



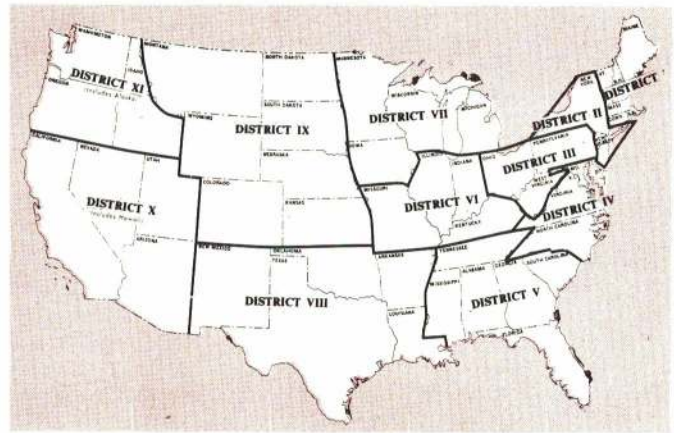




# DIRECTORY OF AMA OFFICERS

## HOW TO USE

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities—many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice-Presidents represent area interests for general AMA policy matters. Whenever district numbers are shown, write to the nearest address in your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.



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**President:** John E. Clemens, Box 64573, Dallas, Texas 75206  
**Sec.-Treas.:** Earl Witt, RR 1, Box 309, Chambersburg, Pa. 17201  
**Exec. Dir.:** John Worth, AMA HQ, 806 15th St., NW, Wash., D.C. 20005

**NAA Representative:** Gen. B. Allen, NAA, 806 15th St., NW, Wash., D.C. 20005

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## COMMUNICATE!

Your officers can't know your thoughts unless you tell them.

Correspondence for the committees and representatives which follow should be addressed to the proper committee or individual and sent c/o AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. HQ will respond to the proper individual and/or committee.

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# Ed Manulkin

by Jim McNeill

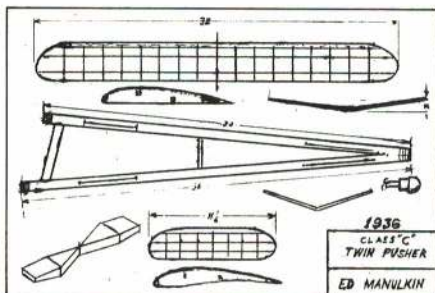
Once upon a time a 9 year old kid walked into posh Philadelphia department store, went straight to the toy counter, demanded to see the best model airplane kit they had. The year was 1929. The store—Gimbel Brothers. The kit? A toy Wanner Baby R.O.G. priced reasonably at 50¢, and by the way the kid didn't have near the necessary funds, so he had to go back home and skimp and save 3 more weeks.

The little boy was Edward Manulkin, destined to become soon after: a superb free flyer, a contest winner all over the East and Midwest, one of the original members of AMA, and eventually; a patron and pillar of our fine Academy, and the founder and president of one of America's most respected model airplane kit manufacturing companies.

Ed took the toy R.O.G. home, spent 3 months coaxing a 30 second flight out of it, earned his Gimbel's Wipacs Club "Grease Monkey" pin. He soon joined the Philadelphia MAA, a then quite prestigious club holding maybe 90% of all national records. Schooled by good modelers, slowly learning his model aerodynamics, Ed gradually became a skillful designer, builder, and flyer of indoor rubber, outdoor rubber tractors and pushers, and Brown Junior powered gassies.

Attending contests from the Detroit Nats to Eastern Seaboard meets, he was a contestant to be reckoned with and feared. He flew against all the greats of his day—Frank Ehling, Maxwell Bassett, Matty Sullivan etc. and earned his share of medals, merchandise, and glory.

The twin pusher pictured was printed in Frank Zaic's *1937 Year Book*, page 91, featuring 2 original advancements to aid endurance. Staggered booms for larger props, enclosed rubber motors in rolled fuselages to cut drag.



After serving honorably in World War II, Ed worked briefly as Sales Manager for B. Paul Distributors. Discontent working for someone else, anxious to get back to the models he understood and loved so well, he quit his job cold one

# Profile of a Life Member

afternoon, went down in his basement, and slaving long hours started the Sterling Model Co. Today he is still at it, still puts in 14 hours a day.

Ed's company has prospered and he has shared his success with AMA. The much sought after Sterling Award, given each year at the Nats for the best scale model to make an official flight, is his baby, and he has given the Academy a hundred dollar check each year to go with it. He also gave AMA a thousand dollars when they needed money, and became a life mem-

ber—before special numbers were ever heard of.

Look in the pages of any model magazine today for the colorful Sterling ads. See the little scale airplane kits for sale. Kits fashioned by a premier free flight pioneer who got on your wave length a long long time ago and never got off, and who wants YOUR kid to see something more elegant than a toy R.O.G. the first time he walks into a department store or a hobby shop and demands to see the best they got!!!



Above: On the left is how Ed Manulkin, Life member No. L-7, looks today; in 1946, fresh out of a tour in the U.S. Army, he was flying the FF at right called the "Super C"—lost for good at a meet in West Chester, Pa., after a 15-mile chase. Below: An earlier photo taken by John Sussaywich shows Ed in an apparently humorous pose, kneeling, but he didn't give us the punch line. Some great modelers are shown (L-R): Merrick (Pete) Andrews of current Indoor fame; Matthew Kania and wife, Chris; Jessie Bieberman, school teacher and sponsor of their club at the time; Jean Sussaywich, wife of the photographer who now runs a hobby shop in Philadelphia; Martin Nemerofsky, an excellent modeler who was killed in the Battle of the Bulge in WW II; Ervin Leshner, who is now a private engineering consultant after many years with the Philco Corp.







## Aero-Crafts

(continued from page AMA 1)

the show and looked at every square inch of it to find the "Made in Japan" tag.

Along with all the AMA members who came out of the bushes to enter planes in the show and thereby admit their identity, another group deserves accolades from every do-it, glue-it, flew-it enthusiast across the land. These are the members of the Delaware Valley area clubs who pitched in and helped with everything from aiding the august body of judges (Paul Garber, historian emeritus of the Smithsonian Institution, Frank Piasecki, president of Piasecki Aircraft Corp., and Paul Heintz, aviation writer for the *Philadelphia Bulletin*) to dropping everything at work to deliver planes to the museum for special publicity photo sessions prior to the show, and showing up each Saturday to sit at a workbench in the museum and show the visiting public *how* the planes on display were *really made by hand*.

Also pitching in to aid the effort of showing the public what the Radio Control planes were all about, were people like Bob Elliott of EK Logictrol. Bob, a bit nervous, turned over his "Little Red Friend Maker" for the entire time of the show. LRFM is a mock-up RC demo plane with all the goodies out in the open where even the dullest fellows can see them in action and understand the mystery of RC. One quick exposure to the LRFM and its transmitter had a lot of visitors asking the shortest routing to a hobby shop.

Ed Manulkin of Sterling Models donated a "Fledgling" kit that members of the Valley Forge Signal Seekers tumbled out of bed early of a Saturday morning to drive in to Philadelphia and assemble for the visiting multitudes. (This club deserves a Medal of Honor for all they've done to aid the promotion of modeling at all levels in the past years!)

Bernie Paul of AHM, upon hearing of the purpose of the show, instantly donated his prize possession—a closed circuit TV system. This little gem sat in an alcove in the show area and gave off happy pictures and sounds of models in action throughout the month-long tribute to handmade flying machines.

Meanwhile people like Jack Salmon and Bill Risko of the AMA Show Team went off to train Philadelphia policemen in the art of building and flying Delta Darts. No effort to avoid future parking tickets, but a part of the area-wide promotion of modeling as a worthwhile and wholesome activity for all concerned . . . all a part of the museum effort to show modeling to the general public. Then, Police Athletic League contests were held throughout the area for over 20,000 youngsters in the PAL program. (Of this number, 19,972 kids asked why the planes were not ready-

made in Japan. Of all participating, 19,972 later unanimously agreed that they were glad that they had to make the things themselves. The other 28 were from modeling families and tested out as disdainful of *anything* made by someone else, here or abroad.)

Other flowers, if we had them to hand out, should go to the executive director of The Museum of The Philadelphia Civic Center, John Pierron. Mr. Pierron showed his mettle as an executive by believing the initial tales told him by Mr. Nobel as to the value of such a show, and by opening the museum to accommodate it.

To Mr. Nobel, if we had one to hand out, would go the AMA PR Benefactor's

CONTEST				
	1	2	3	4
7	8	9		13
14	15		18	19
			24	25
	29	30	31	

### Official Sanctioned Contests of the Academy of Model Aeronautics

**Note:** For quick response and as a favor to those staging, administering and directing the contest, be certain to send a stamped, self-addressed envelope along with your request to the listed Contest Director (CD) for additional information.

**Aug. 3-4—Freeland, Mich.** (A) SVRCC 2nd Annual RC Scale Model Air Show. Site: 2220 Lane Rd. R. Coates CD, 4016 E. St. Andrews, Midland, Mich. 48640. Sponsor: Saginaw Valley RC Club.

**Aug. 3-4—Salina, Kans.** (AA) MARCS 3rd Annual RC Meet. Site: Old Municipal Airport. L. Gehrke CD, 215 Main, Delphos, Kans. 67436. Sponsor: Mid America RC Society.

**Aug. 4—Jamestown, N.Y.** Flying Rebels Fly for Fun. Site: Blanchard Road. E. Ecklund CD, 75 Benson St. Jamestown, N.Y. 14701. Sponsor: Flying Rebels.

**Aug. 4—Lockport, NY** (AA) 3rd Annual Western NY RC Jamboree. Site: Lockport R. Brock CD, 562 Orchard Pl., N. Tonawanda, NY 14120. Sponsor: Niagara County RC MAC, Inc.

**Aug. 4—Norfolk, Va.** (AA) Fall CL Annual. Site: Norfolk. E. Regan CD, 4200 Mayflower Rd., Norfolk, Va. 23508. Sponsor: Norfolk Aeromodelers.

**Aug. 4—Livermore, Calif.** (B) S.A.C.R.C. Picnic Scale Meet. Site: Hummingbird Haven. D. Franco CD, 4868 Mauna Loa Pk. Dr., Fremont, Calif. 94538. Sponsor: Southern Alameda County Radio Controllers.

**Aug. 4—Rancho Cordova, Calif.** (AA) Northern Calif. FF Council Monthly Meet. Site: Wagle Field. K. Oliver CD, 2213 El Centro Cir., Rancho Cordova, Calif. 95670. Sponsor: Capitol Condors.

**Aug. 4—Bloomfield, Ohio** T.C.R.C.M. Fun Fly. Site: Bulek Field. N. Flavell CD, 278 Clifton Dr., Warren, Ohio 44484. Sponsor: Trumbull County RC Modelers.

**Aug. 4—Rochester, Minn.** (A) RAMS 1/4 Midget Air Races. Site: Rochester. H. Wayne CD, 1706 7th St., NE, Rochester, Minn. 55901. Sponsor: Rochester Aero Model Society.

**Aug. 5-15—Lake Charles, La.** (AAAA) National Model Airplane Championships for FF, CL, RC and Indoor events. High ceiling indoor events at Spring, Tex. Aug. 4-5. For entry form and information, send request with pre-addressed and stamped envelope to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

**Aug. 7-11—Sioux Falls, S.D.** Sioux Empire Fair Fun Fly. Site: Fairgrounds. J. Donovan CD, 1409 Thompson Dr., Sioux Falls, S.D. 57105. Sponsor: Flying Eagles MC, Inc.

**Aug. 10—Hamburg, N.Y.** Fun Fly Meet. Site: Hamburg. K. Landefeld CD, 11151 Jamison Rd., E. Aurora, N.Y. 14052. Sponsor: RC Aircrafters, Inc.

**Aug. 10-11—Great Falls, Mont.** (AA) 6th Annual Fun Fly. Site: Great Falls. R. Jones CD, 1425 80th Ave., S., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers.

**Aug. 10-11—Dallas, Tex.** (A) Dallas League of Silent Flight 2nd Annual Thermal Soaring Guggle. Site: Mesquite Field. T. Williams CD, Box 1012, Irving, Tex. 75060. Sponsor: Dallas League of Silent Flight.

**Aug. 10-11—Wyandotte, Mich.** (B) I.C.R.C. Annual Contest. Site: Wyandotte. E. Lynn CD, 3187 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC Club, Inc.

**Aug. 10-11—N. Couer d'Alene, Id.** (A) Henley Aerodrome RC Sport Scale Rally. Site: Henley Aerodrome. G. Horstman CD, E11223 LaCrosse, Spokane, Wash. 99206. Sponsor: Barons Model Club.

Award, an award that should be yearly given to those outside the hobby who look in and see it as a great American pastime and appreciate it fully . . . ingenuity, finished with love and care—the satisfaction of craftsmanship.

A bit of upper East Coast activity? Not at all! It was a *first* for others to follow in their areas . . . modelers and museums alike. The groundwork was laid in Aero-Crafts '74. Museum bulletins and newsletters will carry it as a first . . . it's up to modelers to get out of their hiding places and carry the concept further. Thanks to Mr. Nobel (and Mr. Da Vinci), other museums will possibly be very willing to listen.

**Aug. 10-11—Minneapolis, Minn.** (AA) Twin City Radio Controllers Annual Contest. Site: Minneapolis. L. Neuman CD, 4916 30th Ave., S., Minneapolis, Minn. 55417. Sponsor: Twin City Radio Controllers.

**Aug. 10-11—Great Falls, Mont.** (AA) 6th Annual Fun Fly. Site: Great Falls. R. Jones CD, 1425-80th Ave. D., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers.

**Aug. 11—Hadley, Mass.** (A) Sport Scale & Fun Fly. Site: Hampshire Co. RCers Field. B. Sparrow CD, 418 Meadow St., Agawam, Mass. 01001. Sponsor: Hampshire County Radio Controllers.

**Aug. 11—Cowley, Wyoming** (AA) Cowley RC Glider Meet. Site: Cowley. W. Higgins CD, 305 S. Day, Powell, Wyoming 82435. Sponsor: Wyoming Sagebrush Hoppers.

**Aug. 11—Hempstead, NY** (A) Meroke 1/4 Midget Races. Site: Hempstead. M. Carver CD, 3511 Westminster Rd., Oceanside, NY 11572. Sponsor: Meroke RC Club.

**Aug. 11—Hanford, Calif.** (A) Sky Kings Free Flight Meet. Site: Manzanillo Ranch. E. Souza CD, 514 A So. Bridge, Visalia, Calif. 93277. Sponsor: Sky Kings.

**Aug. 17—Moundsville, W.Va.** (A) Valley I.F.O.'s Annual RC Contest. Site: Fallen Timber Lane. A. Blair, Jr. CD, Rte. 2, Box 383, Moundsville, W.Va. 26041. Sponsor: Valley I.F.O.'s M.A.C.

**Aug. 17-18—Cedar Rapids, Iowa** (AA) Skyhawks 6th RC Meet. Site: Seminole Valley Park. J. Finn CD, 36 Hampden Dr., NE, Cedar Rapids, Iowa 52402.

**Aug. 17-18—W. Suffield, Conn.** (AA) New England RC Pattern Championships. Site: NCRCC Field. S. Griswold CD, Cottage St., New Hartford, Conn. 06057. Sponsor: Northern Conn. RC Club.

**Aug. 17-18—Lakehurst, N.J.** World War II Scramble for RC. Site: Lakehurst. D. Meier CD, 61A North Place, Flemington, N.J. 08822.

**Aug. 17-18—Birmingham, Ala.** (AA) First Annual BAMA Flyers RC Contest. Site: Birmingham. F. Newman CD, Rt. 12, Box 2007, Birmingham, Ala. 35215. Sponsor: Birmingham Aero Modelers Assoc.

**Aug. 17-18—Oilville, Va.** (AA) R.A.R.C. Annual Pattern/Scale Meet. Site: Club Field. D. Robelen CD, 327 Selden Rd., Newport News, Va. 23606. Sponsor: Richmond Area RC, Inc.

**Aug. 17-18—Tullahoma, Tenn.** (AA) 15th Annual Coffee Airfoilers FF Meet. Site: Tullahoma. B. Cleveland CD, 708 County Club Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers.

**Aug. 18—St. Louis, Mo.** (AA) Sixteenth Annual CL Midwestern Championships. Site: Buder Park. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: St. Louis Yellow Jackets Inc.

**Aug. 18—Johnsville, Pa.** (AAA) 27th Annual Eastern States FF & CL Championships. Site: Warmminster. N.A.F. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057.

**Aug. 18—Southern Calif.** (A) San Fernando Valley Silent Fliers Bi-Monthly Meet for Aerobatics. Site: to be announced. B. Jones CD, 7300 Farralone Ave., Canoga Park, Calif. Sponsor: San Fernando Valley Silent Fliers.

**Aug. 18—Schenectady, N.Y.** (AA) United Pylon Racing Association Meet. Site: Clean. B. Brown CD, 1255 High St., Bradford, Pa. 16701.

**Aug. 18—Ohio** (AA) NOAA August FF Meet. Site: Pending. J. Robinson CD, 195 Fairfield Rd., Avon Lake, Ohio 44012. Sponsor: Northern Ohio FF Association.

**Aug. 18—Fresno, Calif.** (A) FGMAC Monthly FF Meet. Site: Fresno. F. Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

**Aug. 18—Cascos, Mich.** (A) Pylon Racing Meet. Site: RCCD Field. H. Mottin CD, 2124 Common Rd., Warren, Mich. 48092. Sponsor: RC Club of Detroit.

**Aug. 18—Colorado Springs, Colo.** (AA) Pikes Peak Pattern & Sport Scale Meet. Site: Colorado Springs. J. Cole CD, 2007 Warwick Ln., Colorado Springs, Colo. 80909. Sponsor: Pikes Peak RC Club.

**Aug. 18—Albany, Ore.** (AA) 1974 Fall Northwest FF Championships. Site: Parker's Field. B. Stalick CD, 1120 Shady Ln., Albany, Ore. 97321. Sponsor: Willamette Modelers Club, Inc.

**Aug. 18—Dallas, Tex.** (AA) 4th Annual FF Pearl Bash Picnic. Site: Dallas. P. Nelson CD, 2908 Lanette, Arlington, Tex. 76010. Sponsor: Dallas Cliff Cloud Climbers.

**Aug. 18—Lapel, Ind.** (A) 1st Annual Lapel RC Fun Fly. Site: Club Field. R. Watson, Jr. CD, RR#3, Box 200G, Anderson, Ind. 46011. Sponsor: Lapel RC Flying Modelers.

**Aug. 18—Denver, Colo.** (A) MMM Monthly FF Meet. Site: Denver. W. Baldrige CD, 1464 S. Lafayette St., Denver, Colo. 80210. Sponsor: Magnificent Mountain Men.

**Aug. 18—Brighton, Wisc.** (AA) Bong Eagles FF Contest. Site: Bong Field. G. Wisniewski CD, 1535 E. Tripoli Ct., Milwaukee, Wisc. 53207. Sponsor: Bong Eagles.





**Aug. 24—Omaha, Neb.** (A) M.A.S.S. Monthly Soaring Meet. Site: The Grass Pad. J. Simpson CD. 2636 Forbes. Omaha, Neb. 68123.

**Aug. 24—Cudahy, Wis.** (A) 2nd Midsummer RC Soar-In. Site: Warnmont Park. G. Fornary CD. 220 7th St. Racine, Wis. 53403. Sponsor: Milwaukee Flying Electronics, Inc.

**Aug. 24-25—Pearl City, HI.** (AA) 2nd Annual Hawaii UC Championships. Site: Pearl Harbor Park. S. Clough CD. 318-B Millert St. APO San Francisco, Calif. 96557. Sponsor: Hawaii CL Club.

**Aug. 24-25—St. Charles, Mo.** (AA) McDonnell RC Seventeenth Annual Meet. Site: McDonnell-Douglas Electronics. W. Feldmeier CD. 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC Club.

**Aug. 24-25—Anderson, SC.** (AA) South Carolina State Championships for RC. Site: Anderson SC Airport. L. Nash CD. 403 Lavista Place. Pendleton, SC 29607. Sponsor: Tri County RC Flyers.

**Aug. 24-25—Cleveland, Ohio.** (AAA) 39th Cleveland Junior CL Air Races. Site: Cleveland Hopkins CL Flying Field. R. Sargent CD. 1684 Wright Ave., Rocky River, Ohio 44116.

**Aug. 24-25—Orange, Mass.** (A) 21st Annual NERCOC Contest. Site: Orange Airport. W. Army CD. 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers.

**Aug. 24-25—Salt Lake City, Ut.** (A) Lucky 13th Annual RC Summer Festival. Site: Saltair Model Port. D. Roper CD. 3914 W. 4955 S. Salt Lake City, Ut. 84118.

**Aug. 24-25—Omaha, Nebr.** (AA) Omahawks Annual RC Meet. Site: Omahawks Field. R. Hess CD. 11720 Cedar. Omaha, Nebr. 68144.

**Aug. 24-25—Fountain Valley, Calif.** (B) 1974 LSF Tournament. Site: Mile Square. B. Henon CD. 1042 Embury St., Pacific Palisades, Calif. 90272. Sponsor: San Fernando Valley Silent Fliers.

**Aug. 25—W. Suffield, Conn.** (A) Nor'East Air Races '74. Site: NCRCC Field. B. Williams CD. 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club, Inc.

**Aug. 25—Lakehurst, N.J.** (AA) Dist. II RC Pattern Championships. Site: Lakehurst N.A.S. J. Friend CD. 62 Joysan Terr., Freehold, N.J. 07728. Sponsor: Monmouth M.A.C.

**Aug. 25—LaSalle, Mich.** (A) Hobby Stop Silver Cup 1/4 Midget Meet. Site: Toledo Weak Signals Field. B. Mallory CD. 4466 River Rd., Toledo, Ohio 43614. Sponsor: Weak Signals, Flying Tigers.

**Aug. 25—Chardon, Ohio.** (A) CRC 3rd Annual Glider Meet. Site: Chardon. F. Sheplavy CD. 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

**Aug. 25—Hamburg, N.Y.** Flying Knights 6th RC Fun Fly. Site: Hamburg Recreation Center. N. McCormack CD. 6709 Hillcrest Dr., Boston, N.Y. 14025. Sponsor: Flying Knights of Hamburg, N.Y. Inc.

**Aug. 25—Dansville, Mich.** C.A.R.D.S. of Lansing Mich. RC Fun Fly. Site: Dansville. B. Bailey CD. 800 Eugenia St., Mason, Mich. 48854. Sponsor: Capital Area Radio Drone Squadron.

**Aug. 25—Queens, N.Y.** (AAA) Association of MAC Greater N.Y. CL Meet. Site: Flushing Meadow Park. P. Bianchini CD. 260 S. Broadway, Yonkers, N.Y. 10705.

**Aug. 25—Elk Grove Village, Ill.** (A) CPC Pylon Race. Site: Chicago Land Field. B. Browning CD. 18 Linden Ave., Wheeling, Ill. 60090. Sponsor: Chicago Pylon Club.

**Aug. 25—Rice Lake, Wis.** (AA) Hawk 2nd Annual Summer FF Contest. Site: Barron Co. Campus. F. Kelley CD. 20 Phipps Ave., Rice Lake, Wis. 54868. Sponsor: Hardscrabble Hawks MAC.

**Aug. 25—Brookport, N.Y.** (A) Alvin R. Grant Sailplane Meet. Site: Brookport. R. Walder CD. 27 Folkside Ln., Fairport, N.Y. 14450. Sponsor: RC Club of Rochester.

**Aug. 25—Ft. Wayne, Ind.** (A) First Annual Stand-off Scale Jamboree. Site: Ft. Wayne. J. Spallone CD. 7116 Penmock Dr., Ft. Wayne, Ind. 46819. Sponsor: Fort Wayne Flying Circuits.

**Aug. 25—Lincoln, Nebr.** (AA) Aero-Design 7th Annual UC Contest. Site: Humane Society Park. D. Reiber CD. Rt. 8. Lincoln, Nebr. 68506.

**Aug. 25—Framingham, Mass.** (A) Charles River Glider Contest. Site: Calahan State Park. J. Peghiny CD. 2202 Comm. Ave., Auburndale, Mass. 02166. Sponsor: Charles River Radio Controllers.

**Aug. 25—Honolulu, HI.** (B) Hawaii RC Pattern Bash. Site: Ford Island. B. King CD. 4138-1 Keanu St., Honolulu, HI. 96816. Sponsor: Hawaii RC Club.

**Aug. 25—Osseo, Minn.** (AA) Annual CL Fall Contest. Site: N. Henn Comm. College. T. Hetzler CD. 3124 Columbus Ave., Minneapolis, Minn. 55407. Sponsor: Minneapolis Pylon Poppers.

**Aug. 25—Kansas City, Mo.** (A) Sky Devils CL Meet. Site: Swope Park. J. Holliday CD. 1210 S. 38th St., Kansas City, Mo. 66106. Sponsor: Sky Devils MAC of KC, Mo.

**Aug. 31-Sept. 1—Jacksonville, Fla.** (AAA) District Five Championships. Site: Jacksonville. A. Wright CD. 5682 Alpha Ave., Jacksonville, Fla. 32205. Sponsor: RC Club of Jacksonville.

**Aug. 31-Sept. 1—Anderson, Ind.** (AA) 3rd Annual Mid Western RC Championships. Site: Anderson Municipal Airport. S. Darlington CD. 3402 E. 8th St., Anderson, Ind. 46012. Sponsor: Madison County RC Flyers.

**Aug. 31-Sept. 1—St. Paul, Minn.** (A) 3rd Annual Pylon & Scale Contest. Site: St. Paul RC R. LaBrash CD. 2590 Cohansey St., Roseville, Minn. 55113. Sponsor: St. Paul Radio Controllers, Inc.

**Aug. 31-Sept. 1—Orwell, Ohio.** (AAA) Third Annual FF Meet. Site: Orwell. L. Campbell CD. 9230 Independence, Parma Hgts., Ohio 44130. Sponsor: Cleveland FF Society.

**Aug. 31-Sept. 1—Billings, Mont.** (AA) 8th Annual Montana RC Championships. Site: B.F.M. Flying Field. R. Wilson CD. 3225 Phillip. Billings, Mont. 59101. Sponsor: Billings Flying Mustangs.

**Sept. 1—Blaine, Minn.** (AA) Annual August FF Meet. Site: Hentges Sod Farm. L. Stockstad CD. 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: Mpls. Model Aero Club.

**Sept. 1—Ft. Lauderdale, Fla.** Ft. Lauderdale Ugly Stick Race. Site: 16001 W. S.R. 84. W. Williamson CD. 8300 NW 38th, Coral Springs, Fla. 33065. Sponsor: Broward County RC Assoc.

**Sept. 1—Glenview, Ill.** (AA) Scalemasters 6th Annual Scale Rally. Site: Glenview NAS. C. Macomber CD. 922 Oak St., Winnetka, Ill. 60093. Sponsor: Chicago Scalemasters.

**Sept. 1—Montezuma, Iowa.** (A) Sig CL Contest. Site: Sig Field. H. Pohlmann CD. 401 S. Front St., Montezuma, Iowa 50171.

**Sept. 1—LaSalle, Mich.** Seasons End Helicopter Championships. Site: Weak Signals Field. D. Keats CD. 2014 Atlas, Troy, Mich. 48084. Sponsor: Mich. Whirlbirds RC Helicopter Club.

**Sept. 1-2—Pasadena, Tex.** 3rd Annual Gulf Coast RC Fun Fly. Site: Red Baron Flying Field. W. Beckham CD. 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

**Sept. 2—Fort Meade, Md.** (B) 1st Annual RC Meade Modelers Club Championships. Site: Range #5. W. Cislo CD. 575 Rita Dr., Odenton, Md. 21113. Sponsor: Fort Meade Modelers.

**Sept. 2—Jacksonville, Fla.** Second Annual "Snoopy's Fun Fly Decathlon". Site: Jacksonville. C. Belcher CD. PO Box 6176. Jacksonville, Fla. 32205. Sponsor: Gateway RC Club, Inc.

**Sept. 7-8—Fiskdale, Mass.** (A) 9th Annual Hydro Championships. Site: Brimfield Dam. W. Army CD. 15 Rhodes St., Millbury, Mass. 01527. Sponsor: New England RC Modelers.

**Sept. 7-8—Taft, Calif.** (AAA) San Valeros Annual Free Flight Meet. Site: Taft. R. Hunter CD. 9486 Sandusky, Arleta, Calif. 91331. Sponsor: San Valeros MAC.

**Sept. 7-8—Monroe, NC.** (AA) MR/RC Air Races. Site: Monroe RC Club. B. Helms CD. 800 Tyvola Rd., Charlotte, NC 28210. Sponsor: Monroe RC Club.

**Sept. 7-8—Dayton, Ohio.** (AAA) Buzzin Buzzards CL Jamboree. Site: Municipal Flying Field. R. Perry CD. 5016 Angelita Ave. Dayton, Ohio 45424. Sponsor: Dayton Buzzin Buzzards.

**Sept. 7-8—Muncie, Ind.** (AA) Mid-State CL Championships. Site: Westside Park. M. Eber CD. RR #1, Box 213A, Selma, Ind. 47383. Sponsor: Muncie Controllers MAC.

**Sept. 7-8—Rhinebeck, NY.** Rhinebeck WW I Jamboree. Site: Rhinebeck. G. Bickel CD. South Greenhaven Rd., Stormville, NY 12582. Sponsor: Mid-Hudson RC Society, Inc.

**Sept. 7-8—Hobbs, MN.** (AA) HARKS Annual RC Contest. Site: Hobbs. J. Cox CD. 1917 N. McKinley St., Hobbs, NM 88240. Sponsor: Hobbs Aero Radio Control Society, Inc.

**Sept. 7-8—Ft. Wayne, Ind.** (AA) 21st Annual Mid-States RC Contest. Site: Smith Field Airport. P. Gieseking CD. 1212 Delta Blvd., Ft. Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits.

**Sept. 8—Gridley, Calif.** (AA) Gathering of the Ducks #5 for FF. Site: Gridley. W. Gho CD. 329 Redondo, Ct., Stockton, Calif. 95207. Sponsor: Stockton Gas Model Association.

**Sept. 8—Elvira, Ohio.** (AA) Dave Wallick's CL Red Light Special. Site: Lorain County Comm. College. L. Baker CD. 4023 Victory Blvd., Cleveland, Ohio 44135. Sponsor: The Happy Hookers.

**Sept. 8—N. Liberty, Iowa.** (A) Iowa City Aero Hawks 2nd Annual Glider Contest. Site: Quail Creek Golf Course. T. Edmonds CD. 1 Lakeview Knoll Rd., Iowa City, Iowa 52240. Sponsor: Iowa City Aero Hawks.

**Sept. 8—Lake Elsinore, Calif.** (A) Rockwell International Flightmasters "Picnic R.O.W.". Site: Lake Elsinore. R. Brinkner CD. 4239 Centinella, Los Angeles, Calif. 90066. Sponsor: Rockwell International Flightmasters.

**Sept. 8—Middletown, R.I.** (AA) CL Class AA Meet. Site: Middle School Field. L. Myttinger CD. 25 Renfrew Ave., Middletown, R.I. 03840. Sponsor: CL Aero Modelers of Middletown, R.I.

**Sept. 8—Hadley, Mass.** (A) "Pulled-Up Powerless Planes" Meet. Site: Hampshire County RCers Field. R. Dash CD. 19 Kelleher Dr., S. Deerfield, Mass. 01373. Sponsor: Hampshire County Radio Controllers.

**Sept. 8—Moweaqua, Ill.** (A) Decatur Blunderbirds' Fun Fly. Site: Kroenleins Airport. D. Holtfretter CD. PO Box 366, Blue Mounds, Ill. 62513. Sponsor: Decatur Blunderbirds.

**Sept. 8—Ft. Worth, Tex.** (A) Pylon Meet. Site: Ft. Worth. F. Cox CD. 209 Rolling Hills Dr., Ft. Worth, Texas.

**Sept. 8—Pensacola, Fla.** Northwest Florida RC Fun Fly. Site: Elyson Field. R. Hanft CD. RR 1, Box 3348 Elberta, Ala. 36530. Sponsor: Northwest Florida Radio Control Modelers.

**Sept. 8—Easton, Penna.** (AA) BAM FF Bash IV. Site: Easton Ave., Bethlehem, Penna. 18017. Sponsor: Bath Area Modelaires.

**Sept. 8—Wyandotte, Mich.** (B) Indian City Fun Fly. Site: Wyandotte. E. Lynn CD. 3167 - 22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC Club, Inc.

**Sept. 8—Nashville, Tenn.** (AA) Music City CL Festival. Site: Warner Park. W. Henry CD. 269 Elysian Fields, Nashville, Tenn. 37211.

**Sept. 8—Brighton, Wis.** (AA) 31st Annual FF Midwestern States Championships. Site: Bong Field. P. Stotch CD. 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

**Sept. 14—Waco, Tex.** (A) 7th H.O.T. M.A.C. Fly for Fun Meet. Site: Waco. C. Horton CD. 916 Wedgewood, Waco, Tex. 76710. Sponsor: H.O.T. M.A.C.

**Sept. 14—Omaha, Neb.** (A) M.A.S.S. Monthly Soaring Meet. Site: The Grass Pad. J. Simpson CD. 2636 Forbes. Omaha, Neb. 68123.

**Sept. 14-15—W. Suffield, Conn.** (A) Nor'East RC Air Races '74. Site: NCRCC Field. B. Williams CD. 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club.

**Sept. 14-15—Taft, Calif.** (AA) Thunderbugs 28th FF Annual. Site: Taft. J. Norcross CD. 4836 W. 123rd St., Hawthorne, Calif. 90250. Sponsor: Thunderbugs.

**Sept. 14-15—Elmira, NY.** (A) Harris Hill Open RC Glider Meet. Site: Harris Hill. E. Heyworth CD. 1210 Wolcott Dr., Horsehead, NY 14845. Sponsor: Harris Hill Lift Over Drag.

**Sept. 14-15—Wichita, Kans.** (AA) Fall Pylon Meet. Site: 13th & Webb Rds. J. Finley CD. 6540 E. Central, Wichita, Kans. 67206. Sponsor: Wichita RC Club.

**Sept. 14-15—Bossier City, La.** (AA) Sharks RC Annual. Site: Bossier City. B. Lund CD. 707 N. Acres, Springhill, La. 71075. Sponsor: Shreveport Radio Control Society, Inc.

**Sept. 14-15—Columbus, Miss.** (AA) Second Annual J.O.C. RC Model Airplane Contest. Site: Columbus AFB. J. Brownlee CD. 257 Clay St., Columbus AFB, Miss. 39701. Sponsor: Columbus Prop Busters.

**Sept. 15—Detroit, Mich.** (AA) Fall CL Internationals. Site: Rouge Park. J. Lucas CD. 20463 Ardmore, Detroit, Mich. 48235. Sponsor: Strathmore Model Club of Detroit.

**Sept. 15—Downers Grove, Ill.** (A) 1st Woodland Races for 1/4 Midget. Site: Downers Grove. B. Vojslavak CD. 7819 Chestnut Ave., Woodridge, Ill. 60515. Sponsor: Woodland Aeromodellers.

**Sept. 15—Rockaway, NY.** (A) PARCS 1974 East Coast RC Scale Championship. Site: Ruis Park. J. D'Amico CD. 9224 Rost Pl., Brooklyn, NY 11236. Sponsor: Penn. Ave. RC Society.

**Sept. 15—Glastonbury, Conn.** (A) Glastonbury Modelers FF Fall Fly In. Site: Glastonbury Meadows. E. Novak CD. 150 Price St., Bridgeport, Conn. 06610. Sponsor: Glastonbury Modelers.

**Sept. 15—Queens, NY.** (AAA) Assoc. of MAC of Greater NY CL Meet. Site: Flushing Meadow Park. J. Droesch CD. 86-17 108 St., Richmond Hill, NY 11418.

**Sept. 15—Lakehurst, NJ.** (A) 7th Annual B.C.R.C. & M.C.R.C. RC Meet. Site: NAS Lakehurst. J. Johnson CD. 2529 S. American St., Philadelphia, Penn. 19148. Sponsor: Burlington County RC Club.

**Sept. 15—Ohio.** (AA) NOFA Old Timers Contest. Site: Pending. K. Emde CD. 1538 Lakeland Ave., Lakewood, Ohio 44101. Sponsor: Northern Ohio FF Association.

**Sept. 15—Colorado Springs, Colo.** Pikes Peak Area Championships for 1/4 Midget. Site: Colorado Springs. J. Aycock CD. 1422 Tesla Dr., Colorado Springs, Colo. 80909. Sponsor: Pikes Peak RC Club.

**Sept. 15—Westfield, Ind.** (A) Hamilton RC Fly for Fun. Site: Westfield. H. Vandiver CD. 10714 Lakeview Dr., Carmel, Ind. 46032. Sponsor: Hamilton Flying Modelers.

**Sept. 15—Urbana, Ill.** (A) Midwest All Stunt CL Meet. Site: Illini Airport. J. Laws CD. Box 191 Hindsboro, Ill. 61930. Sponsor: Champaign-Urbana Aeronauts.

**Sept. 15—Mansfield, Ohio.** (AA) Electronic Flyers Pattern Contest. Site: Mt. Zion Rd. M. Kalish CD. 235 Cline Ave., Mansfield, Ohio 42730. Sponsor: Electronic Flyers.

**Sept. 21-22—Ontario, Canada.** (AA) United Pylon Racing Circuit Championship Race. Site: Waterford. E. Landefeld CD. PO #2, 11151 Jamison Rd., E. Aurora, NY 14052. Sponsor: Niagara County MAC, Inc.

**Sept. 21-22—Tullahoma, Tenn.** (A) Coffee Air Foilers Fall RC Thermal Meet. Site: Tullahoma. L. Webster CD. 1000 Sycamore Cr. Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers MAC.

**Sept. 21-22—Huntsville, Ala.** (AA) MACH FF & Oldtimer Meet. Site: Old Huntsville Airport. R. Deep CD. 8622 Valley View Dr. SE, Huntsville, Ala. 35802. Sponsor: Model Airplane Club of Huntsville.

**Sept. 21-22—Raleigh, NC.** (AA) RD/RC Bar-B-Q Meet. Site: RD/RC Field. M. Sanderson CD. 3410 Baugh St., Raleigh, NC 27604. Sponsor: Raleigh/Durham RC Club.

**Sept. 21-22—Virginia Beach, Va.** (AA) Tidewater RC Annual Meet. Site: Virginia Beach. J. Raynor, CD. 5529 Nashua Rd., Virginia Beach, Va. 23462. Sponsor: Tidewater RC, Inc.

**Sept. 21-22—Oklahoma City, Okla.** (A) TORKS RC Meet. Site: TORKS Field. C. Brownlee CD. 3033 Rolling Stone, Oklahoma City, Oklahoma.

**Sept. 22—Bristol, Conn.** (AA) MUM CL Classic Meet. Site: Edgewood School. J. Scott CD. 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets.

**Sept. 22—St. Paul, Minn.** (B) Minnesota State Pattern Championships. Site: Shoreview. J. Brown CD. 1458-97th Ave., NW, Coon Rapids, Minn. 55433. Sponsor: St. Paul Model RCers, Inc.

**Sept. 22—E. Bridgewater, Mass.** South Shore RC Meet. Site: State Correctional Inst. E. Thompson CD. 57 Rathbun St., Coventry, R.I. 02816. Sponsor: South Shore RC.

**Sept. 22—Dayton, Ohio.** (A) Ohio Pylon Racing Association Championships. Site: Dayton. W. Hager CD. 5200 Rye Dr., Dayton, Ohio 45424. Sponsor: Dayton Wingmasters.

**Sept. 22—Brighton, Wis.** (AA) 12th Chicago Aeronuts Fall Old Timers Contest. Site: Bong Field. P. Stotch CD. 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

**Sept. 22—Suffolk, L.I., NY.** (A) Suffolk Falcons 8th Annual Hydro Meet. Site: Suffolk T. Placek. CD. 53 Winkle Pt. Dr., Northport, L.I. NY 11768. Sponsor: Suffolk Falcons.

**Sept. 22—Nassau, NY.** (AA) Long Island Drone Society 16th Annual Pattern Meet. Site: Mitchell Field. W. Fuori CD. 28 Fernwood Dr., Commack, NY 11725. Sponsor: Long Island Drone Society.

**Sept. 22—Ft. Lauderdale, Fla.** (A) Ugly Stick Races. Site: Ft. Lauderdale. W. Williamson CD. 8300 NW 38th St., Coral Springs, Fla. 33065. Sponsor: Gateway RC Club.

**Sept. 22—Wichita, Kans.** (AAA) 7th Annual FF & CL Fall Rally. Site: 13th & Webb. L. Woolard CD. 1558 N. Battin, Wichita, Kans. 67218. Sponsor: Wichihawks.

**Sept. 22—Detroit, Mich.** (AA) Michigan Exchange Clubs FF & CL Model Airplane Meet. Site: Ford Uta Test Track. E. Stoll CD. 30471 Manse, Mt. Clemens, Mich. 48043. Sponsor: Detroit Balsa Bugs.

**Sept. 22—Glastonbury, Conn.** (A) East Coast Old Timer Champs. Site: Meadow Rd. J. Whittles CD. 43 Farview Ave., Old Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter-7.

**Sept. 22—Washington, D.C.** (AA) Fall Quadrathon & Balloon Bust. Site: Anacostia NAS. W. Sanders CD. 9735 52nd Ave., College Park, Md. 20741. Sponsor: Sky Lancers of Washington.

**Sept. 28-29—Somers, NY.** (A) Somers RC Scale & Sport Scale Open Meet. Site: Somers Flying Field. C. Babin CD. Dawn Hill, Goldens Bridge, NY 10526.

**Sept. 28-29—Lakeside, Calif.** (AA) San Diego Drones Annual RC Meet. Site: Lakeside. G. Lewis CD. 1624 Chiswick Ct., El Cajon, Calif. 92020. Sponsor: San Diego Drones, Inc.

**Sept. 28-29—Greenville, SC.** (AA) W.C.R.C. Fall Pattern Contest. Site: Greenville. J. Bradham CD. 20 Longmeadow, Taylors, SC 29687. Sponsor: W.C.R.C.

**Sept. 28-29—Columbus, Miss.** (AAA) Second Annual J.O.C. CL Model Airplane Contest. Site: Columbus Air Force Base. J. Brownlee CD. 257 Clay St., Columbus AFB, Miss. 39701. Sponsor: Columbus Prop Busters.

**Sept. 28-29—Fresno, Calif.** (AA) Randalls Round Up "Annual 35th" for Cat I. Site: Fresno. F. Ginder, CD. 5740 E. Ashlan, Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

**Sept. 28-29—Ballston Spa, NY.** (A) Empire State Pylon Racing. Site: Saratoga City Airport. D. Hull CD. 15 Brookview Dr., Schenectady, NY. 12303. Sponsor: Thundersults.

**Sept. 28-29—Fresno, Calif.** (A) 14th Annual Stockton Old Timers Meet. Site: Fresno. R. Douglas CD. 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

**Sept. 28-29—Amarillo, Tex.** (AA) ARKS 14th Annual Contest for RC. Site: Amarillo. J. Franklin CD. 2700 John Dr., Amarillo, Tex. 79110. Sponsor: Amarillo RK Society.

**Sept. 28-29—Clovis, NM.** Clovis MADS Fun Fly Meet. Site: Clovis. E. Harvey CD. Star Rt. Clovis 48, Clovis, NM 88101. Sponsor: Clovis MADS.

**Sept. 29—Kansas City, Mo.** (A) Sky Devils Meet for CL. Site: Swope Park. B. Wright CD. 2818 Collin, Independence, Mo. 64052. Sponsor: Sky Devils MAC of KC, Mo.

**Sept. 29—Mentor, Ohio.** (A) M.A.R.C.S. 6th 1/4 Midget Championships. Site: Tyler Blvd. R. Penko CD. 21151 Westport Ave., Euclid, Ohio 44123. Sponsor: Mentor Area RC Society.

**Sept. 29—Dallas, Tex.** (AA) 13th Annual FF Fall Bash. Site: Dallas. M. Fedor CD. 3021 Duff Dr., Arlington, Tex. Sponsor: Dallas Cliff Cloud Climbers.

**Sept. 29—Mesquite, Tex.** (A) 4th Annual A & B Pattern & Sport Scale RC Meet. Site: Samuels Park East. P. Merrill CD. 2800 Leighann Ln., Arlington, Tex. 76010. Sponsor: Golden Triangle RC Club.

**Sept. 29—Salem, Ill.** (AA) McDonnell Douglas FF Contest. Site: Salem Leckrone Airport. J. Bennett CD. 324 Helffenstein Ave., St. Louis, Mo. 63119. Sponsor: McDonnell Douglas FF Club.





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## LISTER ON L/D=

(Continued from page 62)

quickly as do the three NACA 4-digit sections. In plain words, the Eppler derivatives all have their backsides sticking up in the air like overweight recruits doing pushups. But, that's an Eppler characteristic and people swear by the Epplers, so I guess its okay.

What this all boils down to is that any of the new six ought to be capable of bringing home a prize or two in the classes mentioned, because they are highly cambered, they are thin, and they have general characteristics that came from contest winners. They are a bit like the young fillies of thoroughbred race horse parents—brand new, untried and with big potential payoffs (with all this manure, there's got to be a pony somewhere inside the pile).

So much for the design board. . .paper is one thing, but hardware is something else. Let's talk about available test results in the

field on this new group. What I was looking for was some kind of a test program to evaluate at least the airfoils at the extreme ends of the camber location.

Why the extremes? In a nutshell, if the stuff that seems far out works out, based upon conventional airfoil practice, then the sections in between should also have at least an equally good prospect of being worthwhile.

Of the six new sections offered, the one that seemed farthest out was the NACA 7306, because of its forward camber. This was the section that I wanted to have verified by flight test. To make it even more of an acid test, I did two more things. The first was the application—I built a 1/2A free flight ship rather than a Nordic or a soarer. This would test the climb as well as the glide performance.

The second thing I did was to increase the thickness just a bit, from 6% to 7%. This is in the direction of higher wing profile drag, but

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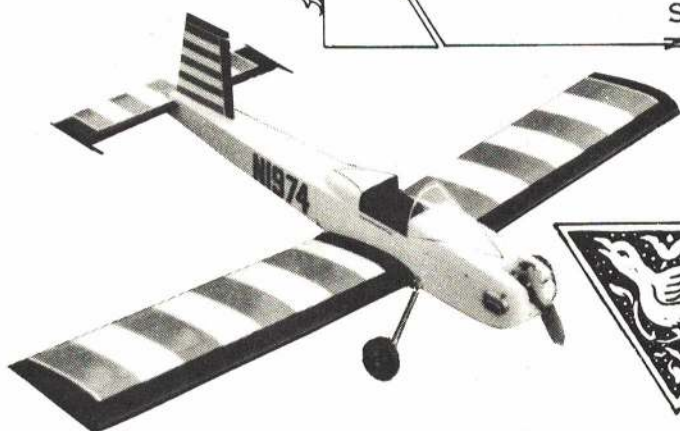
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on a 7" chord it just accomodates a 1/2 x 1/8" hard balsa spar. With all those things going against it, I figured that I would have found a pony if everything worked. The ship had a few other features that you don't find every day in a kit (a down stream topic).

The end result was an unusual looking airplane—so it got named the Grand Funk-320. A sketch of it is shown, using the NACA 7307 airfoil on a geodetic wing. The wing has turned out to be super strong, so there's no good technical reason why a 6% thick section couldn't be used with a 3/8" deep spar on a 7" chord.

In words of few syllables, it worked. The climb was fast, and the angle was about 80°. The transition from power to glide was "snappy" even at a total all-up weight of 9.3 oz. The glide was slow and flat. All in all, the whole thing was pretty successful. The important thing that's worth noting is that the NACA 7307 section gave good performance. The message here is that the flying test bed (Grand Funk) verified that the NACA 7306 has a very good chance for success. What this all boils down to is that there is hope for the six new sections presented here. Try an Omaha Chiquita—maybe you'll like it. (I know now where to keep my banana.—php.)

If you should decide to build the Grand Funk-320, it could be built with either the NACA 7306 or 7307 sections. Since they both use the same 7% meanline, their trim characteristics would be identical. Regardless of which airfoil goes into the ship, the stability in pitch depends heavily upon where the CG is located. As shown on the sketch, the ship was balanced 2.8" from the trailing edge. This is 9% of the average wing chord ahead of the neutral point.

The neutral point is the spot on the ship where the plane will have no inclination of it's own to recover from a pitch upset if it is balanced at that spot. The CG on the Grand Funk is placed pretty well forward of that point for a free flight ship, which is maybe why the transition from power to glide is so nice—it has inherent recovery built in.

There's one more point of possible interest, and then I'll let it go for another month. There's probably no other model magazine that pushes for originality in design like AAM. Taking that to heart, I entered the Grand Funk this past winter in a hobby and art show that was held at the Naval Air Propulsion Test Center in Trenton, N.J. In the modeling category, it was competing against 60-powered, expensive, multi-channel RC ships built from kits. The little Grand Funk, with its weird fuselage and highly cambered NACA 7307 section (made with \$3.00 worth of balsa and Jap tissue) won in the models category. One of a kind still means something, even to judges from a local high school faculty who aren't modeling nuts themselves. Try something new. Get out of that rut. Go Grand Funk.

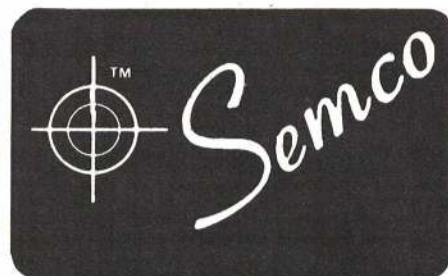
## STOCKWELL ON RC

(Continued from page 64)

events on Sunday (when practically all of these crashes occurred) reminded some of the old hands around Los Angeles of the destruction derby at Universal International several years ago when half of the entry list went down the drain in crashes.

The incidence of zeroes due to crashes, blown plugs (Bob Smith, Dan McCan), running out of fuel (Larry Leonard), two cuts (Jeff Bertken, Ron Sheldon, Tom Tusing) was so high that at least one extremely slow airplane, by today's standards, managed to end up seventh in the Expert standings just by finishing every race—namely Whit Stockwell (we were almost ashamed to come back to the pits after turning in our 1:30's, 1:40's, 1:50's, and one 2:05 when I was sure we would run out of fuel). Ed Hotelling suffered much of the same embarrassment, finishing just ahead of us—mainly on persistence, not speed, compared with the rest of the top ten.

Though, by the time this is published, the pipe controversy will have been settled, part of the basis for settlement occurred at this contest. Ron Schorr set up a Tigre demonstration with and without pipe—both his own pipe and the one used by Prather (pipe means "exhaust extension" in this context). Tweak the needle how they would, they could not make that engine gain a single rpm with either so-called pipe,



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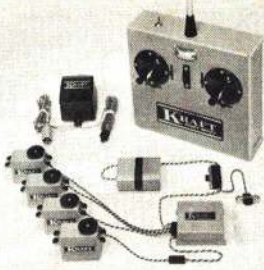
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In other tests, they had found an rpm gain of 500-600. But Prather's own tests indicate that the gain is extremely erratic, rarely in excess of 100 rpm. Jeff Bertken tried an exhaust extension on his K&B in racing with Larry Leonard: he won the race because Larry cut, but Jeff's engine didn't unload as well as it had without the extension. It doesn't really look as though the extension does anything consistently, except get the exhaust out of the engine compartment, which is why the contest board *should* allow them.

The core of the contest management was superb: Chuck Smith was a first-class CD, and the assistance of the Bakersfield crew (Spickler, Jeanie and Jerry Christiansen) was invaluable. But on Saturday, the flagmen and counters were rather young Boy Scouts, who simply didn't have the size and strength to man the flags effectively, and who occasionally had to learn the fundamentals of reading a stop watch. The problems were not very serious, but on Sunday, a crew of Valley Flyers took over the Boy Scout chores and things went much more smoothly. On the P.A. system, Dick Sonheim worked solidly for two full days until he was nearly hoarse, but it really improves a race to have competent announcing for the spectators as well as for the participants.

The final results:

EXPERT CLASS					
1. Terry Prather	L/I Toni	ST	28 pts	1:17.3	
2. Kent Nogy	LR1-A	K&B	24 pts		
3. Ron Neff	Minnow	K&B	24 pts		fly-off
4. Joe Vartanian	L/I Toni	ST	23 pts		
5. Bob Smith	Miss DARA	K&B	22 pts		
6. Ed Hotelling	El Bandito	K&B	21 pts		fly-off
7. Whit Stockwell	Miss DARA	K&B	21 pts		
8. Dan McCan	Miss DARA	K&B	19 pts		
9. Don Powell	Minnow	K&B	19 pts		
10. George Flynn	Miss DARA	ST	19 pts		fly-off
11. Jeff Bertken	Miss DARA	K&B	19 pts		
12. Wes Morris	Miss DARA	ST	19 pts		

STANDARD CLASS					
1. Bob Johannes		6. Bob Novak			
2. Joe Howard		7. Joaquin Alba			
3. Lou Governale		8. Jerry Boyce			
4. Steve Sica		9. Keith Davidson			
5. Bob Emery		10. Sonny Myers			

### MARONEY ON RC

(Continued from page 66)

be accused of negligence and dereliction if I did not reveal some of the negative aspects (in fine print of course).

Although you'll be soaring some of the time (underscore some), you do run the risk of cuts and contusions and/or becoming afflicted with a rash from the vegetation which naturally abounds. In any case, if you survive the ordeal of descent and ascent when retrieving your ship, apply for a merit badge in mountain climbing. You shall have certainly earned it!

The next hazard has never occurred, but do not rule out the possibility... you may be called upon to wade or swim in frigid waters to rescue your glider. If swimming is not your forte, I strongly recommend a preparatory course at the YMCA. And while you're there, take a course in administering first aid.

The dividends paid for being adequately prepared for a slope flying session are always welcome, so the next excellent item for your old kit bag is a bottle of snake bite remedy. This can be imbibed on the pretext of warding off the cold or to bolster faltering courage.

Although you can furnish your own brand, I strongly recommend "Yaqui Doc." This particular elixir is as old as the west and was originally brewed and concocted by a wise old Shaman of the Yaqui tribe of Indians. This stuff is a rare item to obtain today, but go to your favorite liquor emporium and ask for it by name. I'm sure if they don't have it, they can provide a comparable substitute.

And so, if you've never slope soared, I can only end by saying, "you don't know what you're missing." Go to it, tiger!

### MEUSER ON FF

(Continued from page 66)

fuselage must be provided with some means of gripping to enable the filer to exert a pull of about 20 lb. The neatest scheme that has appeared is the method used by Carl Almendinger. Basically, it consists of a wire hook and a wooden tee-handle. The hook engages a loop of wire attached securely to



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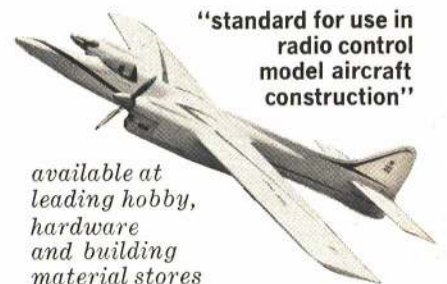
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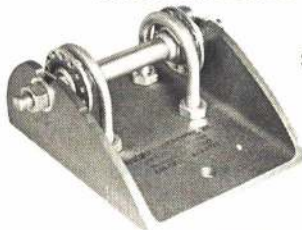
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For modelers of all ages, there is the annual Dick Black Memorial Postal Contest. Flights must be made on any one day during September or October. Events included are FAI Power, Wakefield, A/1 Nordic, A/2 Nordic, 80-gram Coupe d'Hiver, combined class AMA Gas, Hand-Launched Glider, and Unlimited Rubber. Results are to be mailed to Steve Geraghty, 2858 Pinecrest Court, San Jose, Calif. 95121, by November 15. Modelers from all countries may enter both series of postals.

### McCULLOUGH ON RC

(Continued from page 68)

sent in advance with the photo order and you take pot luck, depending on how the file researcher interprets your photo descriptions. In most cases, this works out fairly well.

I generally get good results by sending for a small number of prints of a specific airplane, including a request for some detail shots such as of the instrument panel or cockpit. After seeing this survey of what is available, it is easier to fill in the collection desired by describing other views. The coverage in the Air Force files ranges from the early days to the present, but is somewhat erratic. On some planes, although they can cover you up with

photos of the entire airplane, there are no detail or close-up shots to be had.

One offbeat way to get a look at angles not generally seen is to buy "Wreck" file shots which have an overturned or upended example 8 x 10" glossies cost \$1.25 each (color is sometimes obtainable though at higher costs). Write for Photo Ordering Information sheet for full details. Send money order, not personal check, for photos. Address: Department of the Air Force, HQ Aero Space Audio-Visual Service (MAC), 1221 S. Fern St., Arlington, Va. 22202.

The Navy photo ordering procedure is the same as the USAF, except that they have only their most recent photos, and they want an appointment at least a day in advance for personal visits. 8 x 10" glossies are \$1.25 each. Write: Commanding Officer, Naval Photographic Center, Anacostia Naval Air Station, Washington, D.C. 20390.

Marine Corps pictures can be ordered at \$1.25 for each 8 x 10" from: Commandant, Marine Corps, Combat Pictorial Branch, Code A03P, HQ Marine Corps., Washington, D.C. 20380.

Most U.S. Army aviation photographs of World War II and prior years are in the Air Force files, but for aircraft of the Army since then, send order to: Commander, U.S. Army Audio Visual Agency, Room 5A518, The Pentagon, Washington, D.C. 20310. Bargain prices here, 55 cents per 8 x 10" glossy!

The National Air and Space Museum Library, Smithsonian Institution, Washington, D.C. 20560, is another repository of large quantities of fine scale date material. Their charge for 8 x 10" glossies is \$2.00, and 15 cents per page of photocopy.

We'll have more on this later, including where to get some of the detail and close-up shots the USAF photo section doesn't have.

Amen!: Fred Komlosy, writing in the Palm Beach Aeronauts News, says: "The second hardest thing in the world to do is add weight to the nose of an already overweight scale model to bring it into balance. The hardest thing in the world to do is fly that same scale

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model if it is out of balance and the weight has not been added." We'll add to that sage advice the further suggestion to put some extra weight in the nose for the test flights and go just a bit nose heavy. After the model is completely tested and trimmed, you can take out some of the weight and shift the CG rearward to increase aerobatic reactions. Fact is, a lot of people who do test fly deliberately nose heavy find they like the smooth, non-sensitive reaction to the controls so much that they never change the CG. There wouldn't be so many scale model snap rolls during landing flares and steep takeoffs if the optimum theoretical balance point is carefully figured—and then moved up!

**Bigger Engines For Sport Scale?:** So far, four separate fliers have submitted formal requests to the Scale Contest Board that the engine displacement limit in the current AMA Sport Scale regulations be raised above .61 cu. inches, more change proposals than for any other rule. Two suggest a total displacement not to exceed 1.25 cu. inches for multi-engines with single engine limit to be .80 cu. inches. One calls for a simple maximum of 1.25 cu. inches for all engines, same as the present AMA Scale engine rules.

This would permit some larger engines than 80s, such as Bill Bertrand's re-work of the Ohlsson and Rice used in his quarter-sized Fokker D-7. With the largest engine on the field, it must have been one of the safest RC models, certainly more so than the standard lower displacement pattern and pylon models.

The fourth rules version would permit a 2.40 total displacement with a 1.6 cu. inch single engine limit. This would allow unmodified standard Ohlsson and Rice similar size industrial engines.

Incidentally, the former cut-off deadline of June 1st for making proposals for changes in the rules has been advanced to September 1st to take advantage of experiences gained during the 1974 contest season, including the NATS. Any AMA member may propose changes in Sport or AMA Scale by filling out the standard form available from headquarters. All proposals properly filed will later be voted on and, if passed, included in the 1976 Rule Book.

**Dick Graham, of Liberty Sport fame, has this 3"-1" scale version of the diminutive home-built Scamp. It is exact scale, powered by a Veco 61, and controlled by EK. Test flights, as witnessed by your columnist, were outstanding. (So outstanding that AAM will present the Scamp as a full construction article—php.)**



**Brooklyn PARKS Go For a Fifth:** The Pennsylvania Avenue RC Society of Brooklyn have scheduled their Fifth Annual East Coast RC Scale Championships for Sunday, Sept. 15. Both AMA and Stand-Off Scale will be flown. With \$50. to the winner in each category, and cash and trophies to fifth place, the event should draw a large entry. For details, contact: Joe D'Amico, 9224 Rost Place, Brooklyn, N.Y. (212) CL1-1680.

## MOONEY ON FF

(Continued from page 68)

wheels are supplied. The tissue paper is supplied in the right colors—I do mean colors in the plural. The BA4-B comes with blue, yellow, and red tissue, the Cougar with Red and Black. License numbers are provided in the form of thin, sticky-backed mylar, so they'll stick to the model even if the covering is left undoped.



**Chuck Markos of Deerfield, Illinois, prepares his Guillow SE5 for a flight. (Photo by Dick Stouffer)**

**A trio of Laird LC-DCs. From foreground, they are Walt Mooney's, Curtiss Mooney's and Joel Rieman's.**



**Bill Stroman gets lots of miles from his balsa by building Peanut models. Here, a Fokker D-VI and Dr-I.**

**Careful attention to launch attitude of his Nieuport 28 is given by Frank Zagar. This Guillow kit took third place in the "not-too-scale" event hosted by the Chicago Aero-nauts. (Photo by Dick Stouffer)**



These models join Peck's series of Peanuts, which include the Pietenpol Air Camper, Miles M18, Druine Turbulent, and Clip Wing J3 Cub. In the future, Peck has a P51-D Mustang and a Zero scheduled. I've seen both of the prototypes and they fly really well.

**Refining Trim:** One of the rules for success at contests is: Have your model well tested. At the last Flightmasters indoor contest, Clarence Mather won rubber scale with his Stormovick. This model flies significantly better than the competition—it should—Clarence built it more than 15 years ago.

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**Annual Southwest Q/M Championships  
December 7-8, 1974**



# Bakersfield.....



(1) Jeff Bertken won all the marbles with his DARA II (stretched-wing version of the famous PB kit). (2) Trophy for fastest time. Terry Prather's name will go right under Bob Smith's 1973 name plate. 1:15.7 is moving! (3) From way down south (of the border), Joaquin Alba with his bird-wing paint job. (4) Big Ron Neff took fourth in a fly-off against Bob Smith. He flew Spickler-designed Minnow. (5) Johnny Brodbeck's wife will get a kick out of this shot (and so, probably, will Johnny). That's Jeanie Christianson he's "thanking" for the trophy. (6) Jim Jensen with the controversial pipe and his X-40. This Li'l Toni is a pretty purple and violet. (7) Wouldn't you like to have one of the leading engine customizers as your pit man and caller? Clarence and Jack Lee with their Super DARA. (8) The top father/son team in the country, Al and Terry Prather. Model is Prather's Li'l Toni.

**T**he annual BARKS Formula I race at Bakersfield, California, invariably produces the fastest times of the season. It has traditionally been held in early June, by which time the temperature is up around 95° in the shade, but there isn't any shade. This year it was held in the middle of May, and we nearly froze. In the past, the hot dry air has been credited for the exceptional speeds at Bakersfield. But we now have to predict that the guys will all want to race in cold windy weather.

Until this race, the K&B Schnuerles had never turned under 1:20. Ron Neff, hero of the Bakersfield hosts, a local insurance salesman who looks like a tackle for the Rams, turned a 1:19.5 with a Minnow designed by Glen Spickler, the organizer of this event from its inception several years ago. His engine was (they swear!) a stock K&B, with a propeller that still had the original varnish, a Rev-Up 9 x 7 that hadn't even been sanded for balance! He later turned an incredible 1:16.5, after several others

had followed his lead in making a shambles of the 1:20 barrier.

Jeff Bertken, who in the end won the contest in a brilliant fly-off with Kent Nogy, first turned a 1:19.5 and then a 1:18.4 with his Miss DARA. Not to be out-done by his former partner on the BS Racing Team, Bob Smith went out and first turned a 1:25.8 for eleven laps, and then did a 1:16.4 for a proper ten laps. Bob's caller these days is his lovely wife Cathy, and it is obvious that she does a great job.

There are several husband/wife teams in Formula I racing these days, and the number of father/son teams has proliferated to the point where you can't even keep track of them all. My son Whit and I were, I believe, the first of these teams; then came the Prathers, the McCans, and now the Atzeis, the Sicas, the Johanneses, and several others.

But 1:16.4 was not the fastest time. It was just the fastest K&B time. If you've followed racing at all, you can guess who did it. That's right: it was

Terry Prather. Terry Prather, in his second heat—after being beaten by Kent Nogy in his first heat—apparently decided he didn't care for coming in second, so he screwed on his best prop and told his father Al Prather to call the scatter pylon a little tighter. He turned in an incredible 1:15.7, with plenty of clocks around to confirm that it was at least that fast (I had him at 1:15.1). My guess is that the new "speed barrier" of 1:15 will be broken before the NATS this year. It's pretty discouraging to do a 1:20 and come in second, but that happened several times at Bakersfield.

In spite of the high speeds, this was one of the safest races ever. Among the really fast aircraft, there was not a single crash! In fact, every one of the top ten finishers in the expert category went home with his number-one bird unblemished. There was one mid-air among the experts, which totalled Tom Christopher's aging Ole Tiger (it was in its third year of competition: who can complain about that?). I think one has to conclude that it is not speed which



The first races of the season saw a new record, lots of fast, safe flying, and some indications of things to come. / by Bob Stockwell



wipes them out.

There is little sentiment, so far as I can discover, for slowing them down in California. There were 104 entries at the Bakersfield Race: 44 in expert and 60 in standard class. There are a few experts who ought to face the truth and start flying in standard class; and some of the guys in standard who are turning under 1:30 will no doubt soon move up to expert. However, on the whole the races were extremely well-balanced and equalized for interesting competition.

As evidence that the competition was well-balanced, I cite the fact that not a single flier went through his six rounds without a defeat. There was a fly-off for 1st, for 3rd, and for 7-10 in expert; and for 1st, 4th, 6th, and 9th in standard. In fact 9 out of 10 in standard had to fly-off for their final positions, and all but two in expert had to do the same (John Brodbeck took 5th on points, and Dan McCan 6th).

While the contestants were mainly from California, there were four entries from Mexico (Joaquin Alba, Manual

Sierra, Jose Amezcua, and Jorge Amor), who are all great competitors; one from the rain forests of the great Northwest (Bob Root, who had to make some repairs after his first landing and then crashed with a flutter problem in his second heat).

Mr. Consistency from Maryland, the 1973 NMPRA Champion, Bob Violett, took his engine back to Maryland to tell his partner Cliff Telford it needs some more work. He was flying as fast as he was at the Thanksgiving race where he took home all the marbles, but he wasn't flying any faster, whereas lots of other people were. The weather didn't help any: he came to California last November and ended up with a miserable cold and the worst sunburn in history; this time he lost his voice to laryngitis and another miserable cold. We hope he'll try us again—honest, our weather isn't always this bad!

The perpetual fast-time trophy went to Terry Prather; last year it was Bob Smith. Terry was flying his own Li'l Toni, an airplane which he is kitting and

for which he already—before it's in production—has some 200 advance orders. He hopes to have these new birds out in time for the NATS. His engine (you'll never guess!) was the Supertigre X-40. The customizer was Terry himself, with some help from Jim Jensen. Jensen is flying one of Terry's new birds with a Supertigre, and he also turned under 1:20. Tom Tusing is another of the Prather Li'l Toni and Supertigre group.

The California competition is beginning to shape up as a set of loose team-like groupings: Terry Prather heads the Supertigre contingent, with Jensen, Tusing, Roger Owens, Joe Vartanian, and perhaps a couple of others. Bob Smith heads the K&B DARA contingent, with Jeff Bertken, Dan McCan, Chuck Smith and Charlie Shaw. Larry Leonard and Kent Nogy head the LR1-A contingent, with John Brodbeck, Joe Foster, and Bud Anders. Each is associated with a particular company—Prather Products, PB Products, A&L Distributors, and each has a professional stake in winning. There is no company sponsorship—they are not professional teams, in that sense, at all, and I am not in any way suggesting that there is anything reprehensible about this grouping. It makes for lots of fun for all and sharpens the competition.

It would be impossible in the space I have left to thank all of the Bakersfield workers: Spickler, Jeanie and Jerry Christianson, and the whole BARKS crew on the pylons, the lap counters, and the desk. Suffice it to say that, as always they did an outstanding job. M.A.N. was a co-sponsor of the event, though this year Walt Schroeder was unable to be present. He has done an enormous amount for pylon racing and we missed him. (We know of one East Coast Publisher and Editor who did make the scene.)

#### RESULTS EXPERT

- |                  |                |
|------------------|----------------|
| 1. Jeff Bertken  | Miss DARA, K&B |
| 2. Kent Nogy     | LR1-A, K&B     |
| 3. Bob Smith     | Miss DARA, K&B |
| 4. Ron Neff      | Minnow, K&B    |
| 5. John Brodbeck | LR1-A, K&B     |
| 6. Dan McCan     | Miss DARA, K&B |
| 7. Terry Prather | Li'l Toni, ST  |
| 8. Charlie Shaw  | Miss DARA, K&B |
| 9. Joe Foster    | LR1-A, K&B     |
| 10. Loren McCray | Miss DARA, K&B |

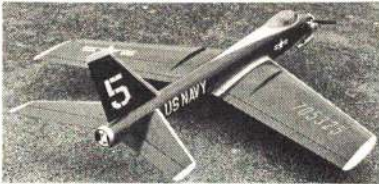
#### STANDARD

- |                    |                      |
|--------------------|----------------------|
| 1. Joe Howard      | 6. Steve Sica        |
| 2. Jerry Silverman | 7. Richard Governale |
| 3. Robert Johannes | 8. Bobby Johannes    |
| 4. Frank Szekula   | 9. Howard Reed       |
| 5. Merle Hoem      | 10. Bob Emery        |

A final note: There was lots of discussion about the ST "pipes," but (though I don't have it officially yet) it appears most likely that they will be permitted under strict conditions: maximum 5" in length, maximum 3/4" diameter. Of course, what's good for the goose is good for the gander: K&B can run pipes too, provided they meet these specs. Don't take this as official, however. AMA will announce when the ruling is final, this one or some other if my guess is wrong.



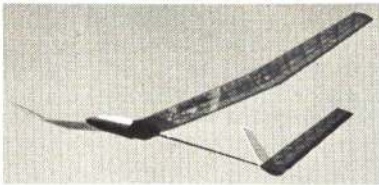
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**OCTOBER  
AAM**



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**ECLIPSE:** It casts a big shadow / by Hal Cover



**BUSHMASTER:** Old-timer style electric / by Roland Boucher



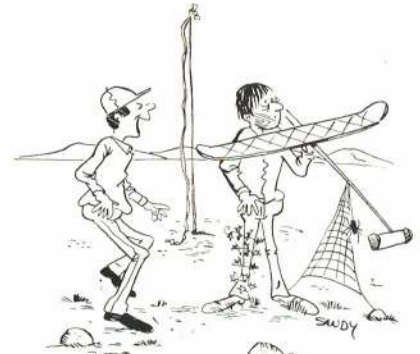
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**COMPLETE AMA NEWS SECTION**

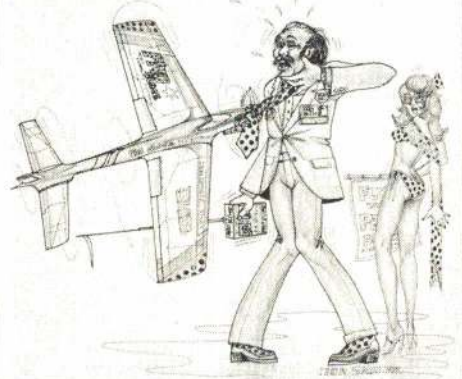
# OFF THE SCENE



"HOW'S IT GOING? GOTTA WAIT LONG FOR A GOOD THERMAL?"



"OH MY GOSH, WHAT AN AWFUL FALL! MILDRED! MILLY, HONEY—DID THE WING BREAK?"



Even the OLD PRO can be distracted! CAUTION! Do not underestimate your engine SUCTION force!



AND YOU MADE HIM GIVE UP HIS TEDDY BEAR?



"THIS DOESN'T LOOK LIKE A GOOD TIME TO ASK ED IF WE CAN HOLD THE NEXT MEETING HERE!"



"You'd better win Harry. That's my washing machine up there."



IS IT, or, MAKE THE MOTOR FIT THE PLANE OR THE PLANE FIT THE MOTOR?!!



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This warranty is void if the System has been improperly handled, tampered with, serviced by anyone other than MRC or an authorized representative, or crash damaged. Except for such repair there are no other warranties given. And MRC hereby **EXCLUDES ALL OTHER EXPRESSED AND IMPLIED WARRANTIES.** In no event shall MRC be liable to anyone for consequential or incidental damages except as required by law.

When returning your R.C. system pursuant to this warranty you must follow warranty and repair instructions in the manual. And include \$9.00 to cover postage and handling.

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