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volume 17, number 191

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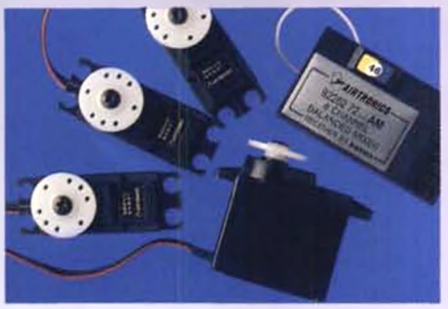

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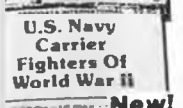

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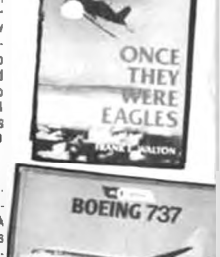

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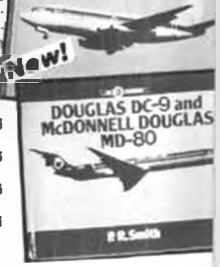

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volume 17, number 191

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FEATURES

THREE-VIEW

CONSTRUCTION

Cover The Aeronca C-3 Master, seen this month on our cover, was painted by noted aviation artist Bob Benjamin. The C-3 is distinguished from the C-2 and the "razorback" C-3 Collegian primarily by its rounded-out aft fuselage and fuller vertical tail outline. The Master was often nicknamed Airknocker, Flying Bathtub, and Belly Whompus, among others, a reflection of the plane's fat, comical-looking shape. Introduced in 1935 with the uprated Aeronca E-113C two-cylinder engine, the C-3 Master carried on a vitally important tradition of making available the inexpensive, albeit basic, flying that kept hundreds of Depression-era aviators in the air. This C-3, in factory paint, cruises lazily through the gentle sky of a classic autumn afternoon.

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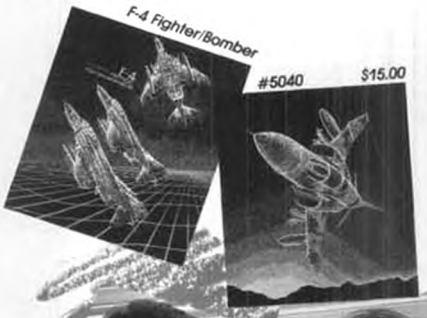

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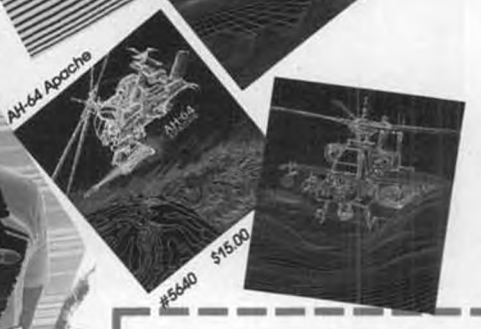

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from Bill Northrop's workbench

Ah, for the good old days! Everyone lined up for a turn, and all flew on one frequency. Plenty of time to relax and trade information.

• Having put myself on the model building inactive list as a result of becoming involved so heavily in the hobby publishing and consumer show business, it seems that I have joined that great modeling fraternity known as "Armchair Modelers Anonymous." Whoops, better change that, the initials are AMA! Let's call it . . ."Society." Whatever the name, the members are those modeling enthusiasts who have chosen, voluntarily or involuntarily, to indulge in modeling from the "Day Dreaming" point of view. In fact, therein lies the two basic membership categories in the AMS . . . By Choice and By Force. The latter category can be further subdivided into such divisions as health, time, expense, family or work pressures, etc.

All of the above is to provide some explanation for some daydreaming in which this writer has recently indulged, and what it has realistically produced.

A couple of years ago, a modeler wrote in asking if it would be possible to get our Gipsy Moth plan in two-inch scale, which would result in a 60-inch span model. His intention was to build a model of the Gannet (sp?) Moth, which was a little-known five-cylinder radial-engined version of the Gipsy. With the idea that we could possibly end up with an interesting scale construction article, new two-inch scale plans were produced by photographically reducing the original three-inch scale plans. For a good modeler, adjusting wood sizes would be no big deal, and all ribs, bulkheads, formers, etc. were reduced along with everything else. To date, nothing has materialized from this effort. In fact, we have long ago lost track of the modeler for whom the plans were provided. That's Step One.

A few weeks ago, this writer was indulging in one of those armchair sessions, Dewars-on-the-rocks in hand, and reminiscing about some of the great flights he used to have with the old Gipsy, underpowered as it was with a plain-bearing Fox .59 turning a dinky little (for quarter scale) 12-inch prop, and thinking once again how he should build a new fuselage for the still-existing wings, tail surfaces, and landing gear. That thought lead to further recollection about the fact that the ship was originated way back in 1958, when our structural design knowledge was quite limited, and we had always figured that the "next one" could easily be built a few pounds lighter than the original 14 pounds, 12 ounces.

A couple of more sips of the Dewars, and more recollections came back of Ralph Brooke's one-third scale Tiger Moth, built from a Practical Scale kit, the line of kits from Germany that he used to import for the US market. Ralph's Tiger was a real beauty, but while he was flying it at a QSAA meet in Las Vegas some years ago (He still had vision at the time, but joked about the fact that he had to fly big ones so he could still see them more than 50 feet away!), the big biplane failed to pull out from the back side of a loop, and was totally destroyed. The servo simply lacked the power to hold up that barn door elevator.

The next scene to come before our mind was the Gipsy, blown up to one-third scale. Wouldn't that be neat? And I bet it could be built to come out at a very reasonable weight that would permit the use of only a moderately large engine. After all, it would only be 1.333333333 up in size from the original quarter-scale Gipsy that flew on that old Fox .59 . . . Boy, that did it!

The following day we dug out the negatives and sent them off to the plans printing company. A few days later we had the blown up autopositive mylars and two sets of prints. The eight-foot long fuselage plan drawing indicates that the overall length, from spinner tip to rudder trailing edge is about 7 feet, 10 inches. Span, of course, comes out to 10 feet. The wheels are eight-inch diameter, and the scale prop diameter is 24 inches.

Well, that much of the dream has come to a reality. The plans are ready. Now it's just a matter of gathering the materials and beginning construction. But then there's the matter of those deadlines and the IMS show. Anyone want a set of those drawings? They're awful big. We'll have to get $30.00 for a set plus $5 postage and handling ($15 p & h foreign). Somebody will have one built before I get to it, that's for sure!

SPEAKING OF PLANS

Giving in to the increasing popularity of Pistachio Scale, Walt Mooney has taken steps similar to ours above, only at the extreme opposite end of the . . .er. . . scale. Walt has selected 36 of his more popular Peanut plans, and also those most adaptable, and reduced them to eight-inch span, or in more nutty terms, from Peanuts to Pistachio. These have all been packaged together into Bag #6, the first five bags all being Peanuts . . . and all still being available. The price of Bag #6 is $5, from Walt Mooney, P.O. Box 231192, San Diego, California 92123.

As these plans are simple reductions of Peanut plans, the wood sizes specified don't jibe with sizes as drawn, and in a paragraph on the front cover, Walt explains how to cope and adjust to this situation. It's no big deal to a person who is used to scratch-building from plans.

At first thought, you might be inclined to believe these things are just too darn small to fly well. Au contraire, mes amis! As Walt points out, if all the structure on the model and the covering could be scaled down, the model weight would go down by the cube of the scale factor, while the surface areas would decrease by its square, thus the wing loadings would decrease. For instance: 8/13 = .61538 = scale factor = dimension multiplier. So .61538 squared = .37869 = area multiplier = A, and .61538 cubed = .23304 = volume multiplier = V. The wing loading multiplier would then be V/A = .61538 and

the wing loading would turn out to be less than two-thirds of the original Peanuts. Such a model would be capable of longer flights than its Peanut scale predecessor. Unfortunately, things like tissue paper will only decrease in weight by the area multiplier. Even so, these models have the potential for long duration flights, and they'll fly safely in smaller indoor sites. We saw proof of this potential at the last IMS show, when a Pistachio biplane, a Liberty Sport, I think, was flown for well over a minute in one demonstration flight. Get out your granny magnifier specs and mini tweezers and have at it!

COVER STORY ADDITION

Just a reminder that, unless they are already commissioned for someone else, the original paintings created by Bob Benjamin for our covers are available directly from him, at 1222 26th Ave. NE, Olympia Washington 98506; phone (206) 352-2602. For information regarding collector prints, call Frame House Gallery, Inc., publishers, at (800) 626-1836.

WHO *WAS* THAT AUTHOR?

The by-line for that How-High-is-My-Airplane article in our November issue was omitted by the printer. The author's name is Howard Lazerson. Howard has some interesting aircraft designs which will be coming up in the near future. In between model building and practicing his medical professions as an ophthalmolgist, he is also the team ophthalmologist for the Los Angeles Kings ice hockey team, and indulges in the sport himself a couple of times a week, in addition to attending all home games.

INDUSTRY NEWS

Davey Systems Corporation, which started out some years ago with high quality glider winches, followed by a winch line retrieval system, then added R/C gliders, followed by electric-powered gliders and then electric-powered scale R/C models, has now branched out even further into high-performance electric motors and reduction gears. And as if that wasn't enough, Ted Davey is making sure he won't have any idle time whatsoever by acquiring the Champion Model Aeroplane Company line of airplane kits, which includes trainers, old timers, pattern, sport scale, and WWII models, making a total of 26 in all. To handle all of this increased business, the company has been moved from Malvern, Pennsylvania, to 675 Tower Lane, West Chester, Pennsylvania 19380; phone (215) 430-8645.

All six Davey Systems electric kits are now available with a motor and switch harness, or a motor, switch harness, and gearbox. The "Hyper-Thrust" motor is an 075 with balanced armature, epoxied commutator, metal rear plate, and heavy duty wire. Included is a 20-amp fuse and a Tamiya-style connector. Retail price is $24.95. With a six- or seven-cell battery pack and using any wide blade 7 x 6 or 8 x 4 prop, it will more than power all of the Davey electric aircraft. With the DSC gearbox, which has a 2-1/2 to 1 gear ratio, the Hyper-Thrust will power sport and scale models requiring a 10 x 6, 10 x 8, or 11 x 6 prop. A 12 x 7 or 12 x 8 folding prop is most suitable for the new Heron and the Lucifer models.

* * *

Air Champ Models, Inc., of Brazil, with distribution office at 2854 N.W. 79th Ave., Miami, Florida 33122, phone (305) 594-5616, announces that its complete line of "Really Ready To Fly Models," first shown at Toledo in 1987, are now available for dealers and distributors. These include the Aerobat 152 (three-channel), Cardinal 177 (four-channel), and the aircraft that caused quite a stir in Toledo, the Tucano T-27 (four-channel), for which we will have a "Product$ in U$e" article coming very shortly. Be sure when you talk to Marcos Machado or Marta, to tell them that *Model Builder* sent you. From outside of Florida, you can use the toll-free number (800) 223-9267.

* * *

A new soft-cover book from England comes under the Can't Put It Down Once You Pick It Up category. Published in England by Mike Clanford, it is a photo directory of his vast collection of model engines, and because of its vastness, certainly rates the title of Engine Reference Book. Fortunately for engine collectors and enthusiasts in general, the book is being distributed in the US by Traplet Distribution (spelled Tony Stephenson), and can be purchased by mail from Traplet Distribution USA Ltd., 1635 Wade Drive, Paso Robles, California 93446. Purchase price is $29.95 plus $5.00 postage and packing. Figuring about an average of five to six photos per 8-3/8 by 11-3/4-inch page of the 213 pages of very clear engine photos, you can safely figure that right around 1200 engines are illustrated.

THREE IF BY AIR . . . Letters to the Editor

First things first. We'd like to remind all of you again. If you are writing to express thoughts for our use in "Three If By Air," well and good. But if you are writing to ask questions for which you expect a prompt reply, please enclose a self-addressed, stamped envelope (S.A.S.E.). It's not only because we're cheap and don't want to spend the postage and use our letterhead and envelopes, but also, because of the

Continued on page 106

Dear Jake:

Here's that recipe you asked me for:

3 egg yolks, 1 Tbsp. lemon juice, 1/2 tsp. salt, 2 drops Tabasco, 1 Tbsp. minced onions, 2 Tbsp. white wine, 1/2 cup butter (melted).

Mix all ingredients except butter in a blender. Slowly pour in butter while mixing at low speed. Refrigerate if not using immediately.

Your Mother

Dear Mom:

Not bad, but it could have used a little more thinner. It didn't brush into the silk very well, and it dried lumpy.

Jake

* * *

Dear Jake:

Is it true that successful flight was achieved before the Wright Brothers did it?

Burgess in Playa del Rey

Dear Burgess:

Yes, birds flew long before the Wright Brothers did.

Jake

* * *

Dear Jake:

Not birds, nitwit! I meant whether or not any other human had flown before the Wrights. And I don't mean gliders or balloons, either. I want to know if anybody accomplished powered, heavier-than-air flight before 1903.

Burgess Again

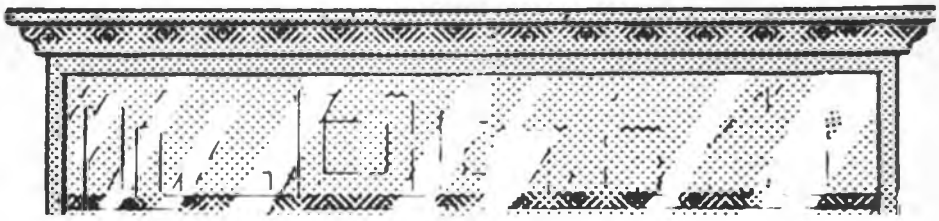
Dear Burgess:

Published accounts from April 1918 indicate that Sir Hiram Maxim flew a steam-powered aircraft in Kent, England, on July 31, 1894. The account further claims that Maxim's flight predated by three years a flight made in France by a Monsieur Ader. Sir Hiram's machine was reportedly built like a box kite and spanned over 80 feet. It was powered by two steam engines, including boilers and burners, and weighed 9,540 pounds with its three-man flight crew on board. It supposedly flew at an altitude of one inch for a distance of five hundred feet.

Continued on page 103

OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases, furnished by the manufacturers and/or their advertising agencies, unless otherwise specified. The review and/or description of any product by MB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by MB.



• Before we get down to the new models and accessories this month, let's clear the bookshelf. It's starting to groan again, so our attention to it comes none too soon.

Well-known British modeler Graham Goodchild, who has written articles on some of his unique model boats for our sister publication, *U.S. Boat & Ship Modeler*, has written a delightful hardbound book entitled *Model Aeroplanes of World War I*. Models featured include a Fokker DV111 (the one with the parasol wing), an Albatros D1, a very interesting Felixstowe F2A Flying Boat, and a DeHavilland DH2. There are many more models than those listed, all of them modeled by Mr. Goodchild, with beautiful line drawings and photographs illustrating each chapter. The 145-page book would be a welcome addition to any modeler's library, whether or not you intend to build any of the models featured. For information on obtaining your copy, contact David & Charles, Inc., North Pomfrit, Vermont 05053.

* * *

Spyplanes play a large and necessarily secretive role in the Cold War between the major world powers, and this aspect of our international relationships is amply covered in *Spyplane: The Secret World of Aerial Intelligence Gathering*, by David Donald. This new book is full of excellent color photos and beautiful color renderings of most of the spyplanes operating since WWII. Those covered include the U-2, SR-71, and the newest generation, the Stealth aircraft. The 128 pages of this book are full of interesting information and photos, making it a perfect addition to your aviation library. It's available from Zenith Aviation Books, 729 Prospect Ave., Osceola, Wisconsin 54020.

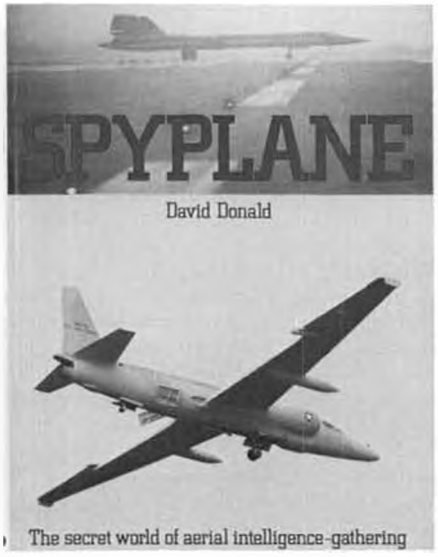
* * *

Battlefield Helicopters, by David Oliver, and distributed by Zenith Aviation Books, covers in full color just about every helicopter used in combat in Vietnam, including Cobras, Hueys, Black Hawks, Kiowas, and Chinooks, plus the awesome Apache, now being deployed as a tank killer. You'll see page after page of stunning color photography, of helicopters shot in Germany, England, and the U.S., including outstanding air-to-air photos of choppers in action during training missions. For helicopter fanatics, this book is a must-have. Contact Zenith Aviation for more information and ordering instructions.

* * *

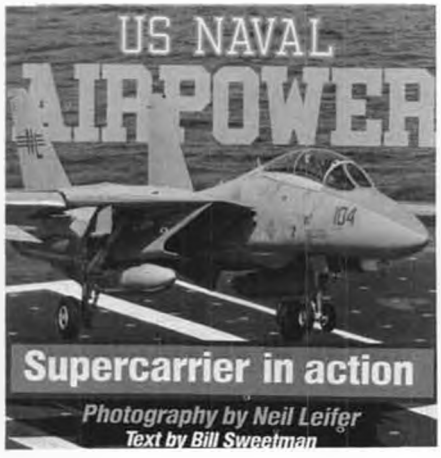
Another book from Zenith Aviation puts

Scale display models and how to build them.

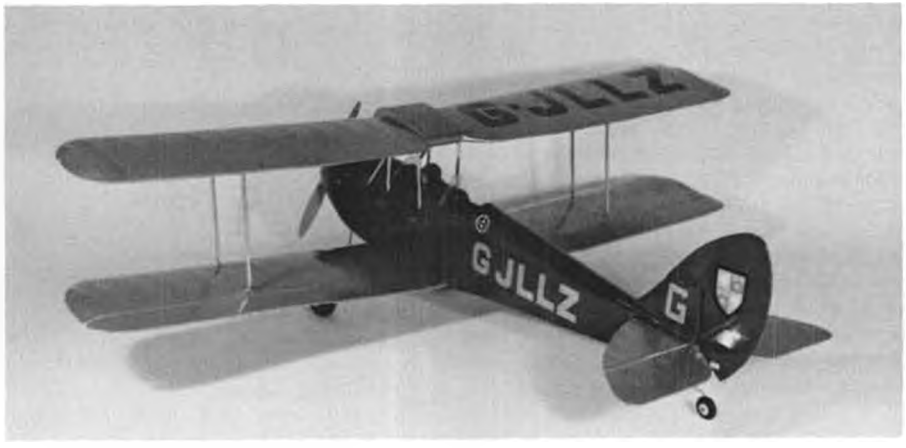


Spyplanes from Zenith Aviation Books.

Battlefield Choppers in color from Zenith.



Supercarrier in Action from Zenith Books.



Gipsy Moth from Aerodrome Models.

ARF Falcon by Robbe Modelsport.

Kyosho Ballad trainer from Great Planes.

Circus Hobbies' Kalt Baron 30MX.

you aboard an aircraft carrier for a unique view of Naval Airpower through the lens of noted Life magazine photographer Neil Leifer. You'll get a definitive view of planes and men aboard a carrier with *U.S. Naval Airpower, Supercarrier in Action*, a beautiful hardbound book with 80 color photos. See the Zenith Aviation Books ad in this issue for ordering information.

* * *

If you've been looking for an electric model for schoolyard flying, check out the new Kyosho Ballad, a parasol-wing trainer with a wingspan of 35 inches. It features a blow-molded fuselage, OHS wings, and a LeMans AP-29 electric motor. The Ballad comes with a battery pack and charger, so nothing can stop you from flying soon after you get your Ballad home. It's distributed by Great Planes Model Distributors, and you'll probably be able to find it at your nearest hobby shop right now.

* * *

The Falcon Motor Glider from Robbe is designed as a first model, and can be powered by an inexpensive .09 engine or a geared electric motor. The wingspan is 86 inches, and the body length 43 inches. The break-proof Plura fuselage, with profiled balsa wings, stab and device for easy wing removal for transportation means you'll have your Falcon flying in no time. All small parts for control and rod systems, base coating, decorations, tools, adhesives, and assembly instructions are included. For more information, see your Robbe dealer.

* * *

Aerodrome Models, 2623 S. Miller Rd., Saginaw, Michigan 48603, has a classic biplane in its line of models, the Gipsy Moth a 54-3/4-inch span beauty for .45 to .60 four-stroke engines. The kit includes ABS pre-cut cowl and wing tank, preformed landing gear and cabanes, aluminum struts, pre-cut windshields, hardware, complete plans and instructions, and genuine Naugahyde cockpit interior. If you wish more information on this fine kit, contact Aerodrome for details.

Max Hog 230 from A.J.'s Free Flight Service.

* * *

Circus Hobbies has introduced the new Kalt Baron 30 MX helicopter, a high-performance 'chopper with 48-inch main rotor, and standard features like collective pitch, Bell-Hiller mix, auto-rotation and aerobatic mixers. This easy-building kit includes a metal clutch, metal tail boom, factory assembled rotor head, main and tail rotor blades, landing skids, aluminum motor mount, and more. You can get yours direct from Circus Hobbies for $199.95, for a limited time only. For more information, call Circus at (702)732-0022.

* * *

For you free flighters: A.J.'s Free Flight Service has just produced a new kit of an old model, for 1/2A competition. The Max Hog was originally designed by Mel Schmidt as a Class C model, but Nat Comfort scaled it down to 230 square inches and simplified construction. The kit features rolled plans, Japanese tissue, contest balsa, printed ribs, and fuselage sides. The lowest priced 1/2A competition kit on the market at $14.95, it's

Continued on page 102

Royal Products' Fast Charger.

Byron Originals 180-degree servo.

J'Tec Electric Motor Mount.

Ace R/C Nautical Commander Radio.

Gorham Model Products' Gyro for choppers.

BIG BIRDS

By AL ALMAN

• Isn't technology wonderful? In the last twenty years our radios have gotten so much more sophisticated while getting so much less expensive. They've also become lighter and unbelievably reliable. . .and hopefully will be far less susceptible to external interference when built to "1991" standards.

Now much of this sophistication, a myriad of "whistles and bells," festoon newer transmitters. And there's no doubt that many of these state-of-the-art features are needed, but not by weekend-type pilots. It's usually the competition-oriented guys who put this circuitry to good use. In truth, all of these extra switches appear to be a distinct liability to us sport fliers because, in addition to making transmitters look like porcupines, they jack up the price of the radio, are easy to break off, and even worse, can be easily knocked "on" at any time.

It's a fact of life that at least one time or another we all have trouble telling a "want" from a "need" and rationalize ourselves into buying frills that we rarely use. This applies to everything, including radio control systems. A lot of sport fliers buy rigs with fancy extras and expect the coupling switch, the roll button, end-point adjust, differential capability, preset trim, and three different kinds of mixing to work some kind of magic (overnight) and make them better pilots.

Sounds like the ultimate fantasy; doesn't it? Hey, there's no easy way to become a good pilot. A fancy radio all by itself won't do it for you any more than boring random holes in the sky will. What it does take is some planning before each flight and a certain amount of dedicated practice while in the air.

Remember KISS (Keep It Simple, Stupid)? Well, we can do just that because all noncompetitors really need are the servo reversing switches, which are probably the single most important feature on newer transmitters. These switches are standard now so there's no additional cost, they don't clutter up the front of the tranny, they can't be hit by accident, and, best of all, they allow beginner or expert to optimize each servo installation without having to worry about servo rotation. And no sweat if things do end up backwards! Just a flick of a switch gets your control surface or throttle moving in the right direction.

The only "extra" you might want to consider paying for would be dual-rate switches. They've been known to come in handy on test hops, can be useful when flying aerobatic birds, and are a definite asset when instructing neophyte pilots.

The splined output shaft and numbered servo arms make centering simple and easy on newer servos.

And in case you're not aware of it because of using older servos, radio manufacturers have also helped us (almost) eliminate the gnashing of teeth caused by the great BIG pain-in-the-tush known as servo centering. On older servos you've got to insert a very small screwdriver or piece of beveled wire down the center of the output shaft and adjust the wiper potentiometer for centering. I don't know about you guys, but no matter how hard I tried, I hardly ever had the right size driver blade or tool handy, or if I did luck out and find it, I'd often have one helluva time trying to get that *&!$@ pot to rotate.

But now, thanks to splined output shafts and numbered servo arms (see photo), you merely reposition the arms till you find the one that centers. It's a blessing not having to mess with a special tool for this.

CONTROL SURFACE THROW INDICATOR

Here's a handy item that's easy to make and, like most simple tools, does a good job. According to Anything R/C's Dick Carson, the idea was originally presented in an old issue of *RCM*.

Dick figured that others would like 'em too and made a bunch for some friends and customers.

As you can see from the pic, there's really not too much to this contraption. A clothespin, a few small scraps of ply, an 8-32 bolt and wing nut, some soft wire, a weight, a protractor for laying out the angles correctly, and Hot Stuff.

Then, just clamp it on a control surface (while in neutral, of course), adjust the indicator face so that the needle is on zero, and, while the appropriate stick is held at full deflection, read the surface throw in degrees.

If you need or want to convert to inches, just measure the distance from the hinge line to the trailing edge and multiply by the number of degrees.

Build one; it's handy!

FUSELAGE JIG

And here's another tool that does its job exceedingly well. Like the throw indicator it's not a new or an original idea, but will probably be a revelation to many new modelers, and might even spur more experienced fliers on to build one.

There's no denying that a bird built straight and true (and light) is gonna fly

Al Doerr with his scratchbuilt 140-inch Robin Hood. She flies great with an OPS Maxi Twin.

rings around one that isn't. And realizing this after building a few bananas that were supposed to be fuselages, Ken Rowe built himself a fuselage jig. And since Ken is, among other things, a darned good carpenter, this jig became a labor of love.

"There's no sense making a jig unless you're going to do it right, and that means starting with a base that's absolutely true. If you don't, it's all a waste of time," Ken pointed out.

So he used a 60 x 18 inch piece of *industrial* particle board. And the two fir runners on the bottom insure that this base remains true and also lock the twenty-four 6 x 1/4-inch station carriage bolts in place, keeping them spaced five inches apart.

The 4-3/4 x 5-1/4 station clamps are made of pine, include a 1/4 x 3/4 pine height extender, and are put together with brads and glue.

Ken estimated this project cost about twenty-five bucks and reminded me that local cabinet shops are a good source for pieces of wood and such that are really cheap, and sometimes free.

His jig is gonna be well used come springtime; he's got three BIG Birds scheduled for winter projects.

Sure, it takes time to make a jig, but that time is always well spent because then you can build faster and still have each and every fuse come out straight and true. Won't it be nice not to have any more flying bananas?

1/3 SCALE KITTEN & SPORTSTER

It so happens that one of the birds Ken is gonna build using his new jig is a one-third scale J-3 Kitten from Dry Ridge Models (59 McCurry Road, Weaverville, North Carolina 28787; 704-658-2663) plans.

Dry Ridge's Chief Cook and Bottle Washer, Emil Agosta, just released these plans along with a second set for the Kitten's sister ship, the J-4 Sportster. No, wait a minute, that's not really so. Make that 1-1/2 sets. Y'see, the J-4 evolved from the J-3, so the wings are identical and the fuselages are very similar. The only differences being the J-4's narrower wing center and the J-3's cabin and turtledeck.

Anyhoooo, the point is that if you want to build both aeroplanes, you'll only need one set of wing plans. All of Emil's work, including his instruction booklet, looks good. And, as a matter of interest, he's been flying these birds for a few years, so their structural integrity has been well proven. Here are the specs:

	J-3 Kitten	J-4 Sportster
Span	120 in.	114 in.
Chord	16 in.	16 in.
Area	1920 sq. in.	1834 sq. in.
Weight	13-1/2 lbs.	13 lbs.
Power	O.S. SF .61	O.S. SF .61
Wing Load	16.3 oz./sq. ft.	16.2 oz./sq. ft.
Airfoil	Mod. NAS 64	Mod. NAS 64

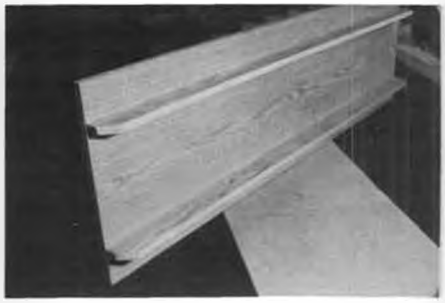
Notice that these birds were designed to fly on their wings and don't need supersized, expensive mills up front. Emil spelled out his philosophy:

"Not only are too many trainers questionable in performance, but the brute power used to fly them is certainly an overkill, to say the least. In the past I've test flown quite a few trainers for friends of mine, and, quite frankly, I could not fathom what the designer had in mind. Most of them flew as fast as my Flat Top Stormer!

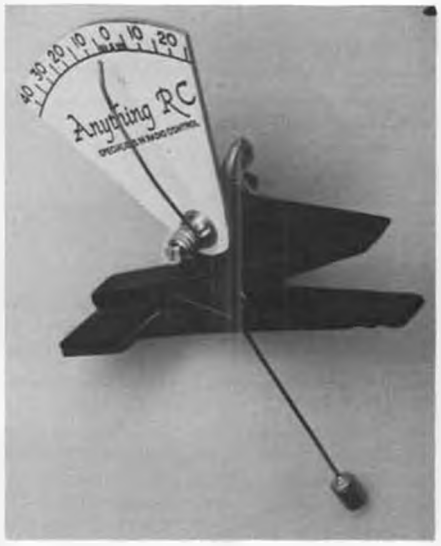
"For the past four years I have been experimenting with power and wing loading. After meeting with an ultralight designer and engineer, my old Miss America concepts were rekindled. . . .

"I believe I have come up with a concept that should satisfy most beginners; a BIG Bird with a light loading that also has scale identity. A beginner could point to it and say that the full-scale version does exist.

Overall view of the fuselage jig. Base must be solid and straight. See text for details.



The two runners keep the base true and also lock the 24 station carriage bolts in place.



This surface throw indicator is simple to make and use, yet very effective.

Closeup of station clamp. Note reference line and that base is high-density particle board.

"My plans were engineered from factory drawings, although it's fun scale that I'm after. I want to hook the guy who hates the looks of trainers, since they have absolutely no identity, and is disgusted with the projectile-type of flying. I do feel that my birds provide scale and training in one swoop.

Continued on page 68

Dry Ridge Models' 1/3-scale J-3 Kitten weighs only 13-1/2 pounds, even though she spans 10 feet. An O.S. SF .61, swinging a 14x4 prop, is ample power for this model.

CHOPPER CHATTER

BY DICK GROSSMAN

• I don't know about you, but it's getting so that every time I spot an article about "safety," I turn to the next page. I know it's an important subject, but I guess I'm just a little tired of hearing the same cliches over and over. If I hear that slogan, "safe flying is no accident" one more time, I think I'll scream! This month I want to point out some techniques for preventing crashes, some of which you may not have thought of. To put into a single sentence the most important rule for safe helicopter flying, it's this: *Don't ignore warning signals!* An unusual change in engine sound, trim adjustment, or a sudden "glitch" in the controls are warnings. Don't continue flying around hoping it'll go away. Don't take an opinion poll from everyone at the field whether something's wrong. Land as fast as you can (under control), *immediately.*

Here are some examples of what might be happening: If your engine starts to speed up, it probably has leaned out and is only seconds from starting to sag or quit entirely. Bringing the throttle down will generally correct a lean run temporarily, but punching it again will probably kill the engine altogether. If you're adept at autorotation, this is good time try one; it will get you down fast and take the engine out of play entirely.

An unexpected "glitch" could be your first warning that your battery is going dead, or a servo is about to fail. Just thank your lucky stars that they didn't just quit!

Mechanical failures in flight are more common for helicopters than fixed-wing craft. Why shouldn't they be? Look at what you've got up there. A spinning, vibrating mess of wires, pushrods, clevises, ball links, nuts, bolts, and screws! My general rule. When something goes wrong, hit the throttle hold button and autorotate. If the problem is a tail rotor failure (probably the single most common mechanical failure on an R/C chopper), an auto will take the tail rotor out of play. Ditto for engine problems. Again, it's the fastest way to get your chopper down (other than by accidentally hitting the invert switch). Sometimes you can get your tailless chopper into fast forward flight, thereby overcoming the torque effect with airspeed, stabilizing it, and putting yourself in a better position for a safe descent to the ground. This system can work even if you're close to the ground when the failure occurs. A helicopter will climb even while spinning around its axis, as long as it doesn't fall off to one side. When high enough, the flier can cut power and autorotate. On the other hand, if you're already close to the ground, it may be a good idea just to get it down any way you can. I'm not too keen on sending an out-of-control helicopter high into the air with the hope I'll be able to get it down again. A low level semi-auto sometimes works. Hit the throttle hold, lower pitch about half way, and hope! The expert flier can save a disabled helicopter in ways you and I would never believe.

Always have a predetermined escape route planned before you take off. Know where the spectators, trees, houses, and cars are located. Now determine where you can "bail out" if the engine quits, or your craft becomes uncontrollable in some other way.

Preflight inspection of an aircraft is a good safety practice for fixed-wing aircraft; but for a helicopter it is *mandatory.* Where an average airplane may have five or six

U.S. Nats champ Curtis Youngblood, center; runner-up Robert Gorham, left; and third place Mike Mas, right.

Top three scale entrants, Kwok, Chapman, and Crain with their winning choppers.

Debut of GMP's Stork-SE in national competition by Allen Dye.

Futaba FP-8SGHP radio, better known simply as the Futaba PCM 8.

Idle Up-2 switch is easy to find for aerobatics. Note tiny screwdriver that attaches to velcro strip.

pushrods, a helicopter will have over *fifteen*, with a total or thirty or more clevises and ball links. Add to that the fact that these connections are subject to stress and vibration that the fixed-wing flier never encounters. A potential disaster? Believe it!

The time for a preflight inspection is *after* you fly. A thorough inspection of your aircraft should be done after a day's flying, well in advance of the next outing. All plastic links should be checked for looseness or hairline cracks. Pushrods must be examined for stress fractures, particularly on the threaded portion. All parts that are screws, bolts, and threaded pivot balls should be checked for tightness. If loose, a good procedure is to torque them down firmly to make sure the threads haven't stripped; then remove them, apply loctite, and reassemble.

Another regular inspection should be made to the wiring. Nearly all helicopter fliers use a gyro, and this introduces a lot more electronic spaghetti that must be inspected regularly for broken wires and frayed insulation. I almost lost a ship a few weeks ago because I hadn't noticed that the gyro control wire had frayed against the edge of the fiberglass canopy. Two wires had shorted and completely shut off the tail rotor control! I'll bet everyone reading this has a similar story of his own. Fuel tubing. Look for cuts in the fuel line, especially where it attaches to the brass tubing. Even a small cut can change your fuel or pressure flow and cause your engine to lean out and quit.

Throttle Hold switch(arrow) and invert switch can be located without fumbling.

Those of us who started out as airplane fliers tend to be a little less careful in the area of maintenance. The cry "dead stick" for the airplane pilot usually means only that he'll have to cut his fight short; and a good pilot can frequently save a plane that has lost rudder or aileron. Helicopters are not as forgiving.

MORE ON THE FUTABA FP-8SGHP RADIO

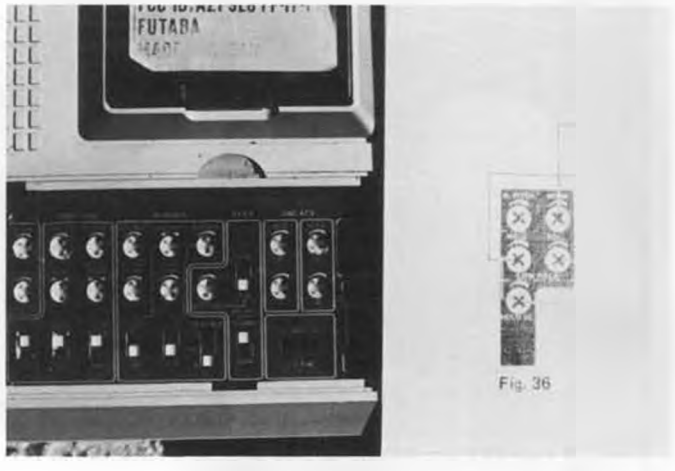
Last month I discussed some of the features of the Futaba PCM 8-channel helicopter radio. I had the opportunity to discuss this radio with Robert Gorham who uses it in competition. Robert, as most everyone knows, is one of the top R/C helicopter fliers in the world. Here, as promised, are discussions of the idle-up and throttle-hold functions:

IDLE UP-1 is for all around flying. Set the IDLE UP-1 POINT trimmer in the back of the transmitter. Watch the throttle servo and you'll see that normal throttle movement will not go below that point even when you move the throttle stick all the way down. Collective pitch continues to operate normally. The best use of this function is to try to maintain a very constant rotor speed, just like full-scale choppers. You certainly don't want throttle to decrease all the way down. Why? Simple. Most helicopters are set up for -2 or -3 degrees of negative pitch at low throttle. At zero degrees (flat) pitch the engine is at its point of least resistance. Do we then want to further decrease throttle as we actually increase pitch (even if it is negative pitch)? I think not.

On top of the transmitter is an IDLE-1 RATE adjustment knob. Remember I said that the IDLE-1 POINT trimmer sets the point down to which the throttle would operate normally. With the RATE adjustment you can get additional throttle travel below that point, at some fraction of the normal rate. So as you reduce throttle/collective the throttle might decrease at its usual rate down to the preset point, and then decrease only a tiny bit more through-

Continued on page 70

Cross trims for elevator and throttle are unique PCM 8 feature.



Graphics in instruction booklet make it easier to locate trimmers.

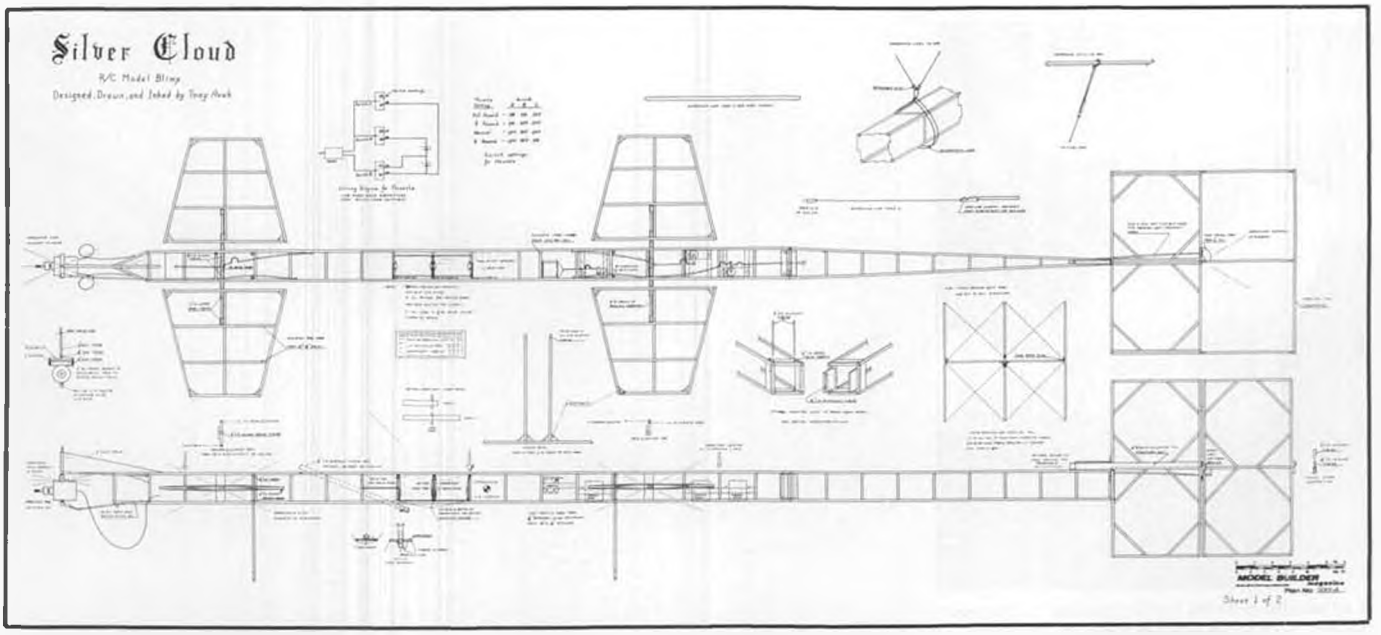
LIGHTER THAN AIR R/C BLIMP

By TONY AVAK. . .His radio controlled blimps have been seen by visitors every year at the International Modelers Show; now the author takes us step-by-step through the construction of one of these aircraft.

• For the past nine years I've had the opportunity to demonstrate my series of R/C blimps at the International Modelers Show (IMS) in Pasadena. From the first shaky beginnings to my most current design, these models have continued to fascinate the crowds and stir up interest in the possibilities of radio-controlled lighter-than-air (LTA). Floating gently overhead like an animated cloud, turning around, and even backing up in flight, they have never failed to put a smile on the faces of the spectators. During these demonstrations many people have asked me if I offered plans for my models, to which I had to say no. That is, until now.

Blimps at the IMS show in Pasadena, January, 1987. The author comes to the show each year to regale the crowd with his lighter-than-air display. He's joined by other blimp enthusiasts.

R/C blimps are incredibly easy to fly. Quite often at the IMS I've given the transmitter to an interested bystander, and they would happily fly the model around for a few minutes. A few years ago I gave the controls of an earlier model to the 10-year-old daughter of a friend, and she was doing precision spot landings within five minutes. Loops and rolls, however, are out of the question. I should make it clear that this model is for *indoor use only* and any attempt to fly it outdoors (except in deathly still wind conditions) will most probably result in having your model taken away by the first wayward breeze. My favorite flying sites are school gymnasiums and auditoriums, convention centers, and large airplane hangars. Even here the wind from ventilation systems has presented problems from time to time, but you quickly learn how to avoid these areas. Because the motor in front pivots together with the flight control sur-



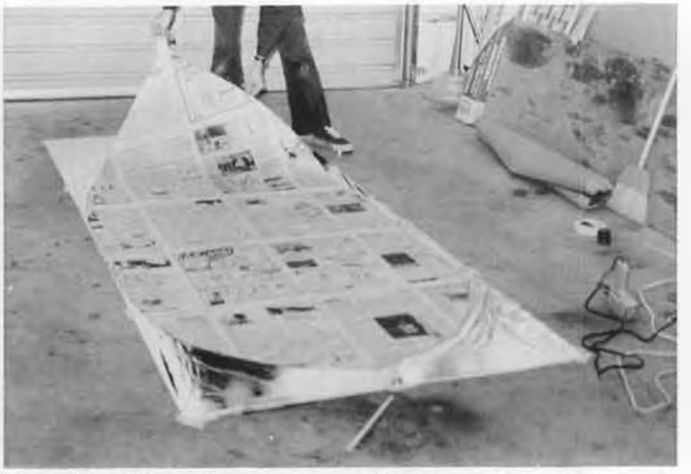
faces, the model is very maneuverable. In fact, my smallest airships can fly quite easily in my living room, which is only a little over three times the length of the ship itself!

This model, this sixth in my series, was designed specifically for those people who told me they had always wanted to build a LTA craft but didn't know where to start. This model should be especially fun for those modelers familiar with traditional stick and tissue construction. My model is finished in yellow Japanese tissue which gives it a light, colorful look. Using even the lightest available plastic covering on this model would be unnecessarily heavy and expensive, although it could be done. If you've never used dope and tissue before, you have a real treat coming. Dolores Kester had an excellent article in the April '87 issue of *Model Aviation* entitled "Building Stick-and-Tissue Kits" which should answer any questions for modelers unfamiliar with this classic method of construction. I have made the model as straightforward as possible so that even a novice modeler can successfully build and fly their own Silver Cloud. Also, the design is flexible enough that, with a minimum of modifications, any standard-sized radio may be used in place of the Cannon Super-Micro system that I use. Feel free to move around parts of the model to accommodate your own radio.

My airships have evolved slowly from their first designs, gradually gaining improvements in controllability, reliability, and ground handling characteristics. This model is intended as a basic design for an R/C model LTA craft, and the builder may go

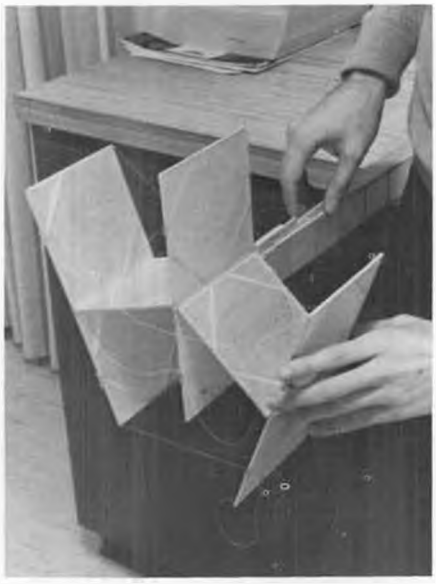
Sealing the plastic bag is done with a soldering gun, using the plastic cutting tip. The wooden stick will scorch and burn a little as you work, but don't let that bother you.

Work completely around pattern, making sure to overlap each individual seal with the next. Process takes about an hour to do.

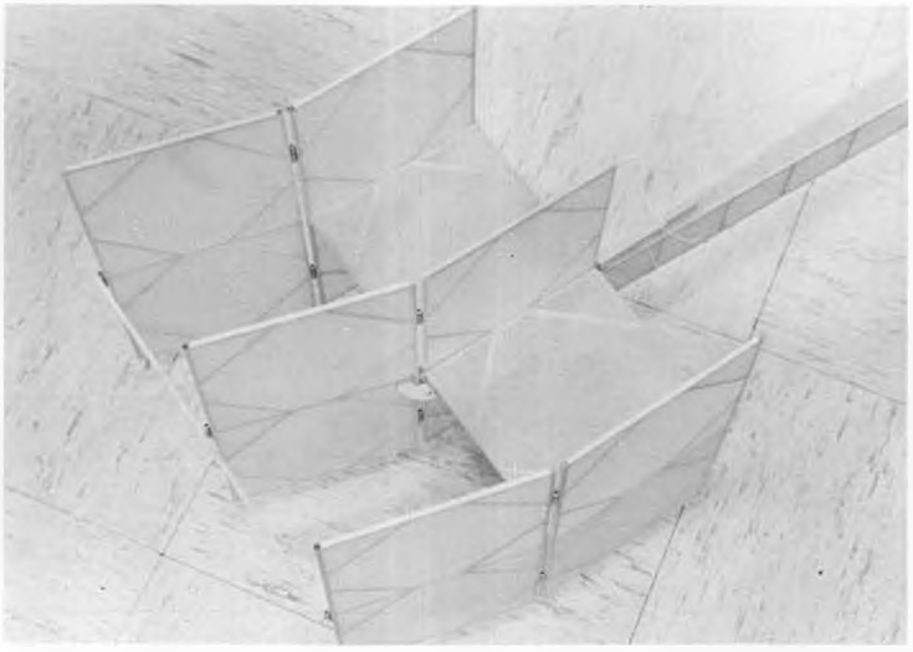


After sealing, lift plastic and pattern off floor, then separate. Tape filler and deflation tubes in place, then inflate.

FULL–SIZE PLANS AVAILABLE–SEE PAGE 106

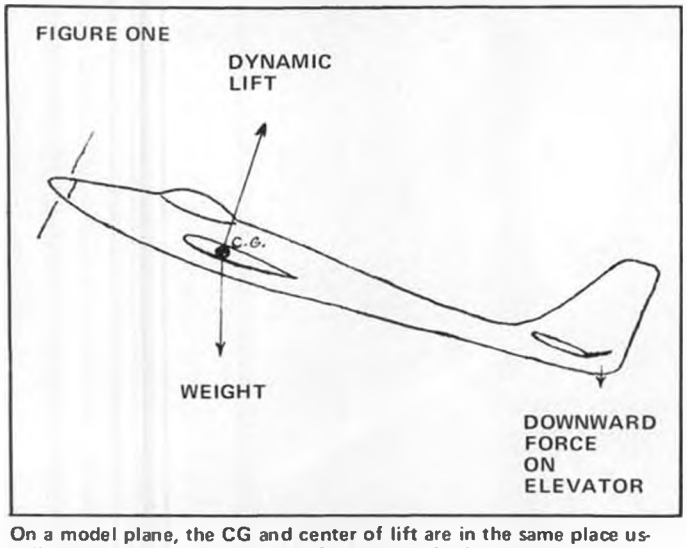


Tail assembly folds up for storage or transportation. Tissue page hinges and strategically glued rigging thread makes it easy to assemble or disassemble tail in minutes.

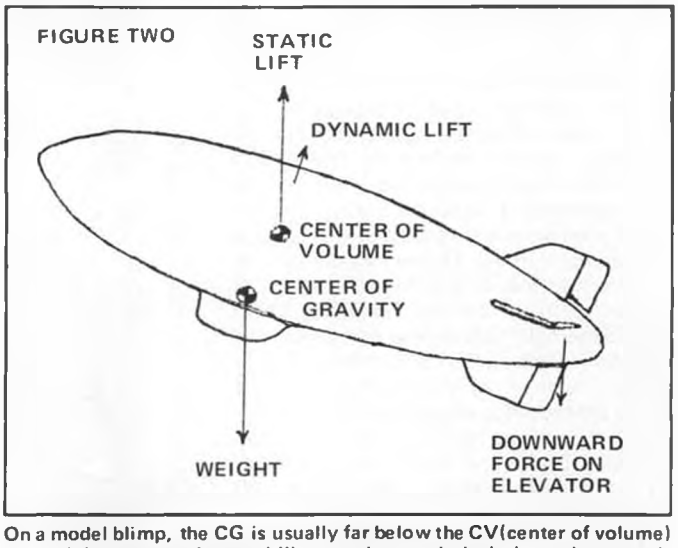


The triple tail. The outer two rudders are slaved to the center by the rudder stick on the trailing edge.

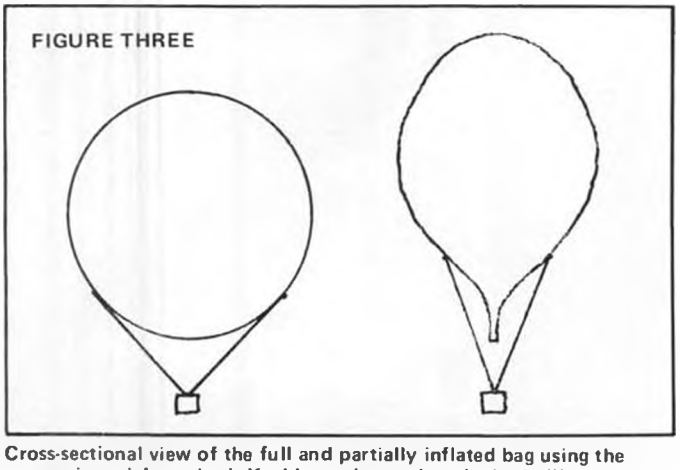
either larger or smaller when designing a ship of their own. This blimp, at 8.75 feet long and 17.5 ounces without ballast, bag, or helium, is the largest and heaviest of my collection. By using smaller and lighter batteries, electric motors, and overall design, you can scale down this model for a more "elegant" version. My smallest model is a three-channel blimp powered by a large Mitshubi servo motor (taken, I'm told, from an old tape recorder) wired to the electronic guts of the throttle servo, thus using one battery pack for both radio and motor.



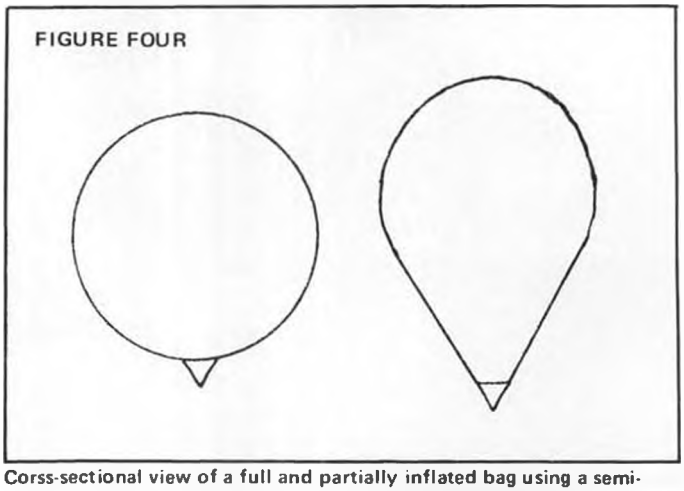
On a model plane, the CG and center of lift are in the same place usually, so only a small downward force is required on the elevator to change the angle of attack.



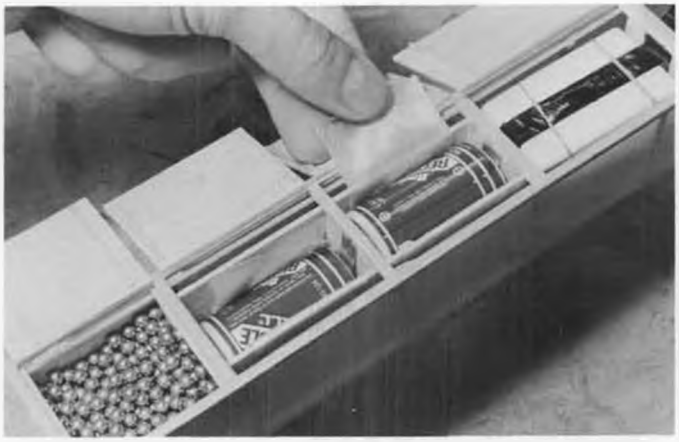
On a model blimp, the CG is usually far below the CV(center of volume) so the inherent penulum stability requires a relatively large downward force on the elevator to change the AOA.



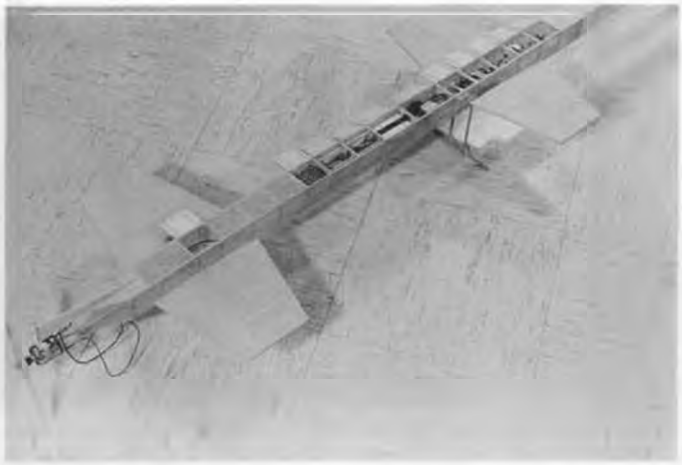
Cross-sectional view of the full and partially inflated bag using the suspension stick method. Keel hangs lower, but the bag still retains its lengthwise shape so the nose does not fold over or collapse inward at 'high' speeds.



Corss-sectional view of a full and partially inflated bag using a semi-rigid keel on a bag. The bag takes on an oblong vertical shape, but this does not affect the lengthwise shape of the bag.



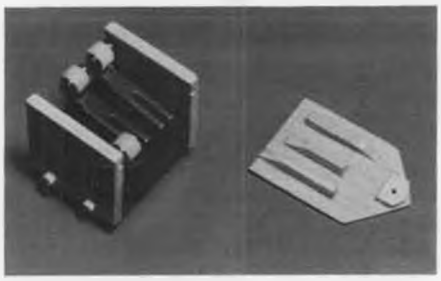
A closeup of the ballast compartment and battery spaces. The strip of fiberglass cloth under the battery is used to lift battery out.



The forward end of the model with all access hatches open.

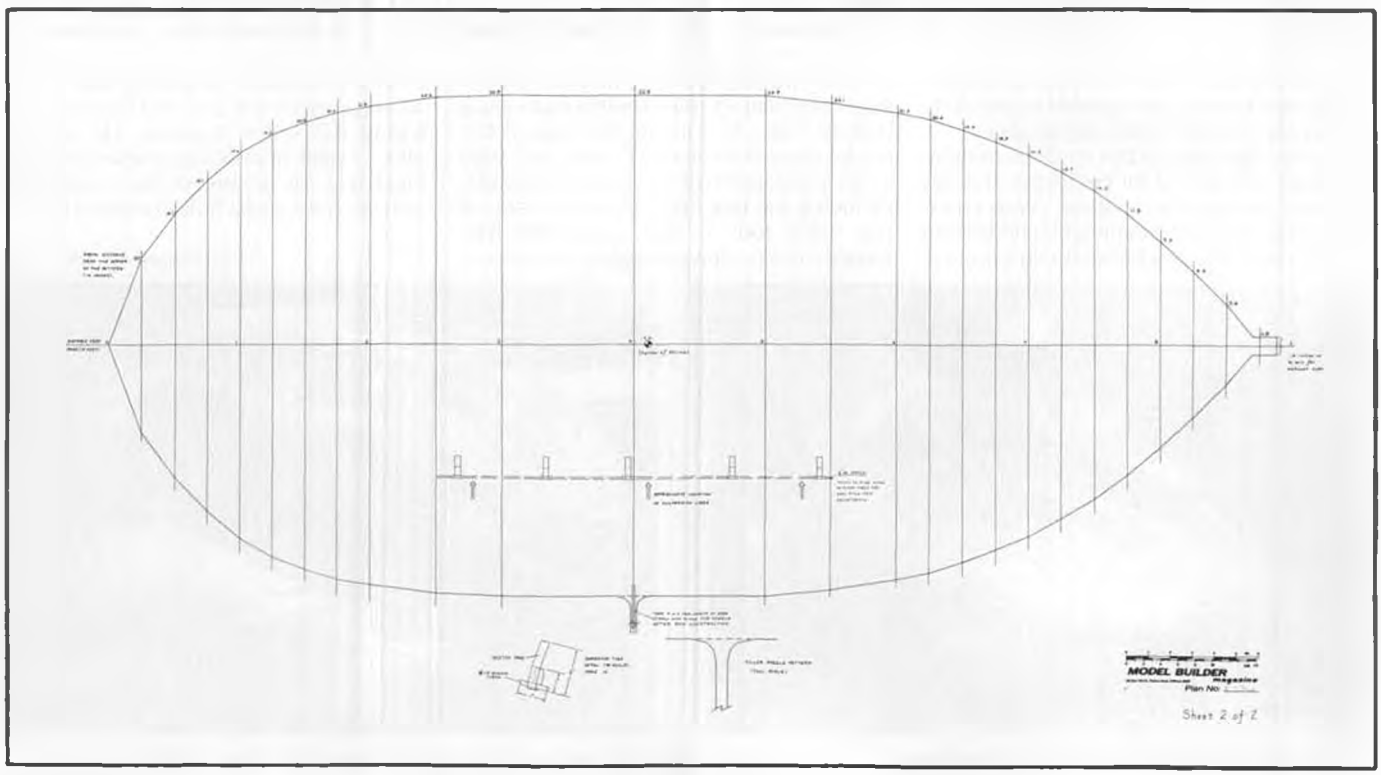
The model is just over six feet in length and weighs 8.5 ounces all up (without helium). Models smaller than this can be built, but performance begins to drop off rapidly as smaller and less powerful motors and batteries must be selected. The Silver Cloud is actually a little slower to turn and accelerate than my smaller models, only because it has more weight to move around. This heaviness was done deliberately, though, so that the modeler can build a successful model using common, off-the-shelf hardware without worrying about finding the lightest materials available.

With the exception of the aluminized mylar plastic bag, all construction materials are available from your local hobby shop and Radio Shack. Overall cost is comparable to that of a small glider. Helium is available from welding or party supply shops. Rental prices will vary, but usually fall between $20 to $35, plus a deposit, depending on the size of the tank and how long you keep it. You may also have to pay an extra deposit for a balloon filler valve. If you want, both helium tanks and balloon valves can be purchased for $200 to $300 total, and then the only expense is the cost of refilling the tank ($40 for a 160-cubic foot tank). Of course, if you have a friend who does heli-arc welding, the price should be even more reasonable.



Motor 'throttle,' without any wiring. Sliding panel is inverted and slid into slots where the wooden steps activate th switches in the order shown on the plans.

Helium is the only gas you should use to inflate your bag. The extra lift you would get from hydrogen (about eight percent more) is not enough to offset the potential hazards of handling it. When mixed with even small amounts of air, hydrogen is explosive and can be set off by an electrical spark or cigarette flame. The image of the burning Hindenburg airship is the one thing that most people think of when you talk about LTA. This is unfortunate, since the Hindenburg was originally designed to use helium and would never have burned had the American Congress allowed the gas to be sold to the Germans. (Remember, this was right before WWII, and we had the monopoly on world helium production.) Helium is so inert that large valves were installed in some U.S. Navy blimps that could flood a compartment with the gas and so displace enough oxygen to put out a fire. Helium is completely nontoxic, so can be inhaled without harm. The change in your voice occurs because sound travels almost twice as fast in the less dense helium as it does in normal room air, and the acoustics of the vocal tract change in a way that resonates with and amplifies higher frequency tones. The only danger you have from breathing in



FULL–SIZE PLANS AVAILABLE–SEE PAGE 106

Motor pivots left/right, and up/down. Long loops of wire from motor are needed to prevent metal fatigue and provide clearance around the pushrods. Upper ball link was offset to compensate for movement.

Forward elevator pivot point, showing pushrod loop. Make it from plasticstruct, as control arm needs a backing as shown on plans to strengthen joint in case you hit something in flight.

helium is the fact that doing so displaces oxygen, and if you're not careful you can pass out from lack of it and bang your head on the floor.

The bag is made from half-mil (half a thousandth of an inch) aluminized mylar plastic. Half-mil polyethylene plastic (available as dropcloth material at any hardware store) may also be used. It is less expensive and more easily available, but does not hold the helium in nearly as well. Non-aluminized (clear) mylar works better than polyethylene, but still not as well as the aluminized. Although sometimes difficult to find, it is worth the extra effort. One mil mylar, both clear and aluminized, and one mil polyethylene are easy to find but are twice as heavy as the half-mil. Unless you need to fly your model three or more days in a row and are unable to get helium to top off the bag before each day's flight, the heavier plastics are just unnecessary weight. If you can't find any at a plastics distributor near you, half-mil aluminized mylar can be ordered from Model Research Laboratories (MRL) at 25108 Marguerite Parkway, B-160, Mission Viejo, California 92692. They are currently selling a 20-foot roll for $25, postpaid. They also offer quarter-mil aluminized mylar for sale, but it is too thin to heat seal together successfully using my method of bag construction.

The construction of this model is straightforward and, except for the instructions for making the bag which follow, needs no explanation. I would recommend completion of the rest of the model before building the

Once bag has been inflated, stand it up and watch for slow, steady deflation. If it is leaking significantly, nose will start to flatten in just a few minutes. Patch leaks with Scotch tape.

bag. Although I deliberately did *not* select the lightest materials available, the weight of your finished product may be greater than mine, and you may need to make a bag slightly larger in volume. The bag of this model has a volume of 24 cubic feet, able to lift a maximum of 24 ounces of weight, including the bag itself. (A simple ratio of one cubic foot = one ounce lift.) The weight breaks down roughly as follows: keel and tail assembly, with radio, 500 mAh Rx battery and two Ni-Cd "C" cells, 17.5 ounces; bag, 3.0 ounces; removable ballast, 3.5 ounces. The weight of ballast may be substituted for heavier radio components (receiver, servos), but be sure to leave at least two ounces of ballast available. As you fly around, helium will naturally leak out of the bag, and you will need some convenient way or removing excess weight. If you leave the model overnight, not only will helium leak out, but room air will leak in and displace potential helium refills the next day. In that case you will probably have to remove most of your ballast to get it flying a second day. This varies quite a bit from bag to bag, of course. I've had bags in which a little extra helium the next day was all that was needed, and I've seen a one-mil thick mylar party balloon that held most of its helium for a couple of weeks.

There are two basic methods of making a bag: taping and heat sealing. Taping gives the cleanest, best-looking bag. Heat sealing, while producing a somewhat more wrinkled product, is by far the fastest, lightest, and easiest technique. Lou Bruhn detailed the tape method of construction in the March 1981 issue of *Model Aviation*. Briefly, it consists of cutting out four or more gores for the bag and then carefully taping the seams together. He required about a week of work and produced a good, clean bag. My method of heat sealing took only an hour and a half to make a bag, in-

Continued on page 105

The Silver Cloud in flight at the 1987 IMS Show.

The Silver Cloud at rest at the Pasadena Center, 1987.

Electronics Corner

By ELOY MAREZ

• Lots of interesting mail this month. First in line for takeoff is Richard Pitman, who writes from Marion, Arkansas:

"I am presenting to you a technical question to which I hope that you may shed some light. As a relative newcomer to the R/C area, I am curious about the practice of quick-charging receiver batteries from the 1.5-volt controlled output from the flight box power panel. I have been to several different locations and seen this occur, so it seems to be a widespread practice. It was explained as follows:

"Rx battery = 4.8 volts at 500 mA/Hr.

"Normal Charge Rate = 4.8 volts at 50 mA/Hr for 10 hours.

"4.8 Volts x 500 mA/Hr = 2400 mW.

"2400 mW/1.5 Volts = 1600 mA/Hr.

"From this formula they explain that using the variable output (amps) of the 1.5-volt outlet of the power panel, you can quick charge the battery at the following rates:

"1.5 volts at 1.6 Amps for 1 hour.

"1.5 volts at 3.2 Amps for 1/2 hour.

"It looks okay by formula, and seems to work in practice, but isn't there something about Ni-Cds that prevent such a rapid change?

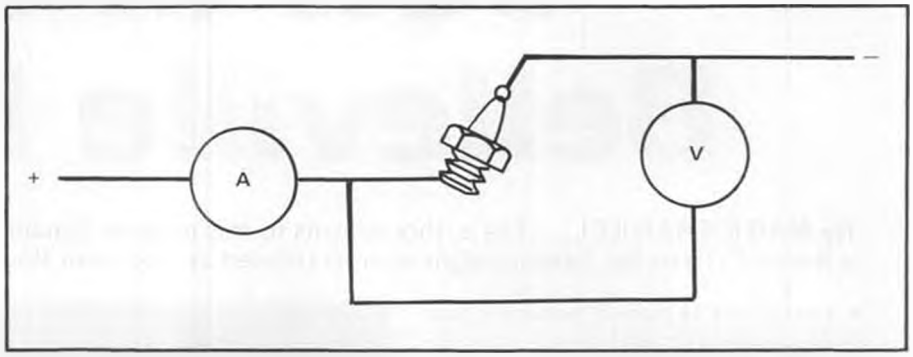
"Any information that you could send my way in regards to this matter would be greatly appreciated."

TEN points for ingenuity; ZERO for the explanation. But first, I must say that I have never seen this done! In retrospect, I do remember now that the Kavan Company in Germany manufactures a "Mini Pulse Glow Driver & Quick Charger," which is rated at even higher charging rates that those Dick quotes: 500 mA in 10 minutes and 1000 mA in 20. I wasn't too impressed because I don't care too much for multi-purpose devices, which include power panels. Their dependency on a single battery means that if it fails for any reason, you are completely grounded. Some failures, like for example the lack of starter battery power, leave you still with the ability to fly if you can otherwise light the glow plug and hand crank. Anyway, the method should work, but for reasons completely different than those given in Arkansas.

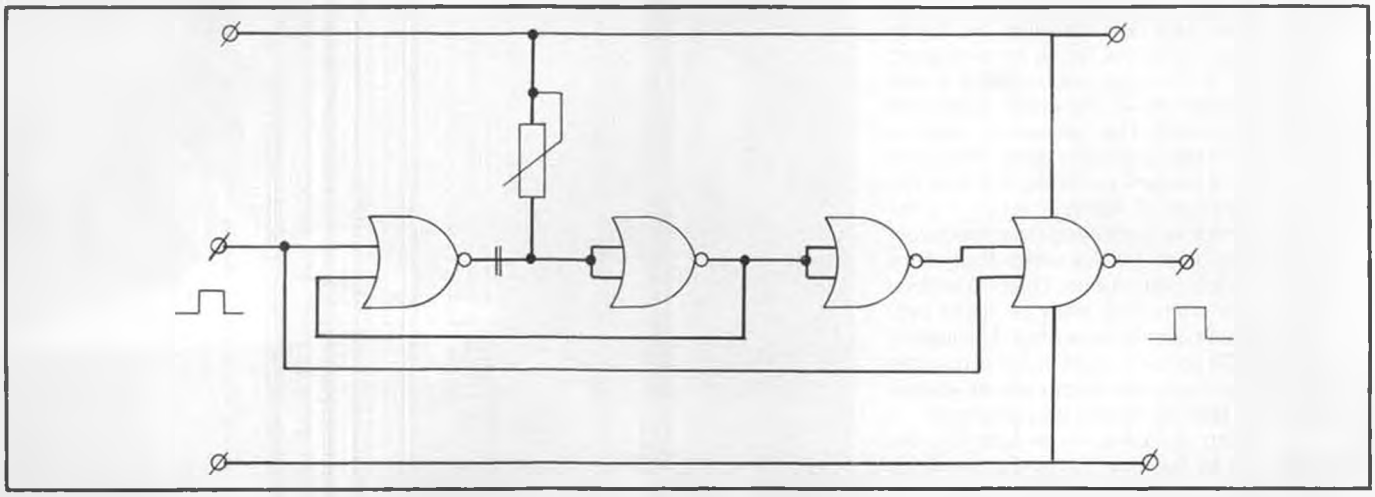
To expand a bit on Dick's information, "they" have converted the available battery power to milliwatts; a valid figure. Then, the products of the charging rates given, the 1.5 volts at X amps, is also 240 mW—but this is one case where figures *do* lie, as you will see.

First the basics. Basic number one, in answer to Dick's question about rapid charging, is that all Ni-Cds are not made to accept very high charging rates. They have all improved in recent years, and some types, es-

Continued on page 92



Method used to measure true current through glow plug and thence its hot resistance. Input(+) voltage is adjusted until exactly 1.5 is read on the voltmeter; ammeter indicates current in amps.



Simple servo reversing circuit that can be used externally to do what more sophisticated transmitters accomplish at the flick of a switch. Use Radio Shack 276-159 PC board to assemble.

A portion of Jack Tse's jet-powered air force.

Jets at the Belleville Fly-in

By MARK FRANKEL. . .The author returns to this popular Canadian Fan Jet Rally with a new camera and a Byron F-15 to fly. Seventy-eight aircraft showed up and were flown to the delight of all who attended.

• June 13 and 14 marked the second year of the Canadian ducted-fan event at Mountain View Airport in Ontario, Canada. Perfect weather and a perfect flying site helped to make this one of the most enjoyable jet gatherings I have ever attended. The Bay of Quinte Aeromodelers, led by Joe LeBoutier, organized a weekend that included ample flight time for all 48 registered pilots and their 78 aircraft. The spectators, who attended in large numbers, were treated to two days of the best jet-model flying in the Eastern portion of North America. I overheard numerous comments from spectators who were awed by the sophistication of these models. Most found it hard to believe that radio controlled replicas could perform in such a realistic fashion. I brought a Byron F-15 Eagle and spent much of my time answering questions from curious spectators. The level of interest was very high.

The flying started early on Saturday, the 13th, and by the time I arrived at the field, Kerry Sterner of Sterner Engineering (661 Moorestown Dr., Bath, Pennsylvania 18014; 215/759-7376) had already "splashed" his

Bob Parkinson and Dave Irons with the Avro Arrow from Bob Parkinson Models.

Ronnie Kemp, Terry Malcolm, and Karl Hibbs of the Skyriders Demonstration Team represented Byron with their F-16 Falcons.

Bob Violett with his high-performance Viper.

Sport Fan. I had heard many favorable things about this model, and I was anxious to see it fly, but a flaw in the aluminum wing spar caused a failure during some energetic aerobatics. Kerry has redesigned the spar and should be flying a new example by the time this report appears in print. Kerry also brought two examples of his popular Lockheed P-80. One model featured jettisonable tip tanks which Kerry displayed during his frequent flights. Another Sterner P-80 was flown by Chris Wilson from Ontario, Canada. While the Sterner P-80 was designed around the Byro-Jet, Chris modified his example to accept a Cook Dynamax Fan. The performance with this powerplant was excellent, and Kerry revealed that he is redesigning his P-80 and T-33 kits to accept the Dynamax as an alternative to the Byro-Jet.

Bob Violett (Bob Violett Models, 1373 Citrus Road, Winter Springs, Florida 32708; 305-365-5869) arrived with several examples of his high-performance Sportshark series. The newest variant is the Viper, which features swept flying surfaces with new airfoils. The speed envelope of this model is remarkable. Bob made some high speed passes that were blinding, yet he followed with slow passes that looked positively leisurely. Bob reported that his Viper was measured with a radar gun at over 200 mph during the pullout from a Split-S.

Bob's daughter Pattie displayed her excellent jet airmanship (airwomanship?) with a Violett Aggressor. Pattie has uncanny eyesight. I was photographing her flight while standing next to Bob, who was calling maneuvers. Some of Pattie's pattern ex-

The Violett Viper on the tarmac awaiting takeoff.

Kerry Sterner's P-80 with jettisonable tip tanks.

Dr. Jack Tse's 1/10-scale F-14 Tomcat with wings swept in full aft position.

A Byron 1/7-scale F-15 flown by the author.

Dr. Jack Tse with one of his 1/10-scale F-14 Tomcats.

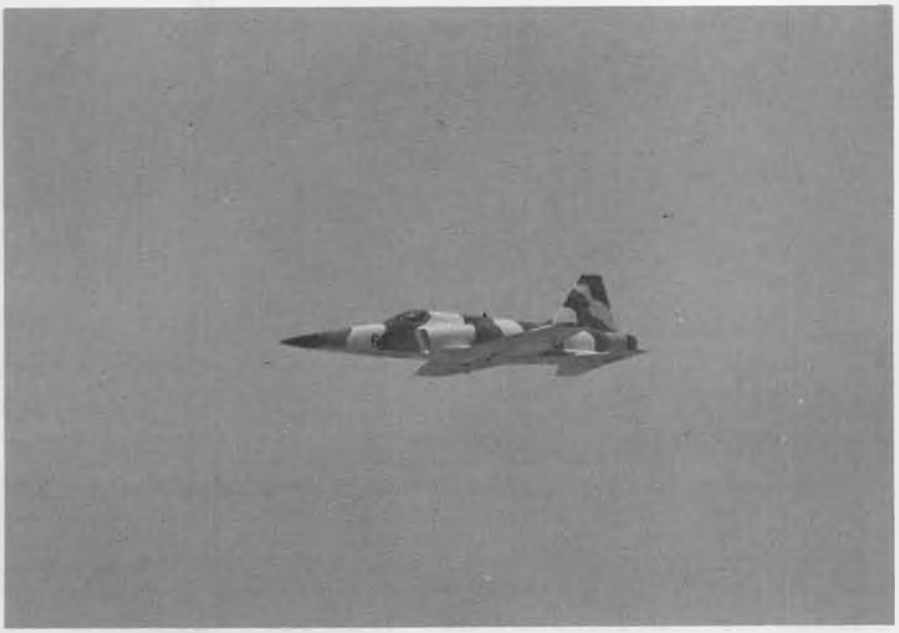
tended so far up and down wind that Bob and I lost sight of the Aggressor. Pattie, however, had no problem, and each maneuver was perfectly positioned in front of me.

Tom Cook (Jet Model Products, 304 Silvertop, Raymore, Missouri 64083; 816/331-0356) appeared with several examples of his latest high performance sport jet, the Starfire II. Unlike the earlier Starfire, the II features rounded inlets and a lowered stab mount. Tom also employs a new laminar flow high lift airfoil on the II which permitted a noticeable increase in top speed.

A third model in the high performance, non-scale group was the new Byron Bullet

A Byron F-16 painted in the highly colorful scheme used at the NATO Tiger Meet exercises, by Giles Pelletier of Quebec.

Pattie Violett with her Violett Aggressor after an impressive flight display.



Pattie's Aggressor as it begins a demonstration flight.

flown by Ronnie Kemp, who traveled across the Continent from Washington State. Like the Cook and Violett designs, the Bullet's fan is fed entirely through bifurcated fuselage inlets with no cheater hole. The result is a very clean, high speed airframe. All three aircraft performed exceptionally well. They exhibited superb vertical performance (each had a thrust-to-weight ratio of greater than one) and each displayed excellent low speed stability. These models represent ideal sport jet aircraft, they can be built quickly and flown from any field that will accept a high performance pattern model. They are a painless and economical means of experiencing jet modeling.

Bob Parkinson of Bob Parkinson Models (3 William St., Thornton, Ontario L0L 2N0, Canada; 705/458-4391) demonstrated his Avro Arrow and Regal Eagle designs. Both models are single-engine sport subjects that use the Byro-Jet propulsion system. They flew well and looked easy to build. Judging from their rapid acceleration and short takeoffs, I am sure that they could function from most club grass fields.

Jack Tse and his fleet of jets occupied a

Continued on page 85

A Bob Violett Sportshark lifting off.

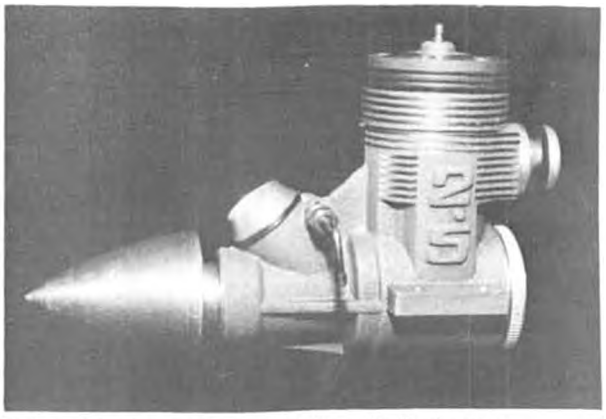
Bob Violett with his impressive high-performance Viper.

Kerry Sterner and Jim Werst of Sterner Engineering with their P-80s.

ENGINES OF THE WORLD

...by Stu Richmond

CS 2.5



Chinese CS 2.5 is made by modelers who fly them too.

VITAL STATISTICS: 2-3/4 inches long to the face of the prop driver, 1-11/16 inches across the mounting lugs, 2-1/2 inches high to the top of the cylinder head. Weighs 6 ounces and is 2.5cc or .15 cubic inch size.
UNIQUE FEATURE: Custom-made in Mainland (Communist) China.

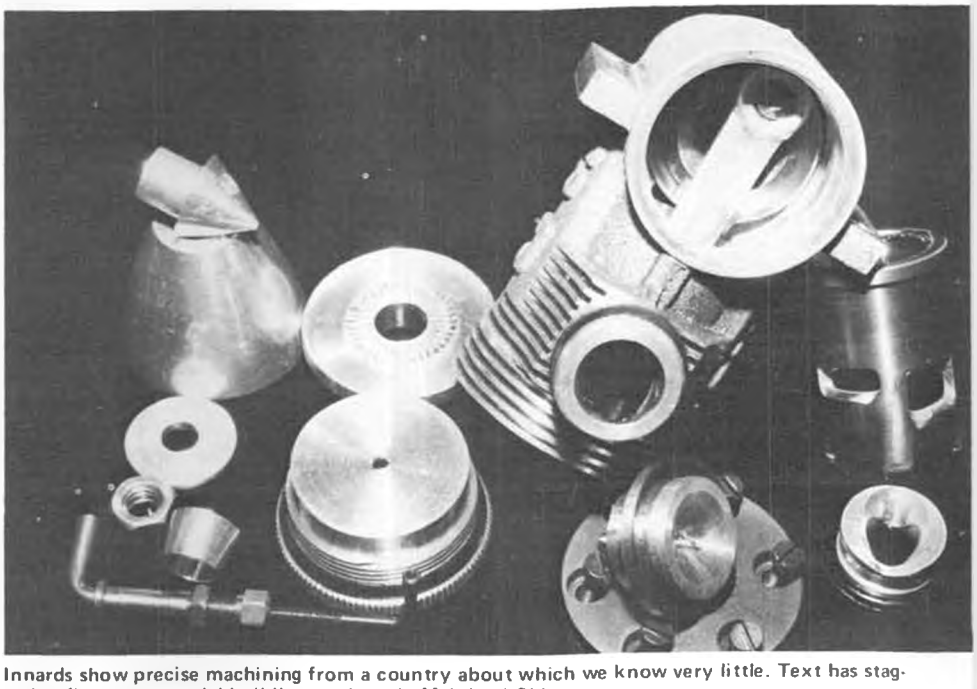
• There are two Berlins, two Germanys, two Vietnams, two Koreas, and there are two Chinas. In each case, this is caused by the battle of democracy versus communism. But model building is universal, as is engine making. It's just that we don't get a chance often to know or learn much about "the other sides." President Nixon sent a team of table tennis players to Mainland China years ago as a friendly gesture. AMA sent, in 1985, a team of USA model builders into Mainland China, and this story is the result of that invitational visit. I heard about the CS 2.5 from John Grigg, AMA past-president who was on that trip; it had been "gifted" to him and was in the AMA museum. John arranged for it to be loaned to me.

In anticipation, I borrowed from Dub Jett his Nelson .15 that had won the Quarter Midget Nats two consecutive years, and I borrowed from Steve Fauble a very rare Three Leaves 2.5 built-in-China engine. A comparison was sure to be interesting!

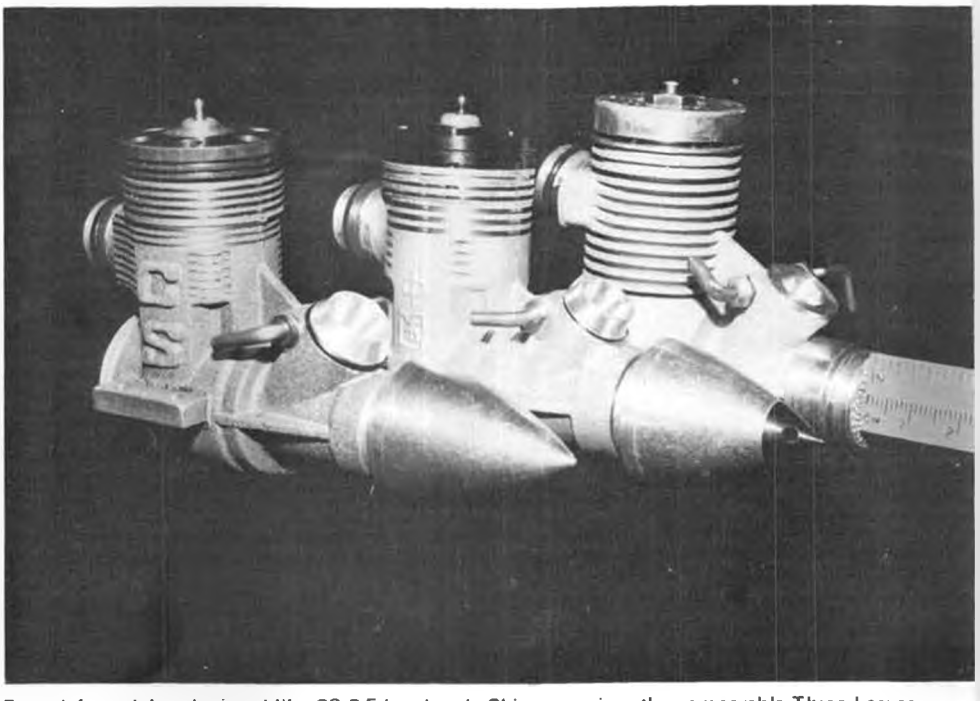
From Taiwan, R.O.C. (Republic of China), we are now getting many consumer goods. This is the "democratic" China simply called Taiwan, a huge island off the mainland. Probably the largest, most-modern model airplane product factory in the world was built in 1985 in Taichung Industry Park in Taiwan by Thunder Tiger Model Co. and from it we're getting Magnum and Royal engines, R/C buggies, a great line of model airplane kits, ARTF kits, chargers, power panels, starters, tachometers, and they're now building complete R/C systems! But practically *nothing* is known about production from the "other" or Mainland China. So with enthusiasm I started into this month's CS 2.5.

It is so pretty it was almost a shame to touch it with a tool. A screwdriver slip would spoil the red anodizing on the head, but off came the head. The button glow plug wasn't Cox or Rossi, but is similar. The connecting rod, machined from bar stock,

Continued on page 94



Innards show precise machining from a country about which we know very little. Text has staggering figures on model building students in Mainland China.



From left to right: the jewel-like CS 2.5 handmade Chinese engine; the comparable Three Leaves SF-1G rated at 35,000rpm; and Jett's Nelson that's twice won the QM Nats. Dimensions are nearly identical for the three engines.

SEVEN-CELL FAI/F3E CONTEST

By BILL FORREY. . . Suppose they threw a contest and didn't invite any members of the U.S. FAI/F3E team to compete. The result? a big entry list, great prizes(including real money!) and a weekend of memorable flying.

Jerry Bridgeman, the $1,000 winner and his modified Snipe. Jerry flew consistently high scoring flights to win the event.

• What would you do if you heard about an interesting, two-day contest that boasted of $2,000 worth of prize money for the top four finishers? If you had almost all of the ingredients for a halfway competitive model and could get them all flying in time, what would you do? If you saw a handbill which stated that the CD wasn't allowing a particular group of modelers to compete who would be the most likely ones to win the money, what *would* you do? If you felt that you had even a *fair* chance at finishing in at least fourth place, the question is, would you go for it? Well, I sure couldn't resist the lure, so I swallowed hard and then coughed up the $25 entry fee and flew in the darned contest. And am I ever glad I did, too!

You're probably thinking I won something. Well, I didn't. I did come close, however, and that was thrill enough! I tried something I have never tried before, and I genuinely like it. You see, this writer's first love is R/C sailplanes. I enjoy the challenge and rewards of trying to advance the performance of my model designs within a multitask contest format, such as F3B soaring. But I also enjoy the relaxing hours I spend with my electric models. Now along comes an event which combines both: FAI/F3E R/C Electroflight.

WHAT IS F3E?

Without going into a lot of detail, which can be about as dull as reading a set of kit instructions, I'll attempt to convey to you the essence of the F3E soaring format and how it was modified for this particular contest.

The FAI rules say that an F3E model can't have more surface area than 2,325 square inches (no problem), can't weigh more than 11 pounds (no problem), but it must have a wing loading between 3.93 and 24.59 ounces per square foot. Maximum voltage allowed in your power pack is 42 volts or 30 Ni-Cd cells in a row. The model may be a prefab job provided it doesn't require "only a few minutes of unskilled effort" to complete its assembly. You can't borrow a buddy's model either, you have to be the builder of the model.

The event is broken down into two distinctly different tasks which very effectively

Left to right: event organizer Felix Vivas; Mike Charles, CD; 1st Place Jerry Bridgeman; 2nd Chuck Hollinger; 3rd Bobby Gerbin; and 4th, Brian Chan.

Chuck Hollinger launching his entry, which blew up on Sunday due to high stress. Chuck came in second.

Brian Chan launches his plane as Steve Neu helps out.

Bobby Gerbin, 16, took home a third place trophy with ship his dad developed based on a Gnome HLG wing. Model was the lightest at the meet at 33 ounces.

Bill Forrey with his fifth place Electricus. One of only two 7-turn motor powered ships.

Keith Finkenbiner and his Astro 40-powered ship. Two low-score rounds kept him out of the money, placing 7th.

Dennis Brandt holds his slimmed down, high aspect ratio Electricus with E374 wing and five-turn cobalt. Placed 8th.

Hatch Manell and the biggest ship of the meet, spanning 90 inches. Hatch finished in 9th.

Eleventh place Dieter Lamprecht and his electrified Pilot Harlequin. Note flaps.

test the performance of the model and pilot. The first is a distance task, and the second is a thermal duration task, but there is no landing between the two; once you are airborne you stay that way till you are done.

The distance course is set up as two imaginary parallel planes "at a distance of up to 150 meters." Although I don't think shorter courses are ever used. Sighting devices are used to define these imaginary planes, and there is at least one at each "Base" line (A and B). The near Base line is A, and the far one is B. Within the plane of Base A there is a gate for models to fly through. This gate is 20 meters wide (65.6 feet) and three meters high (118 inches, or about the wingspan of a Paragon). It may sound big, but you'd be surprised how many good fliers failed to get through it! The sole purpose of this gate is to get the models down to equal heights at the start of the second half of the flight (duration) once the distance flying is completed. It also serves as a convenient place and time to start the watches for the duration event.

A typical flight begins with the PA announcement that your five-minute preparation time has begun. During this time you get your model together to fly, get your tranny from the impound, and find your Old Flyin' Buddy to time for you. Official timers are provided, but they can't help you or inform you during your flight.

After wandering out to the ready area, you generally have to wait for the flier ahead of you to enter the duration portion of his flight. With him off the distance course, you are told to fly. Officially, at this point you have two minutes in which an unlimited number of launching "attempts" are allowed, but in reality if you take more than one attempt, you are wasting precious battery power! You step up to within 10 meters of Base A, but outside the course. You are asked to demonstrate that everything works, and you are on your own. You turn on the motor and either you or your OFB launches the plane. At the moment of release, both the official timer and your OFB (hopefully) start their watches. You now have three minutes to do five things: climb to altitude as quickly as possible, get outside the course at Base A, shut off the motor, enter the course in the direction of Base B, and fly as many 150-meter laps as possible before the three minutes is up.

There is a lot of strategy involved in this event. If you don't climb high enough, you may not have enough *altitude* to do a competitive number of laps. If you take too much time getting up to altitude, you may not have enough *time* to do a competitive number of laps. It takes practice, skill, high power-to-weight ratio, high wing loading, and a clean ship to do it well.

The biggest variables that you have to deal with in distance are weather-related. If there is lift on course, and you might suspect it if the guy ahead of you flew through some or there are other telltale signs such as a guy in his thermal task circling on course, etc., then you might gamble on a little less motor run time and altitude at the start to al-

Chuck Hollinger makes a clean gate on his way to the duration half of the flight in round five, flying his backup ship.

John Lupperger launches Dieter's Harlequin.

Winner Jerry Bridgeman flies with Chuck Hollinger as his helper. Jerry used Airtronics Silver 7 radio with mini receiver, Astro 05 cobalt motor.

John Lupperger holds primary ship, the Amplitude, which had problem with the 6-turn direct drive 05 cobalt. Turned out to be dual rate switch which limited full power.

Mark Grand and his Comanche-like electric. Used a direct dirve, 6-turn cobalt, but ship weighed too much. Mark finished in 12th.

Gary Westland had a nice primary ship with high aspect, constant chord wings. He hit poles and had to fly backup, finished in 17th.

Ken Gray holds his Kinda Firefly electric. The plane looked competitive, but had pilot problems, hitting two gate poles, finishing 14th.

low more time on course for laps. Wind also enters the picture. If it is at an angle to the course, fly to the upwind side during your launch so that you can fly true to the course and drift downwind a little as you go. There is nothing worse for distance than flying diagonally to the course just so that you can fly in a straight-line "groove" over your head!

Okay, you climbed for X number of seconds and made X number of laps; now what? Your three minutes is up. If you used your time and altitude wisely, you just made your last lap at Base A at 2:59, and the power is back on again for a short climbout. Now its time for the gate! If you are a crack pilot with nerves of steel and excellent hand-eye coordination, then you can try what the current F3E world champion has successfully done at the WC's not once, but twice; namely, use a short climbout to gain enough altitude to go through the gate at Mach 1 with motor off, followed by a zoom to altitude and a search for thermal lift sufficient to make five minutes without any motor run time subtracted from the total!

Let me explain. Upon the conclusion of the distance event you have a choice of how to start the duration event. Either you can finish your last lap and go directly through the gate (even if the last lap is finished while actually passing through the gate) or you can take (officially) up to a full minute to make it through. Most guys waste no time going through the gate, thus saving every precious second of motor-on time for climbouts during the next five minutes.

Time starts when you pass through the gate. Two watches are officially maintained: the first watch tells the total elapsed time for the flight (the goal if five minutes), and the second is used to keep track of the total (cumulative) time your motor was run during the five minutes, no matter how many times you turned it on and off. When the flight is complete, the total time gets the motor run time subtracted from it. Also, because this is a precision duration flight, one point per second is subtracted from the flight time for each full second you flew beyond the five minutes.

Finally, there is a landing bonus area consisting of two concentric circles of 15 and 30-meter diameters. You get 30 points for landing in the inner circle and 15 for the outer circle. Extremely ideal circumstances would yield a 300-second, 300-point flight plus a 30-point landing bonus (330 points).

Compare this maximum point value with the uncapped distance event where each full lap is worth 15 points and you can see why the F3E event is a little slanted toward the distance task. Now we come back to the "Seven-cell F3E FAI Contest" conceived by Felix Vivas.

As the contestant's name tells you, the modification which was made to the FAI F3E rules was to limit the maximum permissible power source to a battery of seven 1200 mAh Ni-Cd cells. Everything else was allowed within the F3E rules. No restrictions were placed on the size or number of motors used.

The primary reasons for limiting the power supply were to allow the greatest number of electric glider fliers to compete with either *existing* equipment or less expensive *new* equipment. Further, a greater number of modelers are willing to try the less intimidating seven-cell configuration than the 30-cell monsters and their Keller or Astro cobalt counterparts, the 60, 100, and XXX-size motors that cost a small fortune. And who in electric power doesn't own a seven-cell system and its correspondingly inexpensive charging equipment? Here in the US there have evolved two classes of thermal competition: seven-cell and un-

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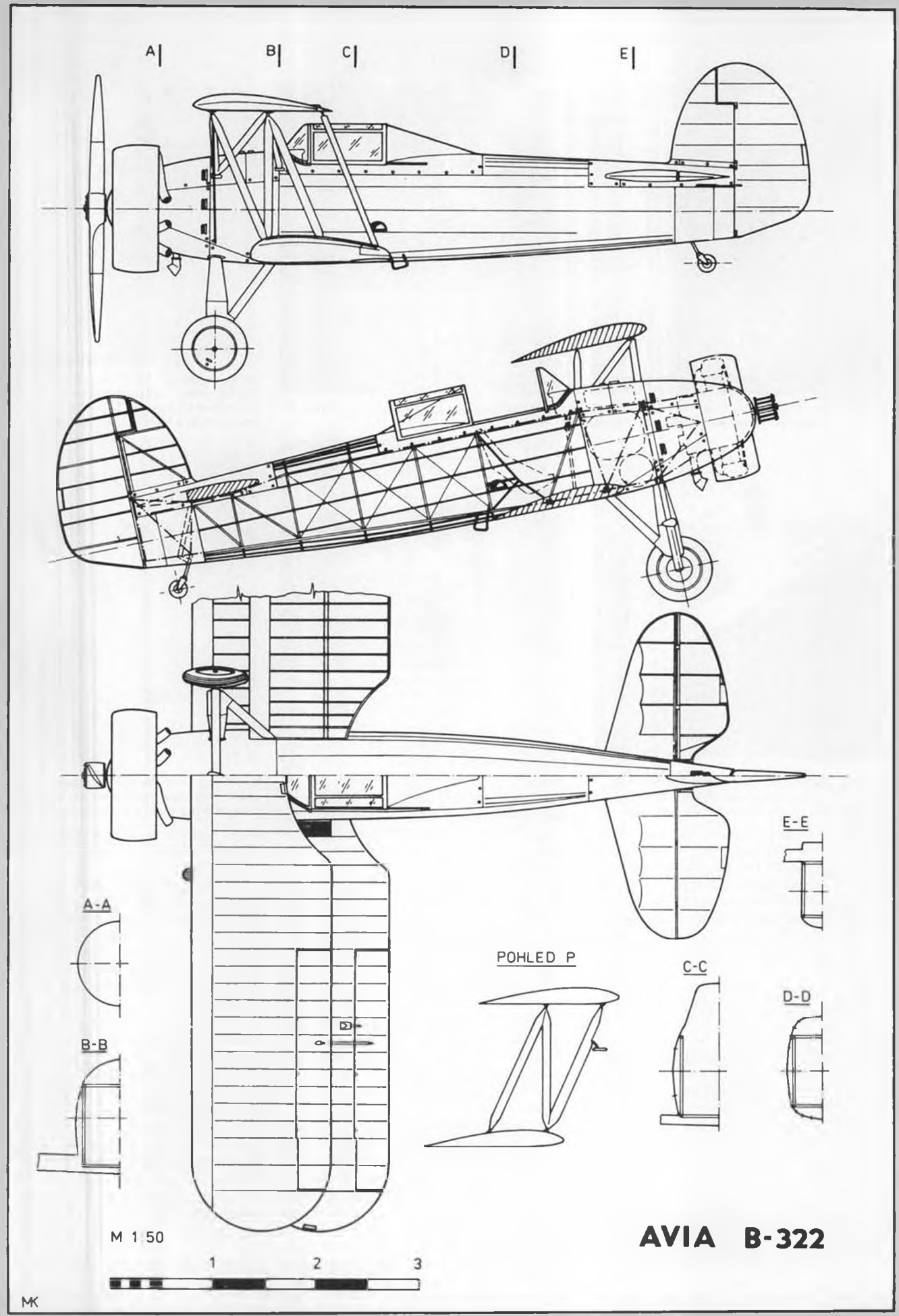
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PLUG SPARKS

By JOHN POND

• Man! If you think it was windy at the SAM Champs at Seguin AFB, Texas, you would have thought the wind there was a mild breeze compared to the windy conditions at the Nationals held at Lincoln, Nebraska.

Temperature-wise, not much to choose between the two locations, but the wind at Lincoln was about 5 to 10 mph higher with gusts hitting 35 mph. The writer had two models literally torn to pieces while trying to wind them in that stiff breeze.

For the first time in many years, the Old Timer Events at the Nationals failed to show a profit. After all these years, I find little to complain about. It simply was a matter of time until we had really bad weather with resulting low registration.

The O/T R/C boys got lucky as the only good day was at the Omahawks Field (about 50 miles east of Lincoln). Located in a state park, the Omahawks are to be commended on a fine field; paved, with good pits, and a regular grandstand section for spectators.

We didn't get too many photos of the action, but Dean Everetts and John Boyd of SAM 53 did send a few interesting shots. Probably the fellow who had the most fun was Bob Hess of the Omahawks, who flew on and off all day with his Miss Tiny as seen in Photo No. 1. Note the beautiful runway.

Biggest winner on the field was Al Grier shown in Photo No. 2 starting up his scaled Goldberg "Gas Bird" aka Diamond Zipper (there was no Zipper in 1937). Al took two firsts and a second. Not a bad showing at all, considering it was the same model used throughout. Note the way of holding the model in the air by Ed Niles. Don't get your pants dirty this way!

Some real fun generated when Ole Olson, proprietor of the local Omaha "Hobby Center" showed up on the field. As usual (he is getting spoiled!), he immediately accosted Pond asking which model was his to fly. This is S.O.P. between Pond and Olson for the last eight years. Every four years it seems we hold the O/T Events at their field!

In less time than it takes, Pond selected his tried and true Enya 80 4/C-powered Flamingo. As can be seen, Ole is checking the model prior to launch in Photo No. 3, with Bill Ferretti holding.

This writer thought that Bob Hess would never get the Enya started as he preferred to start that four-cycle engine on low throttle. The 80 engine is one of those hot four-cycle engines that start on full throttle. And so it finally did! As it turned out, Olson probably could have done better with a test flight plus flying a little later when thermals came out. Be that as it may, the name of the game is fun, and Olson did have fun!

Ever so often, I hear the expression, "Who the heck is John Pond?" Well, gentle reader, we feature Photo No. 4 taken by John Boyd at the Omahawks Field of the Plug Sparks columnist. Why the smile on a windy day? When you can't run and can't fight, you'd better learn to smile!

In a self-interview, when asked at age 70 how long he expected to live, Pond replied, "I expect to die at age 90 jumping out a second-story building because of an irate husband with a shotgun." There! That'll fix you wise guys!

Also seen on the field in Photo No. 5 was Dean Everett's fancy trailer for hauling planes. That's his boy, David, on holiday from Bittburg, Germany. Dean had his problems with the Lanzo Record Breaker that day. Gremlins in the ignition system or sumpin'.

An interesting sidelight developed when the 1/2A Texaco trophies were not available. This forced Jack Warkins to fly his 1/2A Texaco model in the regular Texaco Event. With a little better luck Jack could have won the event. As Jack said, "If it wasn't for bad luck, I wouldn't have had any luck at all!"

Inasmuch as no formal Old Timer Reunion Banquet had been firmed up, trophies were awarded on the field. We may have some pictures of the winners later on. As it

1. Fine-flying Miss Tiny by Bob Hess, Omahawks Field, during the Nats O/T events. Photo:Boyd.

2. Al Grier cranks up his O.S. 60 4/C in his scaled Gas Bird as Ed Niles holds. Photo: Everetts.

3. Ole Olson checks out control on Flamingo before Bill Ferrette releases bird. Good shot of park background too. Photo: Everetts.

5. A neat club trailer by Dean Everetts features his Lanzo Record Breaker and son, David. Photo: Everetts.

6. Lots of spectators for the Nats O/T events. Not much flying in the wind, though!

7. Bert Pond, of compressed air fame, handles this Bottle Baby very carefully in the stiff wind. Photo: Cunnyngham.

8. Not, it's not the Mark of Zorro! It's only Pond's ancient license plate, always seen on the field. Photo: Everetts.

turned out, an informal Victory Dinner was held at the Steak House in Benton (about eight miles south of Lincoln). This turned out to be a great time for all with the jokes and reminiscences of old times being brought up.

Getting over to the free flight area, the wind was incredible! Estimates had gusts over 35 mph! It took a real hero to fly in that wind! The mass fly-off of Twin Pushers scheduled for noontime was rescheduled for 11:00 a.m., in the hopes the wind would not be as bad.

Poor old George Perryman showed up at 11:30 a.m. and during the time this C.D. was telling him that he was late, a gust caught him and broke the wing. I wonder what "Gawge" told Bill Baker about his proxy flying. Just a shame the fun got ruined.

There was no lack of contestants and spectators, as can be seen in Photo No. 6, but as one will note, there were more watching than flying. Launching a free flight in that gale was a real moment of truth, sorta like the matador and the bull. Either one could get ruined.

Bert Pond (no relation) has been promoting compressed-air flying longer than this writer will admit to. A perpetual trophy was the real piece de resistance that Carl Carlson worked very hard to win as proxy flier for Lockwood, an old time flier of the 1923 Illinois Aeronuts.

Seen in Photo No. 7 is Bert Pond with his design called "Bottle Baby." As can be noted, Bert is very gingerly handling the lightly built model in the wind. All due credit should be given to Bert for flying, as the perpetual trophy requires at least two contestants for award.

Wanna know how to spot Pond on the field? Look for a red car (used to be a Chrysler 300 convertible) resembling a Ford LTD Crown Victoria Station Wagon. As can be seen in Photo No. 8, it will have the license plate of "SAM 01," this number awarded this writer back in 1964.

4. Our columnist(70 years young!) seen at the Lincoln Nationals. Photo: Boyd.

As can be seen, this license plate has seen a lot of miles, wear and tear, not to mention a few bumps over a period of 18 years. You would think the affluent California Department of Motor Vehicles would issue a duplicate!

We have complained about the wind, but, in retrospect, we should have noted this did allow for quite a bit of visiting and exchange of pleasantries. That's what it is all about! Let's look at the rather abbreviated results.

RESULTS OF NATIONALS O/T EVENTS

At the Omahawks Field, on July 15, O/T R/C:

Texaco: 1. John Pond, 2. Al Grier, 3. Jack Warkins, and 4. Marshall Earnshaw.

Antique: 1. Al Grier, 2. Ole Olson, and 3. Bill Bowen.

L.E.R. (C1. ABC): 1. Al Grier, 2. Bob Hess, 3. John Pond, and 4. Bob Bonnstein.

At AMA Flying Site, on July 17, O/T F/F:

Antique, 30 Second: No entries.

020 Replica: 1. Jorce Triana.

Class A: 1. Merl Shammo.

Class B: 1. Sal Taibi.

Class C: No entries.

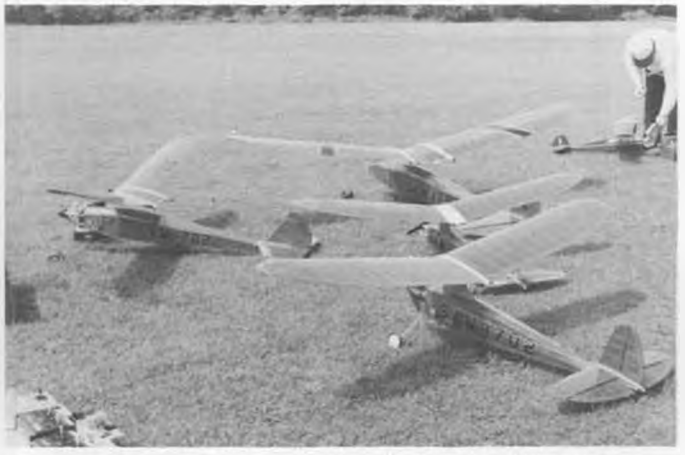
Rubber Cabin: 1. Ernie Linn.

Rubber Stick: 1. Jack Phelps.

Twin Pusher: 1. Carl Carlson, 2. Joe Scuro, 3. John Pond, and 4. Bill Baker (Sponsor) (Perryman Proxy).

Compressed Air: 1. Lockwood (Carl Carlson, Proxy) and 2. Bert Pond.

10. Prolific builder George Murphy showed up with this Dallaire Sportster at the SPOTS Annual. Note Quaker Flash-type decoration.



9. When Steve Boucher goes to a contest, he is prepared to fly!

S.P.O.T.

The latest report on East Coast contest flying comes from Mike Granieri who reports on the Society for Preservation of Old Timers (SPOT) Annual held in New Jersey late 1986.

Mike reports enjoying a glorious sunny morning with afternoon cloudy skies. This literally filled the air with thermals. 45 flights were made, a not too shabby showing for a small group.

Mike sent in a series of photos taken by Bill Kidd. We would like to feature a few headed up by Photo No. 9 showing the flying stable of Steve Boucher who also writes an old timer column in *Flying Models*. Seen in the pic are two M-G designs and two Playboys in various sizes. Boucher did very well, copping two firsts, a second, and a third. A busy man!

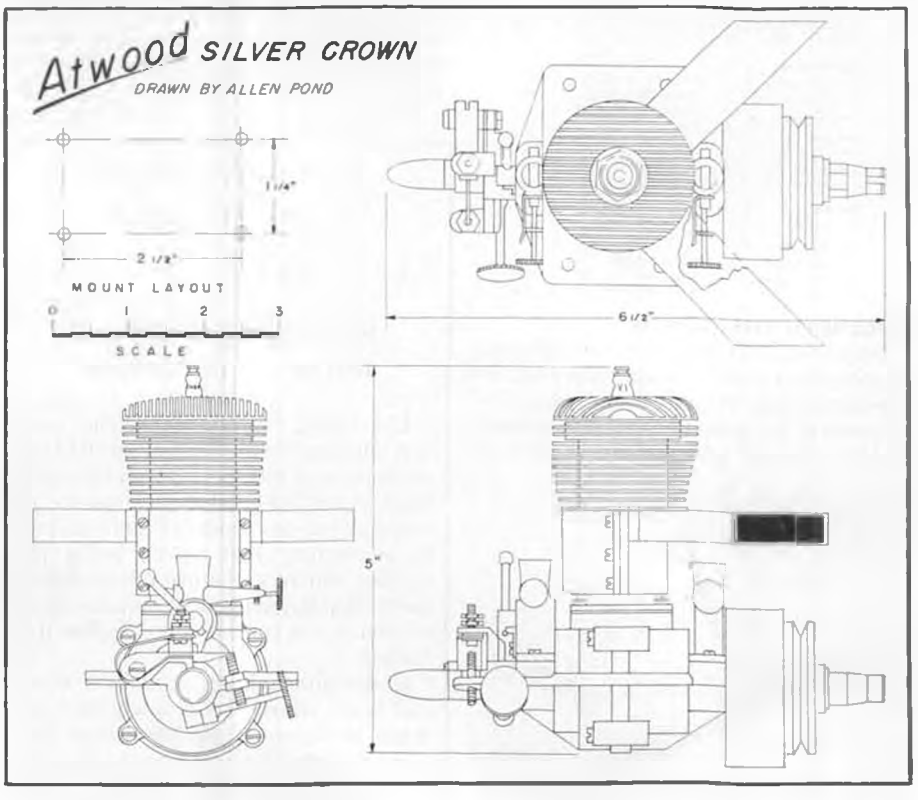
Photo No. 10 is George Murphy's Dallaire Sportster. This excellent flying model placed second in the Fuel Allotment Event (similar to the Texaco Event except any old timer can be used). Where most of the fellows are using O.S. 60 and larger engines, it is interesting to note that George flies with an Enya 46 4/C.

A new gimmick was tried on trophies for this contest. Instead of the usual purchase, club members made up the awards from different colored ceramic tiles with beveled edges. Engraved brass plates were glued in the center of the plaque. As Mike sez, "Our efforts were rewarded by the compliments and enthusiasm shown by the contestants."

Full recognition should be given to Contest Director James Clark, Co-C.D. Mike Granieri, and Marianne Clark holding down the Register and Timer Desk. Joe Csuti doubled as Field Marshall (something we should do on the West Coast) and Chief Timer. The girls, Pauline Csuti and Dorothy Granieri, catered the food. The contestants,

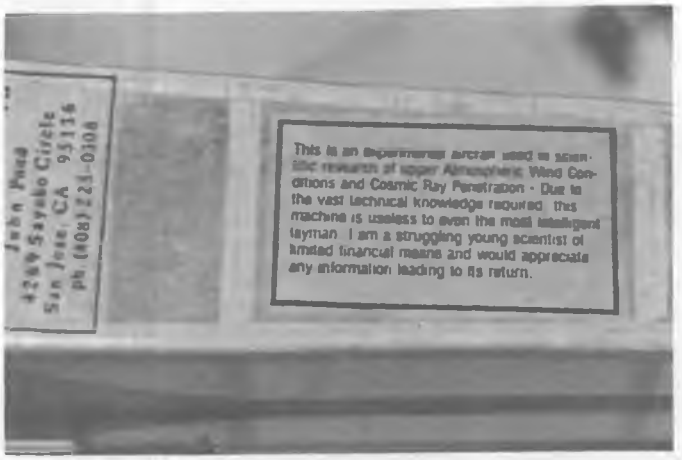
11. C.D. Nate Polk hands the Lord Wakefield trophy to Bernarr McFadden for presentation to winner Dick Korda. Recognize the others? Looks like Bert Pond at far right.

Great shot of Louis Garami's Pioneer, a design powered by an Atom .09. VTO was unheard of in those days!



15. Carl Hatrak built a beauty; a little-known Miss Fortune X designed by Mickey DeAngeles.

17. How about CO_2 old timers? Al Lidberg is heavily promoting this event for the Southwest Regionals.



13. Note this 'please return' type of label for your missing model. It can't miss!

14. Prize time at the Spring Brainbuster Annual for the Juniors. Andy Van Dover hands out the goodies to the lucky winners.

to show their appreciation, took all the girls to dinner well satisfied that all had a good time.

Results:

12A Texaco		
1. Art Peterse	Swoose	1800
2. Tom Wroblesky	Playboy	1068
3. Steve Boucher	MG-2	1006
Fuel Allotment		
1. Steve Boucher	MG-2/OS 60 4/C	1694
2. George Murphy	Dallaire/Enya 46 4/C	1035
3. Joe Cwiti	Ehling/Saito 40 4/C	785
Antique		
1. Mike Granieri	MG/Enya 60	1588
2. Steve Boucher	MG/K&B 40	1528
3. Joe Cwiti	MG/K&B 40	1059
Ignition		
1. Steve Boucher	Playboy/McCoy 60	480
Class ABC Glow		
1. Charlie Stager	Playboy/KB 40	1513
2. Tom Wroblesky	Playboy/KB 59	991
3. Art Peterse	Playboy/KB 19	669

ENGINE OF THE MONTH

For this month's subject, we are indebted to John Nuovo of Pittsburg, California, for the data on the Atwood Silver Crown. This was one of the series of engines developed by Bill Atwood utilizing the same type crankcase casting.

John Nuovo has been utilizing castings of this engine and producing a very distinctive engine that he calls the Green Dragon. Although he did not have an engine to copy, he did have the casting and machining drawings that had been redone by K-Dee Pty, Ltd., Sydney, Australia (issued under the name of K-Dee High Speed 15 c.c. Special).

This engine, designed for boat work, was offered in casting form only by Atwood originally. As the demand fell off for casting kits, this Australian company picked up items and offered basically the same parts and drawings as Atwood did originally.

Back in 1940 when the announcement of this series of engines came out in the 1940 April and May issues of *Model Airplane*

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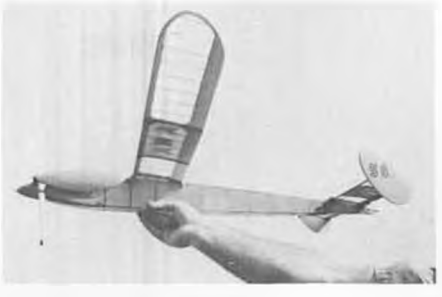

16. Ed Heyn built this good-flying Roy Beaumont Sticker. Ed does well at the SAM 7 meets.

Old Timer of the Month

Earl Stahl's GYPSY

Designed by: Earl Stahl

Text by: Bill Northrop

Earl Stahl's "Gypsy" Wakefield model was published in the September 1942 issue of *Flying Aces*. However, Earl and the model were on the 1939 Wakefield team, the year when all but one model became relegated to anonymity, that model being Dick Korda's, which on the first official flight of the contest stayed up for 41 minutes and put an end to the contest almost before it got started.

Under more ordinary conditions, it's difficult to say whose model might have gone down in history as the '39 winner, but if looks counted for anything, Earl's Gypsy, built in the neat, functional, looks-good/flies-good style of all his models, certainly would have been at the top end of the winner's list. John Blair, Warne, North Carolina, a now-and-then contributor to *Model Builder* drew the plans and built the model shown. As might be expected, he calls it the most consistent and reliable of the models in his old timer collection.

John says, "I have redrawn the plan as originally presented; no diagonals, gussets, or other goodies which we routinely build into our models today. I would recommend to builders that they beef-up the wing

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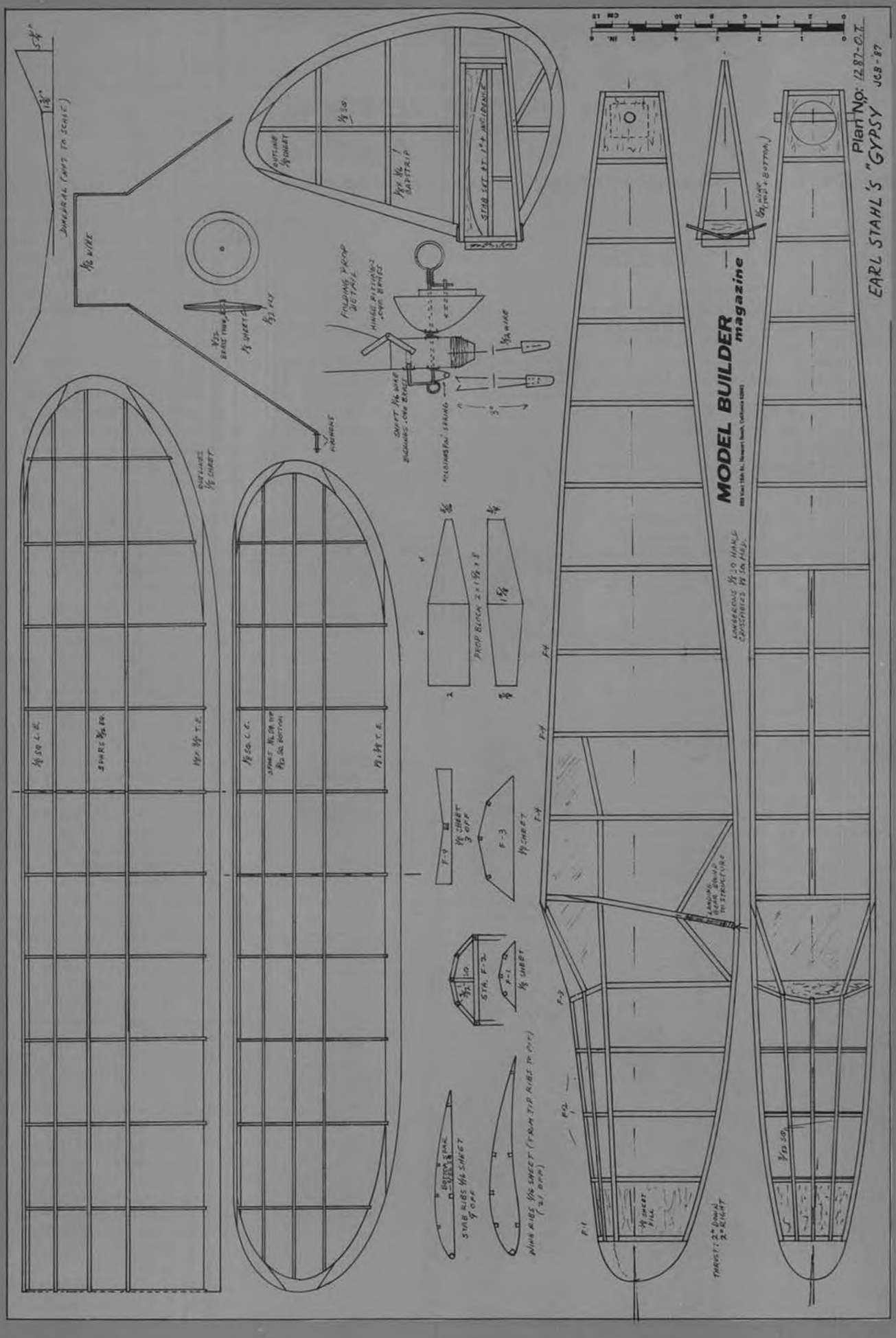
MODEL BUILDER magazine
Plan No: 1287-D.F.
EARL STAHL'S "GYPSY" JCB-'87

ELECTRIC POWER

By MITCH POLING

• The December column already, and this is the end of August! Outside it is working its way up to the high nineties. So, what else but to wish you a Merry Christmas! Maybe it will make the day feel cooler! Well, let's look at toys! I know that this is a serious hobby, and we do not play with toys; we are highly trained operators of remotely piloted vehicles, and that is that. However, I'm still a boy at heart, my electric planes are really my toys after all, and that makes it fun and not so serious.

Anyhow, a serious piece of equipment that is very useful in our hobby is the DVM. I don't happen to have a regular DVM, I have the Accutach, which is a combination tachometer and voltmeter marketed by NorCal Avionics. It is excellent and does its job well. But now that I have gotten interested in making very precise measurements in the thousandths of volts for testing connectors, switches, speed controls, and the like, I have become aware that a meter with a 1.999-volt scale (3-1/2 digit) is almost a necessity. The Accutach has only a 19.99-volt scale, so will not show the thousandths place, where much of the action happens for connectors. Radio Shack has one that looks interesting, 22-171, with autoranging, for $24.95. It isn't in the stores yet as I write this, but it is in the 1988 catalog and should be stocked by the time this column is out. The previous model, the 22-170, has been discontinued. It was quite a bargain at $19.95, but Radio Shack says there were reliability problems.

Anyhow, I went ahead with the Accutach to verify some of the numbers that both Keith Shaw and Roger Mason sent. Apparently Roger's SC-4 had a bad FET or two, he had mentioned a 1.2- to 1.4-volt drop, I got a .17-volt drop at 15 amps on a 14-cell pack on mine, almost ten times lower. This makes sense, since I cannot see an rpm difference between the SC-4 and a straight through good quality single pole toggle switch. I measured a double pole toggle on the same setup, 14 cells at 15 amps, and got a .07-volt drop. This is with the two poles hooked up together to drop the resistance, internally the switch will have two contacts per position (like using two pins per line on a Deans plug). This cuts the resistance loss in half. A single pole toggle should come out at about .14 volt, just like the SC-4. This gives an idea of the relationship of voltage drops to rpm. I think that the maximum rpm drop that will not show on my Accutach is between 30 to 40 rpm on the 10X scale, which shows rpm to the tens place. So, I'm going to say that the rpm drop caused by .15 volts is about 40 rpm under the conditions I used.

The holder end of the International Prop Balancer.

The International Prop Balancer balances boat propellers, too.

The International Prop Balancer at work; it's handy, sturdy, and sensitive.

These conditions are: direct drive, current in the 10- to 20-amp range, rpm in the 10,000 to 12,000 range. A drop of 300 rpm total is quite significant in this range, it is like losing five- to ten-percent power. It means the difference between a snappy ROW and a draggy one. A 150-rpm drop is much less noticeable, in fact, 150 rpm hardly affects takeoff at all.

I measured a .03-volt drop for the 25-amp fuse plus the female spade connectors used as holders, and .00 volts for the drop across a Deans two-pin connection. When you translate the info Keith sent, he measures a .02-volt drop (yes, you can see how the 19.99 scale drops out some significant information!).

Now, finally, we can figure out in theory what the rpm drop is for most setups. My usual 05-size setup is a fuse, a four-pin Deans connector from motor to switch, and a four-pin Deans from switch to battery pack. I use about 1.5 feet of SR or Jomar 16 ga. Keith's number for the wire is .130 volts for this length. So, all this ads up to a total drop of .48 volts. This would come out to about a 120-rpm drop. I don't have time to do the testing now, but before the next column I will, and we'll see how close to reality this is. Wouldn't it be nice if we could connect the motor straight to the battery! However, I for one do not like to give up the convenience of plugs. I used to hard wire everything, but it became too inconvenient. And, notice that the major loss comes from the wire, not the plugs! You can switch to the Jomar 12-gauge wire and come up with .30 volts, for a loss of only 80 rpm. If you use spade lug connectors, this comes out to a .248-volt drop and a 60-rpm drop. Well, enough! Most of us sport fliers need only keep the wiring clean and use good quality components, and our systems will perform well.

Speaking of wiring, I use an arming switch for my cobalt systems from 15 size on up. An arming switch is a switch between the speed control (or servo-operated toggle) and the motor. Occasionally I have not done this, and I have always gotten an uneasy feeling when I didn't, similar to handling a live cobra. A cobalt motor can do a real number on you! So, now I have an arming switch, period.

I have two strong recommendations for your choice of an arming switch. The first is a safety one. Buy a DPDT-center-off switch, the Radio Shack switch 275-664 (six-amp

rating) is quite satisfactory. Now you are asking, why the center off? That gives two off positions, center and to one side, and you don't need two off positions; do you? Well, you do! It gives a "safety" position, if the toggle gets bumped accidentally, it will most likely flip to the center, which is off, and your body is still in one piece! Enough said! The other item is the double pole. As said before, this allows you to use two poles per line and is half the resistance. You get more power, the switch is loaded less, and reliability will be much better. So, lots of advantages!

International R/C Specialties, 2310 Cimarron Rd, Las Vegas, Nevada 89117, sent me their new prop balancer. I am using it, and I like it! I recommend this balancer for its ease of use and fantastic sensitivity. It is hand-held; just push the prop on the holder and watch the heavy blade settle! It is almost like a perpetual motion machine; the friction is so little that it takes quite awhile before it stops moving. The secret is the two high-tech ball bearings, which have balls the size of a ball point pen tip. I am not sure of the price, somewhere in the twenty-dollar range, I think. The other thing I like about it is that it is easy to take care of; it is built like a Sherman tank, you can just stick it on the bench, in a tool box, or whatever; and it is very unlikely to get damaged. It is ideal for field use, and it should last a lifetime.

Now my props are balanced, and I know that if I hear noise in the air, it isn't the prop, and that it is time to check the motor shaft or the centering of the prop holder. I have said this before, but I'll say it again, a noisy prop is a bad prop. Noise means inefficiency. If the noise is more than what you hear from a room fan, investigate. Since noise is an ongoing concern for gas power, I see occasionally that someone will write that we should "test props" to see how much propeller noise is a factor in the noise level. Hey, folks, electric fliers have been

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One of Al Weber's aerial shots, this one near the park where Al flies. His house is just to the right of the prop spinner.

The city of Ft. Lauderdale as seen by Al Weber's on-board camera. Text gives details on how Al does it.

Pompano Beach, Florida at sunrise. He's up pretty high!

Al and his plane, Pompano Beach, Florida.

Al's glider with a 9-cell 800mah pack to haul it up with a 3.8:1 Leisure gearbox and an RX540 Technituned motor. Prop is Al's own.

Simply Scale

BY STEVE GRAY

• For me the week of July 19 to 26 was spent in Arnprior, Ontario, a small town near Ottawa, the Capital City of Canada. Arnprior Airport was the site of the 1987 Canadian National Model Airplane Championships. The event was organized by Gerry Naden and his crew of volunteers who worked feverishly to insure the best possible conditions for good competition were in place. R/C Scale this year was well-attended and many interesting models showed up for the event. Four categories of competition were run. These were FAI Scale, Giant Scale, Canadian Stand-Off Scale, and Sport Scale. The first event was run using the FAI rules for International competition and doubled as the Canadian R/C Scale Team selection. The top three fliers in this event would represent Canada in the World Championships next year in Italy. The next event, Giant Scale, provided a competition for those aircraft too large to participate in the other events. Canadian Stand-Off Scale was the event with the largest entry and was the most closely contested. Sport Scale, a relatively new event at the NATS was set up to encourage the participation of anyone new to scale competition.

The competition was run over three days from Friday to Sunday. Friday's weather was acceptable except for the rather strong winds. Saturday's weather was perfect and was the best day of the competition. Sunday was a bit of a washout with high winds and a couple of heavy thunderstorms closing the activities early.

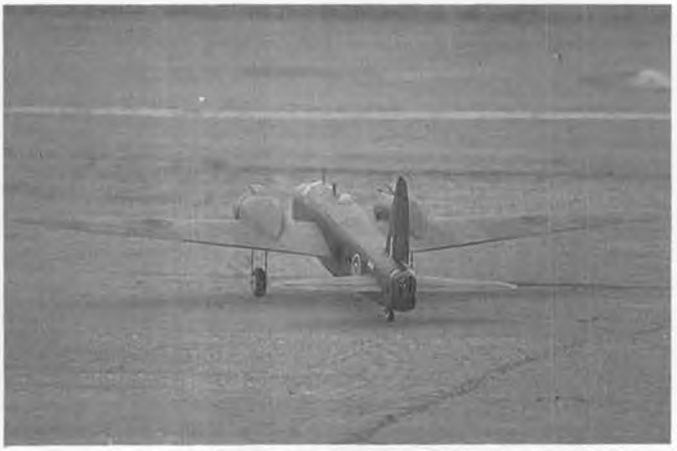
Some very notable flying was done during the competition by some strong competitors. Norm McLellan from Chatham, Ontario, had some truly stunning flights made with his Mick Reeves 1/6 Scale Hurricane. Norm's four-stroke-powered model had the sound, the speed, and the smoothness to earn himself a well-deserved place on the Canadian FAI Scale Team. His excellent flying was due to his experience in flying a proven model. The Hurricane has been flown by Norm for some time now and his familiarity with the model's flying characteristics showed. Another Hurricane done in the same colors and markings and in the same scale as Norm's was flown by Bill Oriss of London. Bill powered his model with a S.T. 2500 glow engine which had no trouble pulling the model along. Both Bill's and Norm's models had custom air-operated retractable landing gears with working Oleos manufactured for them by Charlie Mill's in Chatham. The Hurricanes were both documented by photos taken of one of the few full-size Hurricanes still flying. The subject aircraft is hangared at the Canadian Warplane Heritage Museum at Mount Hope, Ontario, and can be seen there on display except when they let it out for a romp with the clouds.

I can still remember the first time I saw this aircraft. I was attending an electric model fly-in last summer at Rockton, Ontario, just 20 miles from Mount Hope. The quiet whirring of our small electric models was interrupted by the unmistakable sound of a Merlin engine. As we looked around we could hardly believe the sight of a Hawker Hurricane in full battle dress skimming the tree tops to one end of our field. The pilot of the Hurricane treated us to two more low passes before disappearing. It was quite a surprising sight, and one which I recalled as I watched Norm and Bill fly their models so well at the NATS.

Another model at the Nats was notable as being a rarely modelled but impressive multi-engined project. Chris Gauntley from Kitchener, Ontario, entered his Vickers Wellington twin-engined bomber. The model simulated the geodetic structure that made the Wimpy so unique. The balsa wing was built conventionally with ribs and spars, but strips of wood were laid diagonally across the ribs to simulate the geo-

Kevin Jones and his Byron Pitts took second place in Giant Scale at the Canadian Nationals.

A great Bucker Jungmeister by Brian Perkins of Kingston earned for Brian a place on the Canadian Scale team.



Chris Gauntly flew this Vickers Wellington Bomber to a fourth place in FAI scale, with two Enya .46 four-strokers for power.

Sepp Ubilacher flew his super Supermarine Spitfire in stand-off scale.

Graham Ireland of Ottawa flew his Quadra-powered Tiger Moth built from his own kit. It has a reputation as a complete, accurate kit.

detic construction. Once covered, it was impossible to tell whether the geodetic pattern under the fabric was real or simulated. Two Enya .46 4C engines adequately powered the model and made a very realistic sound as it flew by. The model flew superbly during the competition, but problems with the electric retracts prevented Chris from doing anything but really great belly landings, a prototypical maneuver, but he forgot to call it. Too bad. The six-grit asphalt runway did great things to the belly of the model, but Chris had no trouble in quickly rejuvenating it for the next flight.

Another impressive model in a totally different category was Al Walker's big Lazer, powered by a great running Saito 270 on ignition. The big Saito powered the lightweight model effortlessly and had a sound all its own. The model was fast and quick and flew like the Lazer we all wished we owned.

Harry Bernard from Burlington, Ontario, won Giant Scale with his beautifully crafted Sig Cub. Harry powered his model with an O.S. 120 four-stroke engine which has proven to be a great match for the Sig kit. Harry's familiarity with the model showed as he had consistently good flights.

One of the most beautiful of the models entered in the Nats was Sepp Ubilacher's Supermarine Spitfire. Sepp is a master craftsman and his model showed it. The four-stroke-powered 1/6th scale scratch-built model was a good flyer, but Sepp's attention to making an accurate model created some problems. The Spitfire's small stab, long nose, and narrow setback landing gear makes it a difficult model to handle on the ground. The model likes to nose over and this tendency, together with some other minor problems, plagued Sepp at the Nats. I know this is just bad luck for Sepp because he has proven the model capable in the past. The last time I saw him fly the model in competition, he beat me.

What do you do with those Robart Scale Wheels to stiffen them up for heavier models? Well, I came across a handy trick for doing just that. As many of you know who have used the Robart Wheels, they are assembled with a two-piece hub and a hollow rubber tire. The tire contains no air pressure or filler and, as a result, can be a little flimsy and flatten out under the weight of a heavier model. They are, however, one of the best looking wheels on the market, so they are very desirable for use on scale models. A solution to stiffen up the wheels has been offered by the people at Robart, and that is to stuff them with a ring of foam to allow them to hold their shape better. I found just the thing to stuff them with in the local hobby store. Walk on over to the R/C car parts section and take a look at the Twinn-K brand foam tires. These can be found in many sizes suitable for stuffing into those Robart wheels. I have used these in a pair of 3-1/2-inch wheels for over two years now and have literally worn off most of the tread from my wheels without them failing. They also allow the model to track better without wobbling.

Just a few of the models waiting their turn at being judged at the Canadian Nationals.

Other tires are available from the R/C car parts section which may be used with scale models. Many different sizes and shapes of rubber tires (those without knobby spikes) can be used with Du-Bro or Robart two-piece hubs to simulate different shaped tires. Have a look next time you're in a well-stocked hobby shop and let your imagination run wild.

At a recent R/C Scale event I was prompted to think about what is happening to the modeler's perception of what Scale Competition is about vs. Scale Rallys or Fun-Flys. So many good scale modelers today who are more than capable of competing and winning in Scale Competitions refuse to enter them. I have heard many reasons stated as to why. Some do not want to be subject to the pressures of competition where structured rules and procedures dictate when and where they must be and

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The judges look over Ray Gareau's Norseman.

Al Walker's big Lazer with a Saito 270 on ignition.

RAMBLIN' AROUND AUSTRALIA

By STU RICHMOND. . .In this episode, Stu risks the wrath of his hosts by agreeing to fly in the Australian Nationals with a borrowed model. Lucky for us Americans, he didn't win(but he almost did!).

• Aviation has played a major roll in developing Australia, probably because their country is so large, spread out, and has so few people. In 1988 they're planning a major celebration for their 200th birthday, and aviation (including models) is to be a major theme of their Australian Bicentennial Airshow.

If you're active duty or retired US military, the following will really interest you. If you're just a modeler like me, you can turn green with envy as I'm doing.

The Australian government has endorsed a proposal submitted by the Model Airplane Association of Australia to stage a Model Expo during the celebration period. American scale modelers who can ride USAF resupply Operation Deepfreeze (active and retired military) flights to Richmond Royal Australian Air Force Base near Sydney, Australia, should quickly contact either Bob Carpenter or John Chadd, P.O. Box 216, Round Corner, NSW 2158 Australia. You may be invited!

The entire Bicentennial Airshow is to be staged October 12 through 16, 1988, and the model expo will be the first two days at their Hawksbury Agricultural College. What is planned is probably the largest International Aeromodeling Show in the world to date. The theme is Australian aviators and their aircraft. All the persons involved in the pageant will dress in appropriate costume to depict the era of the aircraft they are displaying; this will enhance the overall spectacle of the event. Pit areas will be provided for the individual model aircraft, and fliers/competitors will provide diorama and settings to display the model aircraft in proper keeping with the theme. At flight time the flier, model, and ground crew will be driven to the flight line by vintage cars in keeping with the theme. They plan a maximum of 50 participants/competitors, and it's planned that two or more models will always be in the air simultaneously. A public address system will keep the public informed of the proceedings, and background music will be played in keeping with the theme. The Model Airshow will be pre-planned and choreographed in the same manner as the public days of the main Australian Bicentennial Airshow. An R/C model is to be flown across Australia starting from Perth, and it will be planned to arrive at Richmond's Model Airshow on Wednesday, October 12. In addition, a model static display will occur in conjunction with the full-scale airshow.

Stu batted more than a couple of thousands with a borrowed glider.

Leo O'Reilly, left, and son Mike flew Stepp 3 gliders to 5th and 6th places, respectively.

Each time the horn sounded to start a round, seven gliders were launched into the air for an eight-minute max in a 11-minute 'window.'

1987 Australian Thermal Glider winners: Laurie Sherwood with BOT, 2nd; Conrad Gittens with Grand Esprit, 1st; Mal Pring with Balsa USA Nomad, 3rd.

David Meson was Contest Director. He also CD'd the Fifth World Glider Champs in '85 at same site.

Murray Scott, publisher of Australian R/C Modeler magazine, flies while teammate Rex Brown looks on, along with timer.

If I hadn't personally met and spent considerable time with the two chief planners of this program, I'd say it was too ambitious for modelers to pull off with success. But I know these two "earth movers," and I've seen them get things done. Now the Aussie Government has endorsed it, and I know the #1 and #2 model builders in the USA already have received invitations! Act now! And if you're planning an '88 vacation, the Australian Bicentennial Air Show is sure to be a *big one* worth attending. I've supplied the contact address; write for details.

Last month I left you just as I'd met "Plug Sparks" *MB* columnist, John Pond, in Waikerie, South Australia. We were to attend the Aussie's 40th Nationals. Australia is about the same size as the USA. Perth is about like where Los Angeles is; Melbourne is like where Tallahassee is; Sydney is about where Kitty Hawk, North Carolina, is; Brisbane is about like Richmond, Virginia. Their capital is Canberra in the middle of nowhere, about like our Savannah, Georgia; Adelaide is like New Orleans; and Waikerie is the fruit/wine district that's about 75 miles north of Adelaide. Where we have Idaho, Utah, Nebraska, Kentucky, the Carolinas, and the Dakotas, they've got *nothing* but open huge flying fields called "the outback.'

To further identify Waikerie, it's an agricultural town of about 4500 people, and it's the home of the tremendous full-size soaring/gliding school that, in 1985, hosted the Fifth World R/C Soaring Championships where the USA sent an FAI team of glider guiders who displayed the most unsportsmanlike competitive conduct that could be displayed to the world. Believe-you-me I heard plenty from the Aussies about that team. I had a lot of crap to cover up, and I had fun doing it. Seems the Aussies somehow found out that that USA glider team caused the AMA to incur several thousands of dollars in American legal fees too. Every time the subject came up I just bought more bottles of beer and asked them from Oz to teach me to smile and fly as good as they do. In the middle of one coverup attempt, a smiling Irishman from Oz named Leo O'Reilly asked me if I'd like to fly his reserve glider in the next day's thermal soaring event for R/C sailplanes, actually a two-day event. I was well-beered, plenty happy, and learning to smile like they do pretty well. I accepted Leo's kind offer with Leo's added words, "but have fun and fly well, Yank. But if you beat me and my son Mike, we'll talk that one over a bit seriously." Leo is one of Australia's "greats" in model building, and the kindness of his offer and prankiness of the warning offered in jest was accepted with a smile. *Hey, neat, I was gonna git to fly in the Australian Nats!*

Gldier transmitters show Australian variety. 90% fly on Mode 1, right stick forward as Stu flies.

Let me describe Leo O'Reilly to you. Leo is the president of the South Australia (one of their states) Model Aircraft Association and, as such, was the host for this 40th Nationals. The state that hosts their Nationals administrates the entire Nats and also takes the financial risks associated with running a Nats. It's quite a tall order! The Aussie Nats usually occurs over Christmas holidays, which is the middle of their *summer* (seasons are reversed down under) and is often unbearably hot. Leo's group decided to beat the summer heat by hosting the Nats at Easter, which was their prerogative. The Nats was smaller than average I'm told, but the weather for it was truly delightful, and the social/fun/smiling side of the contest

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Cyrul Muxlow performed constant frequency monitoring during the glider contest. Other frequencies were simultaneously in use about a mile away at the 1/2A and Quarter Midget Pylon Races.

Interesting photo of the mechanics of an Australian glider winch.

2646 Bolker Drive, Port Hueneme, California 93041 (805) 984-6639

• The 1987 SAM Champs at Seguin are now recorded in the Annals of Time. "Plug Sparks" will tell you of the wonderful job done by The Plainsmen, et al, and the two incredible performances of Mr. Bumbles at the cost of personal pain and aircraft damage. Chickums just allowed that august gentleman did take home some nice iron, which is more than I did! All I brought home was a sunburn and a basket of memories that I'll never forget and will enjoy forever.

I saw a number of the prewar members of the San Antonio Gas Model Association. These included Jimmy Summersett, Buddy Fraser, Russell Stokes, Charlie Barron, and Hilton Mollenhauer. I kept missing Ollie Pfiel by a hair throughout the meet and Russell's brother Clyde apparently didn't make it, nor did Jerry Heller, who was ill. Herb Fisher (Fish) of Bowden Trophy fame was not there, either. I would have enjoyed meeting these (and many others), but "ces't le Champes," as Sillie would say.

During my visit I stayed with Charlie Barron in San Antonio and forced him to buy the premier issue of *U.S. Boat & Ship Modeler* at the Alamo Book Store, which was a lot larger, but at the same locale as the store where I used to buy my used pulp magazines (G-8, Sky Fighters, etc.) for a nickel each. I also extracted a promise that he would subscribe to the magazine, but Charlie is not only as cheap as I, but he lies a lot, too. The evenings were spent at Charlie's favorite watering holes where, as a friend of Charlie's, I was made to feel at home. It is possible that these activities the evening before contributed to my poor performances on the flying field the day after!

Buddy Fraser had another suggestion. He said that the way my craft performed "If you would put a zipper on your mouth, not talk to everyone that walks up, and pay attention to the model, you could beat these guys!" What else could be expected from the sort of guy that would shoot a hole in the firewall of my '38 Ford Coupe?

That's not all, either. As I picked up my transmitter from the *loaded* table, someone said, "How is it that Fred hardly looks at the table while talking to someone, yet immediately selects the right one?" Bart Morris, the able Knight of the Tran Table, responded, "It's easy—he senses the dirtiest

Buddy Frazier at the '87 SAM Champs, held at Seguin, Texas, with his 1/2A Quaker Flash.

Charlie Barron and his Park Ranger sailplane, at the SAM Champs.

streamers and follows them down to the hardware!"

Still not all, at one of Charlie's Watering Holes I was quoting a Bit o' the Bard (which is an indication of a certain lubrication level), and I overheard Charlie say, "Alfred's mouth is motorized, y'know. . ." He ruined a precious piece of poetry.

Looking back at the Champs, I wish I had taken Paypod and spent my airtime photographing the gala thing from the air. With the camera shooting straight down at an altitude of 1,000 feet, the prints mosaic together quite well, using the middle 2/3 area of each print to maintain a pretty fair scale. If the camera is set to shoot directly out the right side, flying at 200 feet in a wide circle, a little right and up will bank the aircraft a bit so that a nice panoramic view centered about the direction the wingspan is pointing is obtained. Practice is required, of course, mainly to recall that these side shots must be made from straight flight or when in a right turn. A left turn will provide only a picture of the clouds!

Instrumentation for Paypod is steadily becoming more sophisticated! Originally, Paypod was a camera platform using the Ricoh XF-30. This is a good time to discuss camera requirements for airborne equipment and why this particular camera was selected for Paypod.

The first is price. It is a little foolish to risk the well-being of a two-, three-, or four-hundred dollar camera when a much lower priced camera will provide the same service. Modern, moderately priced cameras will produce as good a picture as the most expensive—it doesn't have all the features demanded by the advanced amateur or professional photographer, which are too numerous to mention. These features are not needed for our application and, in some cases, even undesirable. To conclude the discussion of price, the XF-30 is under $100.

The second is weight. The XF-30 is approximately 11 ounces, loaded. A number of similar cameras of other manufacture are as light, however.

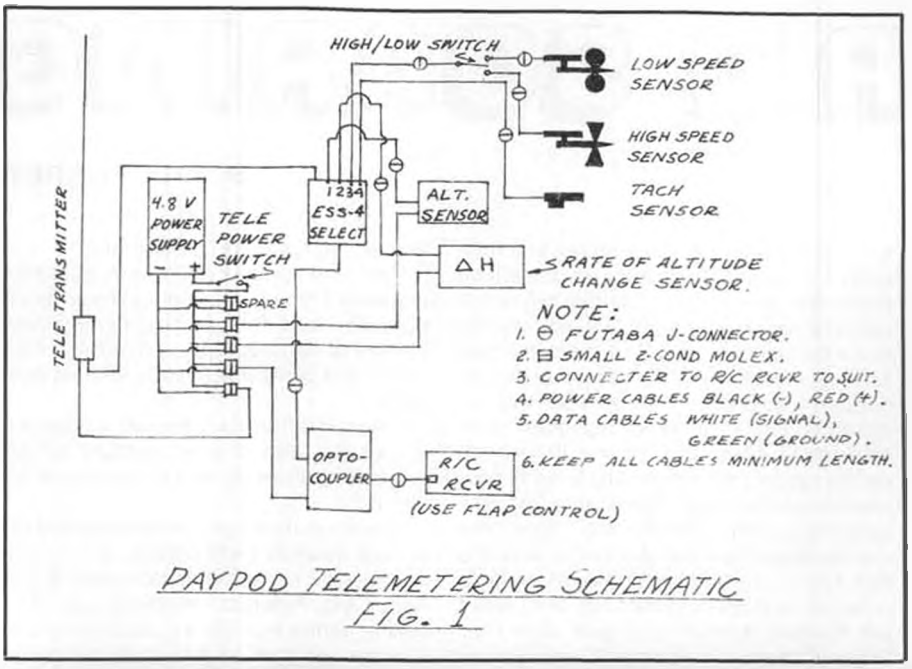
Almost a necessity is auto-cock and film advance. One frame per flight may require weeks to shoot a roll! Electric operation is far superior to spring powered, too.

Auto-focus is not only totally unnecessary but is undesirable in a lot of cases. A portion of the wheel and a smidgen of the wingtip is visible in side shots with Paypod.

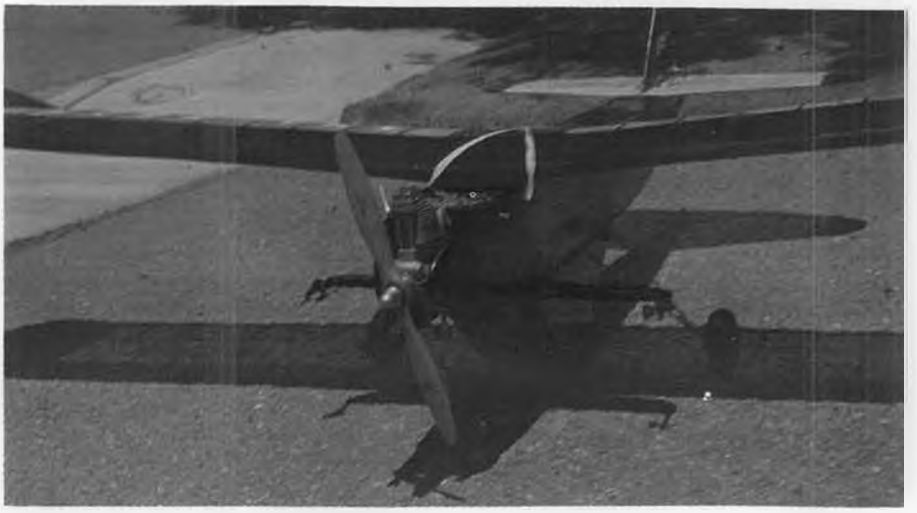
Auto focus would provide clear shots of one or both of these. The XF-30 has three manual settings—one with a picture of a mountain (infinity), one at eight feet, and one at three. Obviously, the infinity position will be used for all hosts. When opening the lens cover of the XF-50, the setting is automatically set at the intermediate (8 feet) position, for that position is the general focus for snapshots of your friends and relatives and will be the correct setting if the snapshotter forgets to set it. As an aerial photographer you must remember the Magic Mountain every time you open the lens cover. This caution may be applicable to other cameras, also.

It is recommended that exposure be automatic, also. The XF-30 also has a strobe that snaps out when there is not enough subject illumination. This can happen as a fluke or in checkout, so be sure there is enough clear space to allow this function. Also, be sure the light sensor has a clear view of the world about when designing your camera/servo module!

Incidentally, my servo is mounted on the ply chassis, not the camera. The camera is held to the chassis with a 1/4 - 28 RHMS. The chassis is of 3/16 ply and L-shaped. The back is the size of the camera back and the bottom (with a 1/4-inch hole for the retaining screw into the tripod socket) is the size of the camera base. Ply brackets hold the two pieces together. Use the absolute minimum of ply required. On the servo (I am talking Futaba) use the round black wheel and drill a hole near its edge to take the mounting screw for a 1/2-inch fender washer. The washer should extend about 1/8 inch past the wheel edge. Use several of these washers to insure contact with the shutter release button. Mount the servo to the ply chassis so that the washers will depress the shutter release, but will not "bottom it out." The wheel assembly should be such that the washer "bump" will be approximately in the center of the servo travel. On the six-function Futaba I use the retract switch for the camera. Each movement of this switch takes a picture. I have found that the servo time and camera take-cock-film movement time is something less than a second. You can rely on one frame per second! Of course, this will *eat* film, which is expensive development! However, for air-to-air shots, it is sometimes better to take three shots a second apart to insure success.



PAYPOD TELEMETERING SCHEMATIC
FIG. 1


Fred's payload-carrying Paypod. See text for details.

I mount this camera/servo chassis in a styrofoam box with an opening "flared-out" from the camera front and painted black with a non-foam-disolving enamel. The black rough foam makes an excellent sunshade for the lens. The box is square in cross-section with an edge equal to the fuselage width, which on Paypod is also the pod width. I cover the foam with posterboard and MonoKote. It fits into the pod (or fuselage) for either a side shot or a down shot. Make it a nice slide fit—you probably

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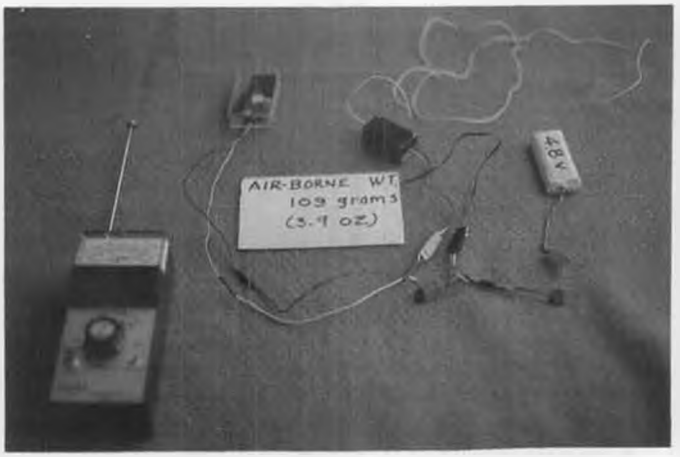
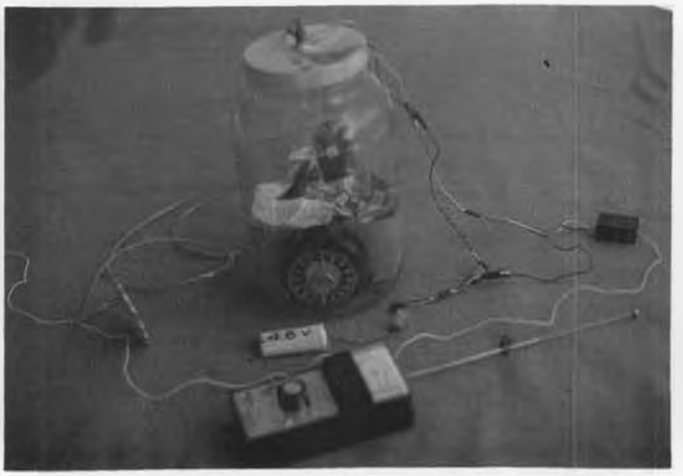


Device for measuring altitude from the Paypod; it was very accurate in tests. See text.


Condor's Digicon TT-01. Text gives details.

R/C SOARING

By BILL FORREY

• I sometimes think I'm working in a time warp; the cover date on this column will be December, but its being written while the calendar says it's summer! Is it any wonder that when someone calls me from the East and says something to the effect that my *last* column was good, I have to stop and ask myself which of the three "last ones" is he referring to. There was the one that's been on the newsstands for the last three or four weeks with the cover date that is just now agreeing with the calendar date, there is the one (perhaps) that has just come from the East Coast printers that I haven't seen in print yet, and there is the "last one" that I just finished submitting! E-gads, dare I say Merry Christmas or Happy Thanksgiving? Perhaps I should ask you how was your Labor Day weekend?

All seriousness aside, folks, I've got quite a few interesting tidbits of information for your armchair (or bedtime) enjoyment, most of which has come from you, kind readers, who have taken the time to let us all know about what's going on in your area. Thank you one and all.

NEW BOOK ON AERODYNAMICS

I have recently received a fantastic new book on the subject of aerodynamics and R/C sailplane design. Its title is *Aerodynamic Design of Radioguided Sailplanes*, or, if you speak Italian, *Progetto Aerodinamico di Alianti Radioguidati*. As you might guess, this book is written in two languages, or three if you consider the language of mathematics, graphs, and numbers, which is universal!

The letter which was sent ahead of the book and was written by its author does a very good job of explaining in a nutshell what the book is all about. It follows:

"Dear Sir, Let me introduce myself: I am an old Italian aeromodeler (I built my first model in 1934). I have been in your country 52 times; my friends include Frank Zaic, Walt Good, Le Gray (*Former* MB *R/C Soaring columnist—wrf*), Hewitt Phillips, Bill Bogart, Jim Gray, and many others.

"After a long career as an aeromechanical engineer, I retired last year and took the opportunity for writing a book, *Aerodynamic Design of Radioguided Sailplanes*, a copy of which is being sent to you under separate cover.

"The text is bilingual (English and Italian); it includes also a short glossary of aeromodeling terms, as well as a digest of 304 airfoils.

"Insofar as the book has been printed in a limited quantity (500 copies), it is mainly intended for the aeromodelers of the Italian Aero Club. American modelers can get it against remittance (to my address) of $48 (US) for sea mail or $53 (US) for airmail post.

"Prices include registered mail shipment (too many books go lost); personal account checks or postal money orders are equally welcome.

Text has info on new book on aerodynamics; it's the best I've seen!

"The book is intended for *non*-technical aeromodelers, therefore, it should be read from the very first page, without jumping from one chapter to another (at least at the beginning). Once you have seen the book, you will realize the reason for this

Bob Sliff with his Slingsby 53 at the 1987 AMA Nats.

Vintage gliders did very well at the Nats this year. Here's a good-looking Reiher sailplane.

Beautiful scale Minimoa seen at the '87 Nats.

Site of the Tri-Cities Scale Soaring Fun-Fly next May. Vertical rise of this slope is 1100 feet. Slope is three or four miles long here.

Bob Lawhead sloping his Blurr over Eagle Butte Vertical rise. Grassy landing area of 100 acres just visible behind pilot.

suggestion.

". . .Thanks a lot beforehand for all your attention and help. Best regards, Dr. Ing. Ferdinando Gale."

After reviewing this book for myself, I must say that I am thoroughly impressed by the work. It could be the most comprehensive source for design information yet produced. It is 288 pages long, an honest 9/16-inch thick, printed in two columns per page (left one English, right one Italian), and it has more graphs and formulas than I've ever seen in a single book. This is a book you will not outgrow; I personally guarantee it!

Chapter titles in this book are: "Elementary Aerodynamics," "Airfoil," "Wing," "Fuselage," "Empennages," "Complete Sailplane," "Longitudinal Static Stability," "Lateral Static Stability," "Maneuverability," "Tailless," "Canard," "Construction," "Examples and Problems," "Problem Solutions," and "Math and Physics Refresher." There is also a glossary of aeromodeling terms, an airfoil digest, and a bibliography. The airfoils in the listing are almost without exception ones which are useful in designing sailplanes: Epplers, Quabecks, Eiffels, Gottingens, Wortmanns, the Clark family of 'foils, NACAs, Boeing, Ritz, Benedek, Bame, and many more (304 total). Each one shows you what the 'foil looks like drawn to a three-inch chord, each one has a set of coordinates (NACA style, not Eppler style), and each one has a summary of data; thickness in percent of chord, percent of chord where maximum thickness occurs, mean camber in percent of chord, position of maximum mean camber in percent of chord, leading edge radius, angle of entry at leading edge, and angle of exit at trailing edge.

Wil Byers about to launch his Cisco design(a two-meter). This site has a rough, rock face but good LZ's on top and at bottom of hill. Surface is wild grasses and alfalfa. Thermal lift can be found when slope lift dies.

This book is a must for every *serious* aerodynamic student. It is written very much like a condensed textbook with absolutely no "fluff." If you are good at mathematics or physics and understanding such scientific (and seemingly abstract) principles that graphs depict, you should get the most from this work. If not, there is still plenty to learn. After all, the airfoils themselves are worth the investment.

The address to write to for obtaining a copy of this book is: Dr. Ing. Ferdinando Gale, Via Marconi, 10, 28042 Baveno, Italy. Telephone is 0323-22.089.

SCALE AT THE NATS

Bob Sliff has provided a few snapshots of just some of the scale entries which were present at this year's NATS in Lincoln. Evidently there were ten scale entries this time and half of those were "antique" designs (i.e., before the advent of molded fiberglass). In spite of high winds, the vintage gliders did very well placing as they did three of the top five.

The winners and almost-winners were: 1. Scott Dukes, 2. David Elias, 3. Jim Thomas, 4. Ed Whyte, 5. Rich Burnoski, 6. Bob Sliff, 7. Robert Elliott, 8. Donald Mulligan, 9. D.O. Darnell, and 10. Robert Cartwright.

AND SPEAKING OF SCALE SAILPLANES

If you enjoy scale R/C soaring and want to support its growth in the United States, then on May 27 to 29, 1988, you have an opportunity! I recently received a letter from Wil Byers of the Tri-City Soarers (TRICS) wherein he describes a very special fun-fly:

"Dear Bill, Attached is the Tri-City Soarers promotional brochure for the Mid-Columbia R.C. Scale Fun-Fly. We are attempting to

Roy Bunnell about to launch Wil's design, the E-Racer. If one sinks out of lift, landing is possible on grassy field 600 feet below.

Shot of Ron Hollenbeck walking back from landing zone. This is Eagle Butte, the secondary site for the TCSSFF. Wind is blowing at 30 mph.

put together a nationally recognized scale soaring event in order to further broaden the enthusiasm for this form of R/C Soaring. It is evident to us, and we feel many others, that this facet of soaring has gone unrecognized, even though it has broad appeal and participation.

"We are asking through this letter for your support. If you see fit to contribute, you will make a difference and be a part of something to come! European soaring enthusiasts have long enjoyed the thrill of organized R/C scale soaring, and it is just a matter of time before scale participation will move to the U.S. in a big way. The Tri-City Soarers currently has the firm endorsement of the AMA (through Byron Blakeslee) for this event, and will be receiving exposure from *Model Aviation* magazine and hopefully other soaring publications.

". . . I am committed to making this soaring event a tremendous success for all involved! Sincerely, Wil Byers, VP Tri-City Soarers."

The thing which may prove to be the most attractive to scale fliers is the flying site. The TRICS have two absolutely fantastic slope sites for this event which are very European in nature. They both overlook the Columbia River in southeastern Washington, and you are probably aware that this is the biggest river in the western half of the United States. If you have a map of the Pacific Northwest, you will find the three cities of Richland, Pasco, and Kennewick, Washington, about halfway between Yakima and Walla Walla. It is less than 49 miles north of US Interstate 80 which is the main highway linking Portland, Oregon; Boise, Idaho; Ogden, Utah; and much farther east, Cheyenne, Wyoming. It is also about 70 miles south of another major US Interstate, 90, which hits such cities as Seattle, Spokane, Coeur d'Alene, Missoula, and Billings in Montana. I say this just to let you know that the Tri-Cities guys are not as remote as you might first think.

The primary slope site has been the site of three major slope races in the Northwest since 1978. It is 1,100 feet high (!), 20 miles long, and the actual face that would be the fun-fly site is a whopping four miles long! It has a grassy face which if one lands below the top of the hill is not dangerous to descend. It has a large grassy area behind the slope for landing, which by-the-way is all kept mowed!

When the wind is really blowing their secondary site is a slope with "excellent" lift. It is only (only!) 600 feet high with 150 acres of wild, grassy area to land on at the top of the hill. There are rocks on the face of the hill, but these should not be a concern. There are usually two or three hang glider pilots flying in the area, and *they* don't seem to worry about the rocks!

AIRFOIL FILE NAME:- E374-8

Line #	Stn. %	Upper coord	Stn. %	Lower coord
1	0.46	0.382	0.01	-0.044
2	0.86	0.946	0.44	-0.382
3	2.00	1.560	1.43	-0.717
4	3.59	2.199	2.93	-1.018
5	5.61	2.837	4.95	-1.271
6	8.04	3.458	7.45	-1.476
7	10.86	4.045	10.43	-1.632
8	14.05	4.587	13.85	-1.743
9	17.58	5.072	17.67	-1.813
10	21.42	5.488	21.86	-1.846
11	25.51	5.827	26.37	-1.848
12	29.82	6.076	31.16	-1.824
13	34.31	6.221	36.16	-1.779
14	38.94	6.243	41.32	-1.721
15	43.68	6.147	46.58	-1.651
16	48.51	5.925	51.88	-1.573
17	53.40	5.587	57.15	-1.486
18	58.31	5.149	62.34	-1.385
19	63.21	4.639	67.38	-1.264
20	68.05	4.096	72.24	-1.115
21	72.77	3.544	76.87	-0.947
22	77.29	3.003	81.23	-0.767
23	81.56	2.486	85.25	-0.595
24	85.51	2.007	88.89	-0.439
25	89.08	1.572	92.08	-0.303
26	92.21	1.190	94.78	-0.183
27	94.86	0.860	96.96	-0.072
28	98.61	0.334	98.59	-0.026
29	100.00	0.173	100.00	0.027

Max. Thickness..... 8.0% at 34% chord
Maximum Camber..... 2.3% at 39% chord

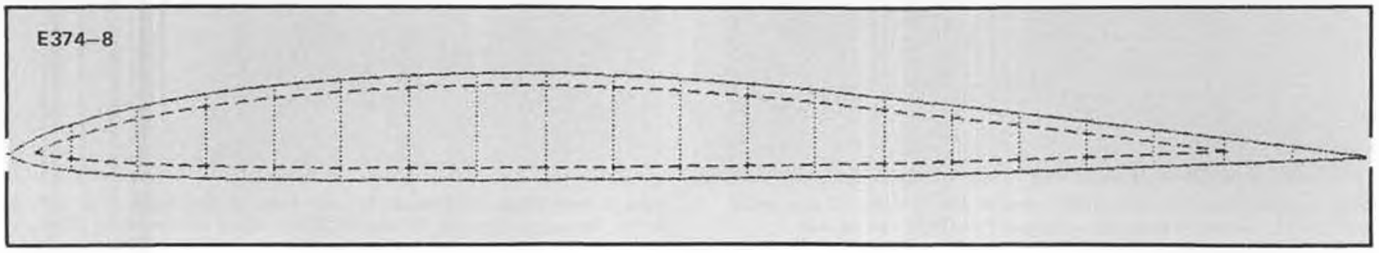
Cygnet Software PC program generated these coordinates.

Wil says that there is already much interest in this fun-fly. Guys are coming from as far away as Hawaii to attend. In the past when this club has hosted fun-flys there have been as many pilots as 45 show up with as many as 100 gliders.

This time there will be a banquet with well-known soaring speakers, a raffle with support coming from such companies as Wilshire Models, Viking Models, and JR Propo (a couple of PCM radios!), which I believe is courtesy of Circus Hobbies. Rainier Brewing Company is also kicking in financially to help support the event (does this mean beer too?).

Wil has promised to look for a photo or two of the sites to help you make up your mind to come to this event, and the following list of interesting things to do may help you decide to vacation in the area with your family. The area supports such activities as golf with seven championship quality courses in the surrounding communities, windsurfing (both rental and lessons) with plenty of wind and water including the Columbia and Hood Rivers, water skiing (naturally), Wet 'n' Wild Water Slide Park for the kids, camping, backpacking, fishing, wine tours, river rides and tours, shopping, and historical sites. The hotel which will serve as HQ for the event is top-quality and overlooks the Columbia River (very scenic): The Clover Island Inn, 435 Clover Island, Kennewick, Washington 99336; (509)586-0541 or (800)833-1800. This hotel has given attendees a very special double-occupancy rate of $35 per night ($30 per single). They have a pool, sauna, and a restaurant.

Since this isn't a contest, but a fun-fly, you could borrow a scale glider and attend,



Paul Smith's Oly II with a gland problem; span is 160 inches!

Marilyn Border and Rich Border's flying wing. Doesn't thermal so well, but should be an excellent slope ship.

Paul Smith's highly modified Goldberg Electra. Details on construction in text.

Neat trap door idea with vent for cool air to exit just behind.

Marilyn Border and HER 2-meter competition ship, Manic Monday.

Paul Smith's modified Goldberg Electra, Paul's Thing, uses Astro Flight on/off control

there is no builder of the model rule here! If this interests you contact Wil Byers at 632 Meadows Drive East, Richland, Washington 99352, or call him at (509)627-5224. Bring your scale glider or power scale slope plane and attend, it will be lots of fun. I might even be there if I can swing the vacation time!

PROUD HUSBAND'S CONTRIBUTION

It has been a few months since I received Rich Border's letter which you are about to share with me. I put off running it for a couple of reasons, none of which seem that important now, but after reading it again I think I may have read a little between the lines. Read it for yourself and see if you can pick up on the love and pride Rich has for his wife Marilyn (and, oh, yes, for the model too!):

"Dear Bill, I thought this might be of interest.

"The lady (in the photo) is my wife, Marilyn Border. She is the first woman to advance to the ESL's Expert Class. She's been flying for two years and is LSF Level III, needing only a 2K and four hours for Level IV. Marilyn has won Sportsman Class at Valley Forge and CASA, the two biggest contests on the East Coast.

"Marilyn is holding a flying wing that I designed and built. The specs are: 72-inch span, 17-inch root, 12.5-inch tip, three pounds flying weight, a Bill Evans airfoil (modified to have a sharper TE), and the wing area is 1,080 square inches. It flies well, but I think it will be a better slope ship than a thermaler. Rich Border."

Judging by the smile on Marilyn's face and the fact that it looks cold and miserable out there in the snow, she didn't just go out there because Rich asked her to. She must have wanted to go, and I think Rich might just have a subconscious desire to crow a bit about that fact. He is a lucky guy to be able to share his hobby with his wife and best friend. Know any couples like that?

I'd like to meet those two some day.

MIRAGE AIRFOIL PER THE COMPUTER

Rich also sent the following letter a couple of months later. It is pretty much self-explanatory so here goes:

"Dear Bill: I was going through my back issues of *Model Builder* to get coordinates for the S4061 and found that and the Mirage's airfoil in the April '86 issue. I had never entered coordinates using what is termed type 2 coordinates in my Chuck Andersen airfoil program, so I put the Mirage's in. Boy did I get a dumb looking airfoil, just like the one you showed as the Mirage airfoil the month before. I assume you have the same program. After playing around with the coordinates I got an airfoil that matches the one in the magazine. The program needed more stations in leading edge. You listed station 100 YU in your column as 0, and in the box accompanying the airfoil as 0.3, I used 0.3.

"Keep up the great columns, I really like the high tech stuff and planes. Good lift, Rich Border."

Rich included a print out of the coor-

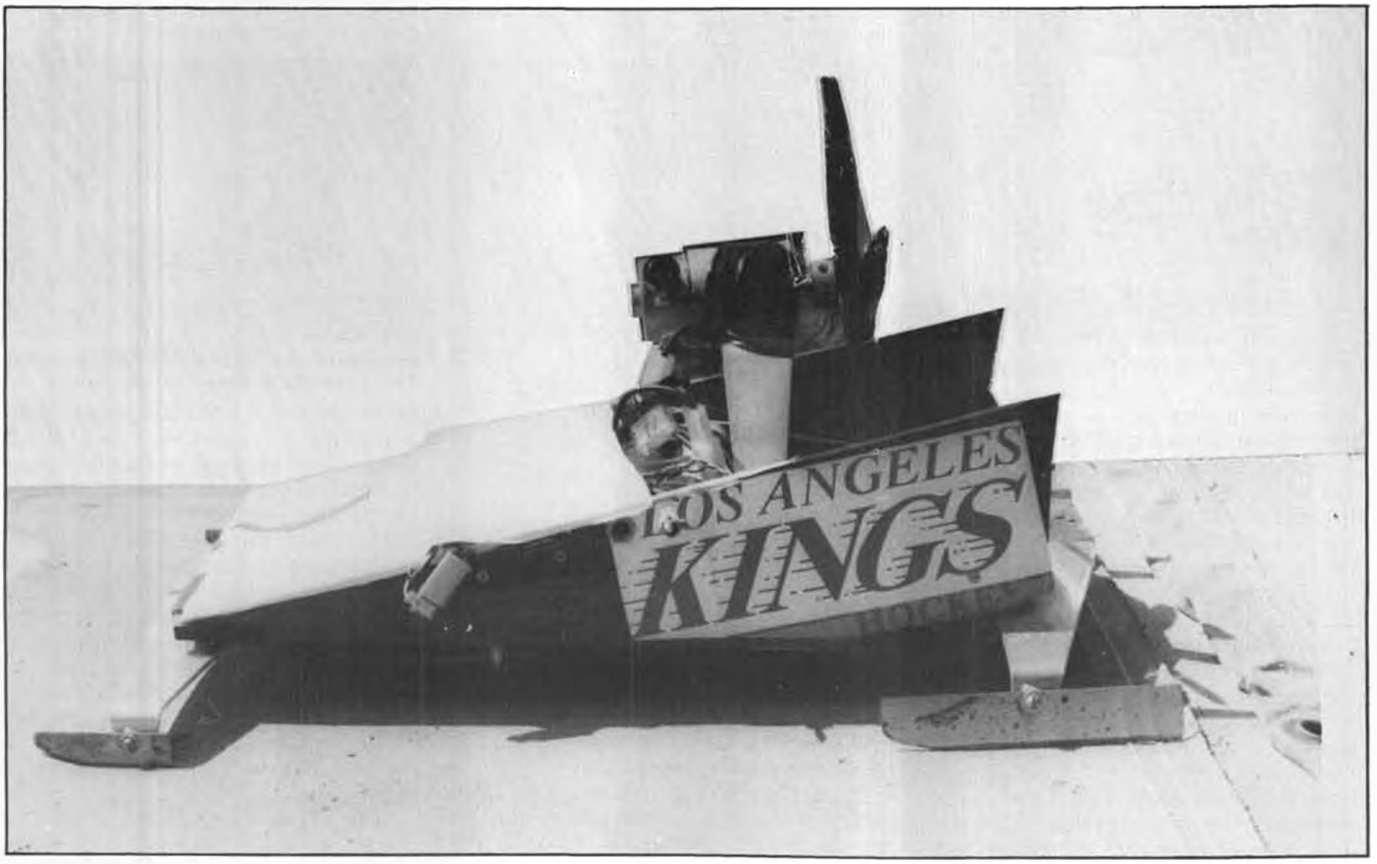
Continued on page 74

MIRAGE AIRFOIL: 6.875-inch chord

NO	X	YU	YL
1	0.000	0.000	0.000
2	1.250	2.050	-1.250
3	2.500	2.950	-1.600
4	5.000	4.450	-2.100
5	10.000	6.600	-2.500
6	15.000	7.900	-2.750
7	20.000	8.750	-2.950
8	30.000	9.250	-3.050
9	40.000	8.800	-2.900
10	50.000	7.725	-2.800
11	60.000	6.250	-2.300
12	70.000	4.725	-1.800
13	80.000	3.250	-1.300
14	90.000	1.750	-0.800
15	100.000	0.300	-0.300

R/C ICE RACER

By HOWARD LAZERSON. . .The author, team ophthalmologist for the L.A. Kings hockey team, has ample time to play on the ice. Combine this with his modeling experience, and you have the R/C Ice Racer!



• I spend a fair amount of time at hockey rinks since, as the L.A. Kings ophthalmologist, I attend all the home games plus I play amateur hockey twice a week at their practice rink.

The big ice surface has always intrigued me, so I decided to try to build an ice vehicle, and the Electric Ice Racer is the result.

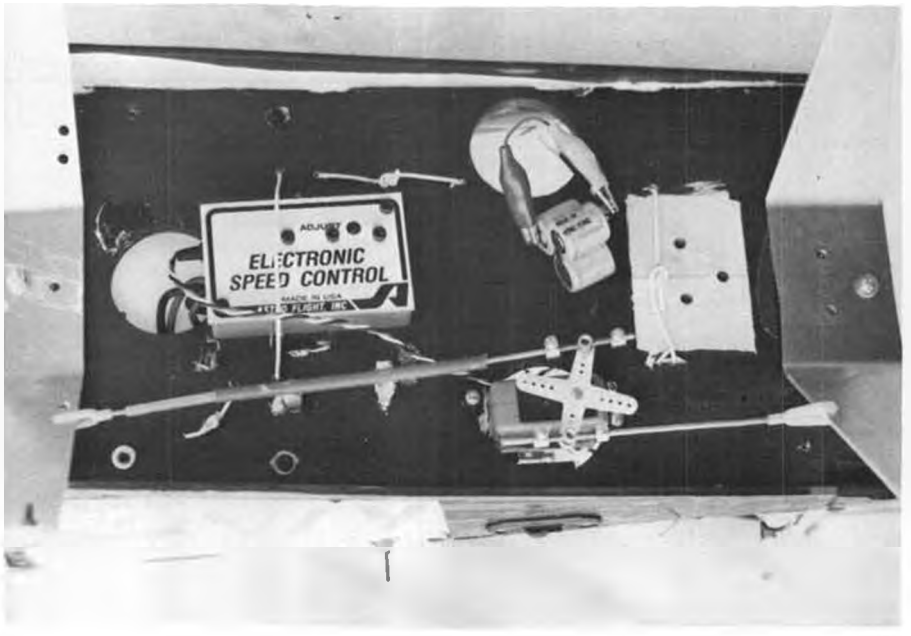
Since the testing was to take place on indoor rinks, I needed a non-polluting and quiet power source, which was no problem as I fly electric-powered airplanes.

I took a piece of 1/4-inch plywood, mounted a 05 motor as a pusher, an aluminum landing gear up front, and a single nose gear in the rear for steering. This was directly connected to the servo using ball linkages. I made the runners out of aluminum shelf brackets, added a radio, and started testing.

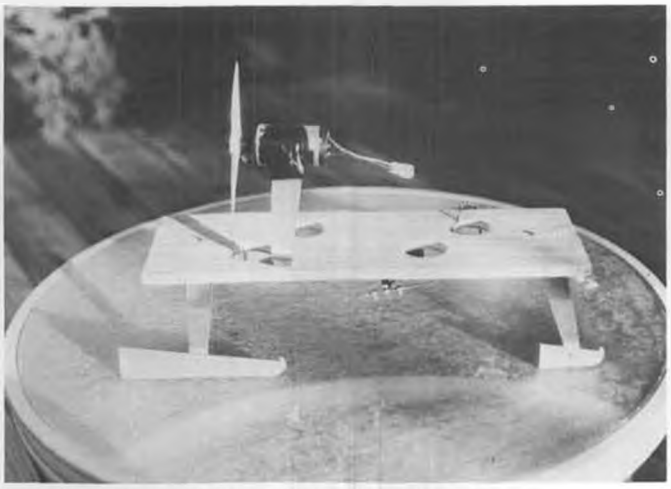
I immediately ran into problems literally and figuratively! The machine was fast, and that was good; however, it turned poorly, would spin out, and would frequently flip over. I was becoming an expert on straightening bent prop shafts.

The first cure was to replace the rear single runner gear with a conventional gear and two blades. Next the aluminum runners were replaced with steel blades filed to a sharp edge. The CG was then lowered by simply rebending the gear. The steering was reconnected to the front gear (I also tried both gear—four-blade steering, but this proved unnecessary), and finally I redistributed the weight so approximately 50 percent was carried by the front and rear runners.

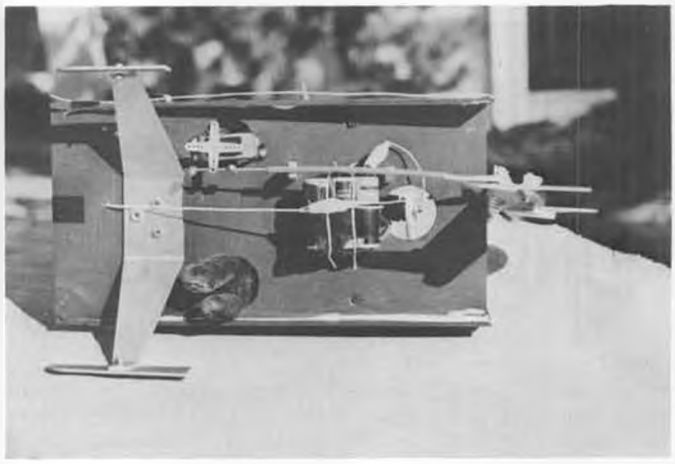
Now I had something! The racer tracked



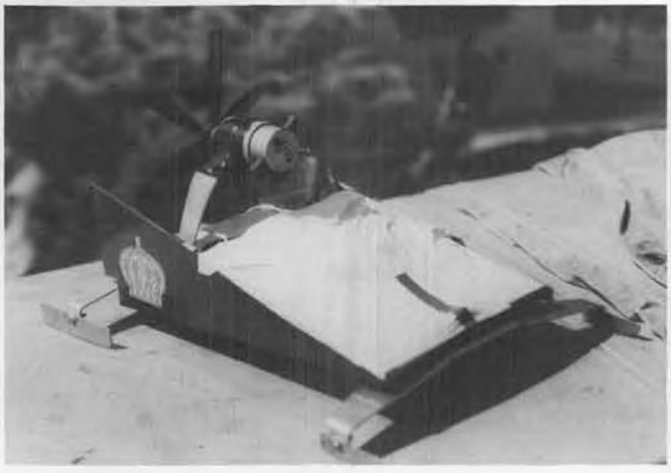
Bottom-side view of the racer. It has 4-runner direct drive steering. A small battery pack drives a servo-operated siren and LEDs. It was later modified to front-axle steering only.



An early prototype. Note shelf bracket blades!



Original design with rear runner steering; it proved to be unstable in high-speed turns.



The final design, with lowered CG. Note six-bladed prop; it was later discarded in favor of Cox Grey 7x3.5.

Final design Ice Racer; note lowered CG.

straight and true, would not flip, and could race around the rink curvature without constantly spinning out. I went through my entire inventory of propellers, including several large three-bladed props cut down for clearance plus various combinations of two props on the one motor. The best propeller on several motor combinations, Astro plain bearing 05, cobalt 035, and cobalt 050, turned out to be the Cox 7 by 3-1/2 gray running on 6 cells. This particular prop also happens to be excellent in electric airplanes as electric fliers well know.

Construction was simply a matter of using standard hobby materials and trying to keep things simple. I'm sure you can see better or more elegant ways to achieve the same result. I kept the racer small since I was running on a small ice surface, but if you have access to a frozen pond or lake, the only size limit would be governed by the size of the motor (or motors). You could even go to gas (yuck!) engines, but don't forget that muffler, please. I even tried a fanjet unit using my Cobalt 25, but it was much too fast in a small hockey rink.

My chassis consisted of a 1/4-inch ply board with large lightening holes. I added 1/16-inch ply fins for "style" and attached the radio and electronic throttle with servo tape. I added a piece of Monokote on top for streamlining and made a motor mount out of a bent landing gear. The electric motor was secured with plastic tape which works quite well in the airplanes also.

There is no limit to what you might come up with, a streamlined foam or fiberglass shell would do for starters. Just keep the CG low and watch the weight distribution.

I think this would make an interesting winter R/C diversion. Put a few pylons on the lake and have some mini races with your friends. Don't forget to use a surface frequency and rig up a prop safety shroud to prevent prop bite.

If you build a racer, I would be interested in receiving any comments or pictures.

Howard E. Lazerson, M.D., 8540 S. Sepulveda Blvd., #1115, Los Angeles, California 90045. •

The author with an early design during ice testing at the local rink.

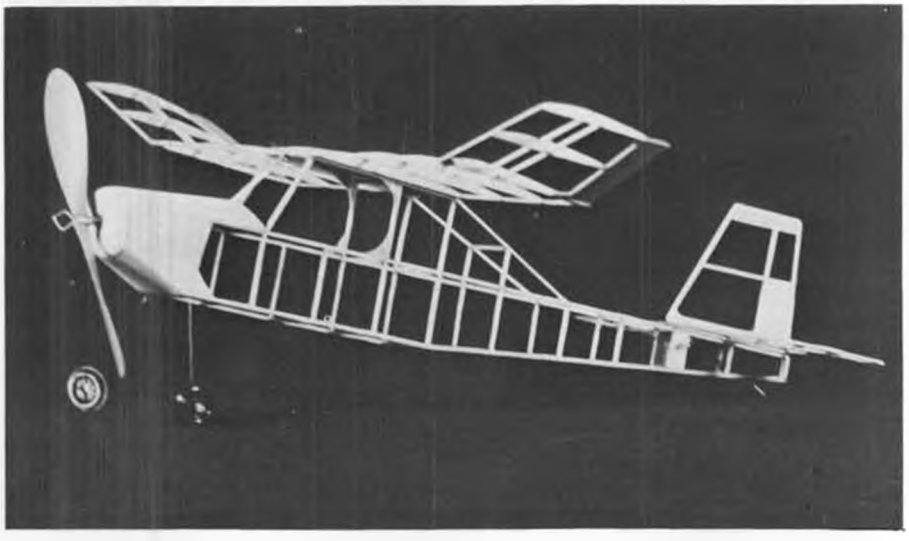
the INSIDERS

INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM

• Yes, we know that "The Insiders" is an indoor column, but a lot of you readers also fly outdoor Free Flight (and R/C and Ukie too, as well) so we don't mind devoting the lead item this month to that Prince of Wakefield fliers, Mr. Robert P. White of Monrovia, California. We are pleased as punch to announce that, after decades of trying to win the Wakefield Cup, Bob White is the 1987 Wakefield World Champ. He had the most popular win ever, making the flyoff with seven maxes and a 5-1/2-minute flight in the 7-minute round. Bob got a standing ovation from the crowd of spectators and fliers watching the flyoff at the Champs in Thoates, France, last August.

NASA engineer/AMA fellow Hewitt Phillips of Virginia admires his second place Proper Bostonian model. It flew to top of 116-foot ceiling!



New from Peck-Polymers, this 16-inch span Bostonian Pup features movable controls for easy flight adjustments. Qualifies for Bostonian contests, but should be built light for indoor use.

Minute Farman Monitor III built by Bill Hannan for Belgian Proxy Postal. A pound of pistachios are in the bag!

Bob will go down in modeling history as more memorable than Dick Korda, perhaps because he has tried so hard for so long—he has won a place on more USA teams than any other competitor. We recall that he was on the 1971 and 1973 FAI FF teams, when we served as Team Manger for the WC in Sweden and Austria. His 1987 winning model is an evolution of the ship he had then, modified to be a tough competition machine under any flying conditions. In honor or his many friends from France, including Pierre Chaussebourg of Venours, he long ago christened the design "Vol Libre" (French for Free Flight). While Bob is quite an extraordinary fellow, the model is ordinary. It follows the KISS principle of design, with no gadgets whatsoever (except a folder prop, but then the 1939 Korda had one of those) but pleasing lines. In this age of Hi-Tech, Bob eschews such gadgetry as Vari-Pitch Prop, Delayed Prop Release, Auto-Rudder, Variable Incidence Tail, etc. He does, however, believe in good rubber.

Bob was not alone, of course, on the team. Jim Quinn and George Xenakis also did well, bringing the USA Wake Team to fifth place—not at all shabby considering the World Class competition. The "Superpowers" took it all at this meet, with Russians winning both Nordic Glider and FAI Power. Eugene Verbitsky from Kharkov won the latter for the second time, also a popular win. He is as well-known as White in International aeromodeling.

We know modelers around the world will join us in hoisting a champagne glass (he drank his out of the venerable Wakefield Cup at the WC) to Bob White, the man who was always the bridesmaid—and is now World Champion F1B Wakefield. Bob, keep that lovely pot polished while it rests a while in California. We want to see it when we visit in January.

OBSCURE AIRCRAFT

Way back in the sixties (remember those halcyon days?) we had the opportunity to at-

Miami's Mike Arak love the 1921 Alco Sport, seen here in 8-inch span Pistachio, and 13-inch Peanut. Next in AMA size 24-inch span.

Tireless scale judges Tony Becker, Ray LeFrancois, and George Leffler award top points to Canadian Bill Henderson's 1907 Bleriot VII Peanut.

tend an AMA Nationals at Los Alamitos Naval Air Station near Los Angeles. While this was exactly twenty years ago as this is being written, we recall being introduced to two memorable items: Obscure Aircraft and the Sugar Shack. You will have to ask *MB* F/F columnist Bob Stalick about the latter, but we will tell you that Bill Hannan had a hangar full of the former.

In those days, an Obscure Aircraft was one of the birds that Bill chose for his plans service. With a beautifully illustrated mail order catalog, he lured many of the scale fliers to try offbeat designs. These days, with "Fikes" and "Laceys" still winning a lot of meets, we are going to try to encourage you scale buffs to try something different. While we don't run a plans service (Bill's wife Joan does, however—send her a buck for a catalog of real goodies. Write Hannan's Runway, P.O. Box A, Escondido, California 92025), we will try to point out where you can get plans or scale data for some unusual flying machines.

Our subject this month is the 1912 "Drzewiecki" Polish canard, as modeled by Benno Sabel of Germany and Dr. John B. Martin Jr. of Miami, Florida. Illustrated in our lead photo this month is Doc's AMA Scale version, sitting atop the Benno Sabel plans. You will need two pairs of Fulton Hungerford wheels to get this canard off the ground and lots of thread for bracing—but when you are done you will have an indoor flying scale model that is one of a kind. Wow the other members of your club or your competitors at contests with this unusual and fine flying Obscure Aircraft from the dawn of aviation. Pioneer aircraft like this make great flyers—and canards are stall proof.

For a set of plans (blue line diazo print and scale three-view) to the AMA size that Doc built for the US Indoor Champs, send cash or check for $2 and a SASE (large, with 39-cent USA stamp) to: Obscure Aircraft c/o Dave Linstrum, 4057 San Luis Drive, Sarasota, Florida 33580. This offer is good only in the USA and Canada. It expires January 30, 1988. We hope you will enjoy this encounter with a truly obscure full-scale flyer. Next month, we will feature a neat home-built Peanut, the Tefft Molecule from Chicago.

FARMAN FLIES TO BELGIUM

While that may not have been a big deal in the early days of aviation, when Henri Farman flew all around France and the surrounding countries, it was quite something when one flew from California last summer! Actually, the "Farman" was the Pistachio Scale version (see photo) built by Obscure Aircrafter Bill Hannan for the Flemalle, Belgium Pro?

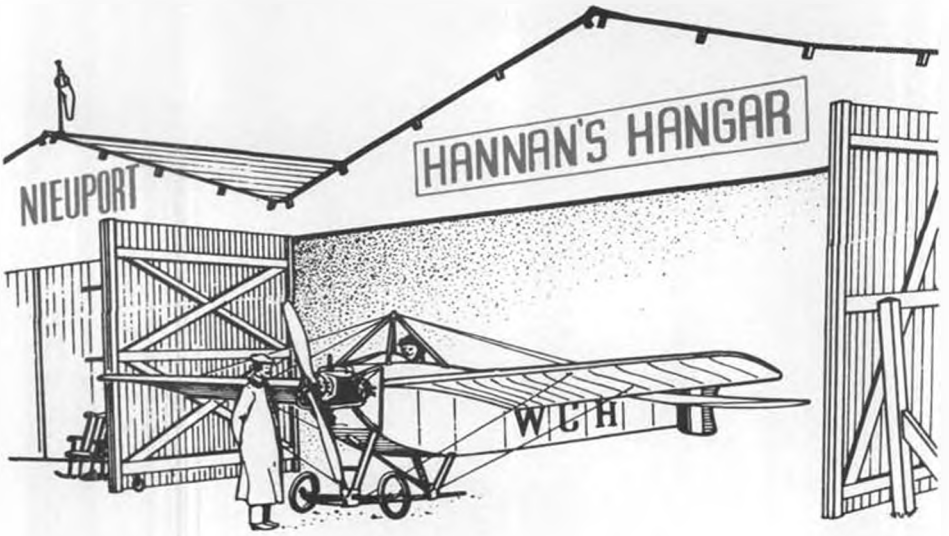
Bill photographed his model according to techniques discussed in his latest book, *Peanuts and Pistachios*. Note the bag of nuts next to it. A full pound of pistachios—the edible ones, not the flying kind! If you want some unusual subjects for eight-inch Pistachio building, send for the book at Hannan's Runway—address given earlier.

PECK'S BOSTON PUP

No, this is not a new breed of terrier or a new mixed drink popular at Harvard. It is the brainchild of prolific Bob Peck of the San Diego Orbiteers and Peck Polymers. Bob has been producing, with his wife Sandy, a terrific line of sport and contest model kits and supplies. See the ad in this *MB* for info on ordering your own catalog,

Continued on page 68

MIAMA club president Doc Martin tests his Canard AMA scale Polish Drzewiecki 1912. Plans are available for this obscure aircraft.



"Life is short, but art is long."

• Our lead-in line, by Johann Wolfgang von Goethe, appeared in *The Journal of the Madison, Wisconsin, Plastic Modelers Society*. Editor Bill Feeny intended it as a tribute to the late Pete Westburg, renowned for his meticulously-detailed scale drawings.

We feel the quotation equally applicable to Paul Matt, another great aero illustrator, who recently passed away. Paul's *Historical Aviation Albums* are respected worldwide, and he had published the 18th in his series only a few months ago. Matt was also a builder of museum models, and his illustrations have appeared in foreign as well as US books and periodicals.

Ironically, Paul's wife died only a week after he did. On the dedication page of his most recent book is this line: "I am forever indebted to my wife Joan who, after these many years of frustration and uncertainties, remains my staunch partner."

Paul Matt's art will remain a fitting memorial to a lifetime of dedication to model building and aviation.

SEATTLE MUSEUM OF FLIGHT

The new Great Gallery of the Boeing Field Museum was opened during July, and already ranks as a major tourist attraction in Washington state.

Among the featured aircraft are a 1929 Boeing trimotor (now fully restored after being salvaged from an Alaskan garbage dump), a Douglas DC-3, a Boeing B-17, Edgar Bergen's Fairchild 24, Molt Taylor's Aerocar III and more. Thanks to Florence Bakken and Pat Jupiter for sharing this news.

COMMON COMPLAINT

"My reference material occupies more space than I have!" So said Dusty Carter, former American Aviation Historical Society president.

HIGHFLYING POSTAGE STAMP

Perhaps the best-known blunder in the history of air mail stamps was the accidental printing of a Curtiss Jenny upside-down. Apparently only 100 were sold before the error was discovered, however 96 are still known to exist and are much sought-after collector's items. One such stamp was sold at a recent New York auction and brought an astounding $143,000!

EARLIEST MODELER?

According to the 1931 book *The World in the Air*, compiled by Francis Miller, Lu Pan, called the "Mechanician of Lu," during the time of Confucius (550 B.C.), was said to have made a "magpie from bamboo and wood, which he caused to fly."

ULTIMATE RACER?

Many of us think of racing planes in terms of such winners as the Gee Bees, Wedells, Caudrons, and modified Mustangs. However, it would appear that the General Dynamics' B-58 Hustler may be the holder of the most speed titles: Between 1961 and 1963 the delta-winged machine won the Thompson Trophy, the Louis Bleriot Trophy (offered some 30 years earlier!), the Mackay Trophy (won twice), the Harmon Trophy, and the Bendix Trophy. All of those in addition to various point-to-point and closed-circuit records. Our thanks to Dick Padg-

Taku Hamada of Japan constructed this D.H. Hummingbird Peanut. Identity of the strange pilot is unknown.

Bill Warner's beautiful diesel-powered free flight scale Stinson, winner of the 1987 Taft Championships, displayed by Phyllis Warner.

Doc Martin, resting from his usual Pistachio models, produced this Polish Drzewiecki canard, a fine flyer.

ham, of Texas, for this information.

SIMPLE MODELS SURVIVE

While some model aircraft continue to grow in size and complexity, the humble Paul K. Guillow slide-together, ready-to-fly gliders and r.o.g.s continue to sell to the tune of *six million per year,* according to clippings shared with us by John Walker. Perhaps, as Mark Fineman suggests, we may need more *simple* models rather than super-scale super-detailed masterpieces.

MOTIVES OF MODELERS

Al Lidberg opines: "My list of models to build keeps growing, even though many of them end up as No-Cals (profile models) which may be not 'fair,' but they are quick to build. When you take the trouble to build a subject anywhere near 'right' or complete, it takes so darn long. Looking through the someday-I-gotta-build-the pile of three-view drawings; a new project has to be started, and I feel better. . . ."

Herb Kelly also prefers the simpler approach: "The secret of a good life is to stay constantly interested in doing things. I think I enjoy working at the drawing board more than building the models. To me it goes much faster, especially if one wants a detailed scale model down to the last nut and bolt. I built one model that way, and it took just about the same time as it would have for a full-size job!"

WHAT'S IN A NAME?

Canadair Limited and Texas Industries have agreed to collaborate on a rotating-wing remotely piloted vehicle which is known as the "Peanut" because of its shape and size. The *official* name is "Sentinel"—not likely to be as well-remembered as Peanut. . . .

PEANUTS IN DENMARK

During the Danish Nationals, the Peanut Scale event, coordinated by Jorgan Korsgaard, attracted 19 entries, with the youngest contestant being 13 years old and the eldest 55. According to Jorgan: "Flight times were not impressive, but we had a very nice and exciting time." And that's the general idea!

BAG-O-NUTS #6

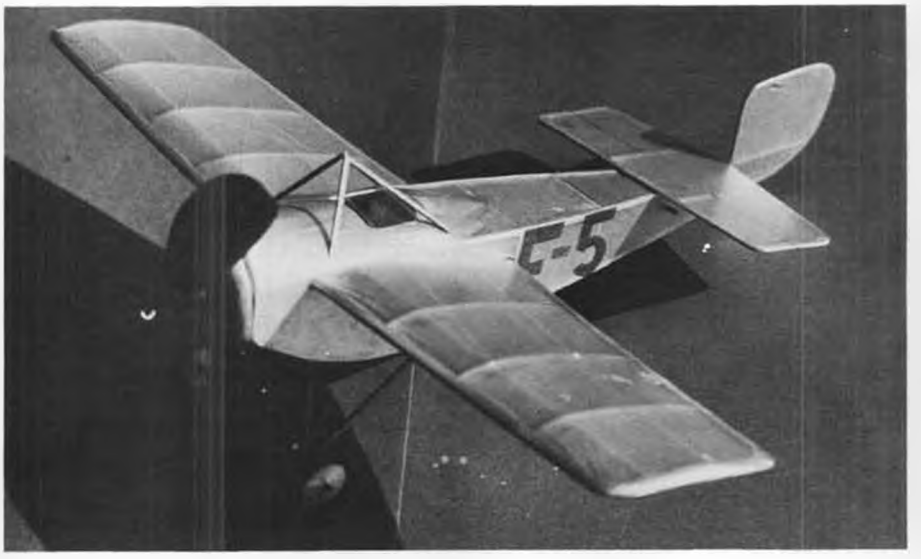
New from Walt Mooney is an assortment of 36 plans for only $5! These are favorite Mooney designs reduced to Pistachio size (eight-inch wing span), which offer the chance to try your hand at building sub-Peanuts and a choice among a splendid variety of types. See Walt's advert elsewhere in this issue for address.

Delightful 'Bostoncoupe' Bostonian model by Brent Saulsbury of Texas. Photo: Larry Kruse.

THE JAPANESE POSTAL PEANUT PROPOSITION

Thanks to Ichiro Yamada, we have seen a video taping of the static-scale judging and a taste of the flying of the Second Peanut International contest of Japan. The turnout was excellent with nearly 100 models, and entries from England, France, Czechos-

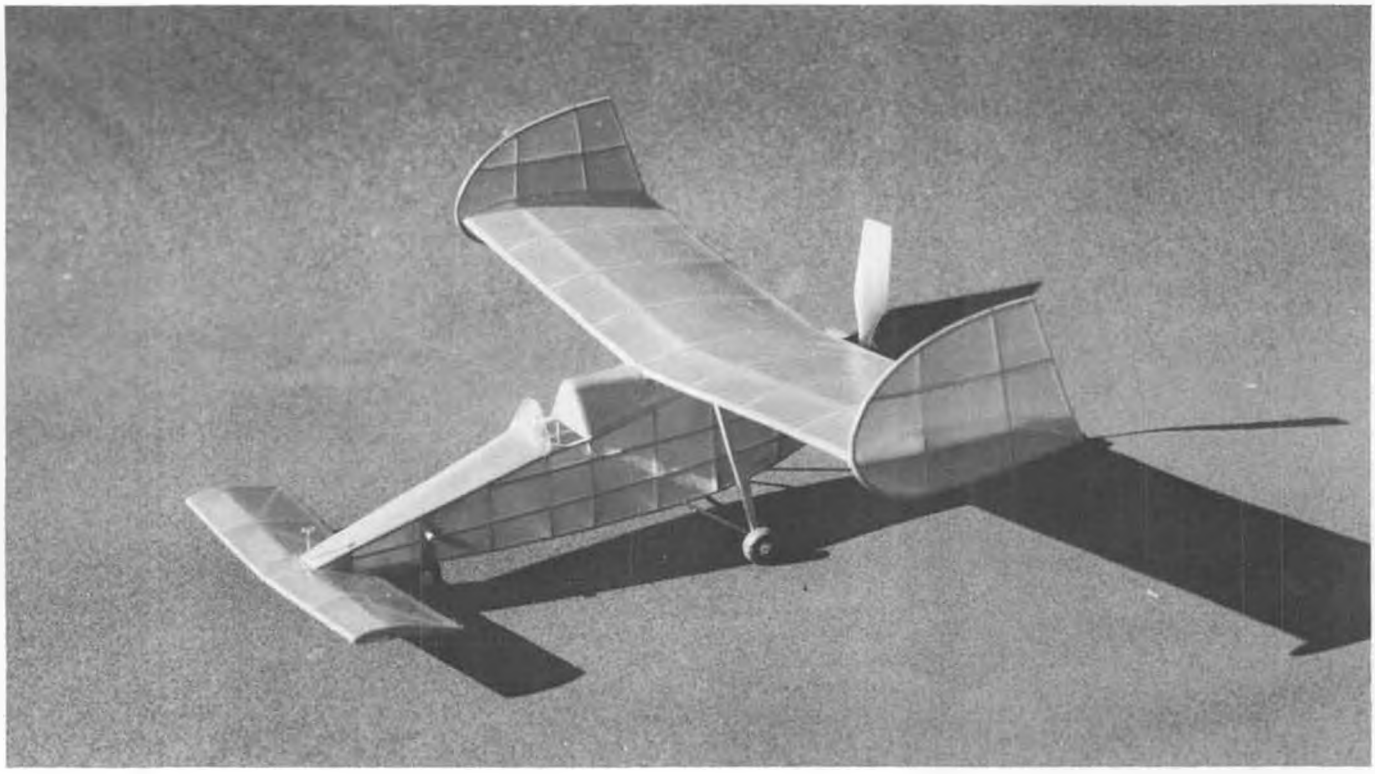
Continued on page 76



One of the first Pistachio Scale models to be constructed in Czechoslovakia is this Ponnier racer, by Lubomir Koutny.

Lubomir Koutny's Sopwith floatplane peanut shown on judging table during Czech contest. It's an exceptional flyer. Photo: Pavel Jelinek.

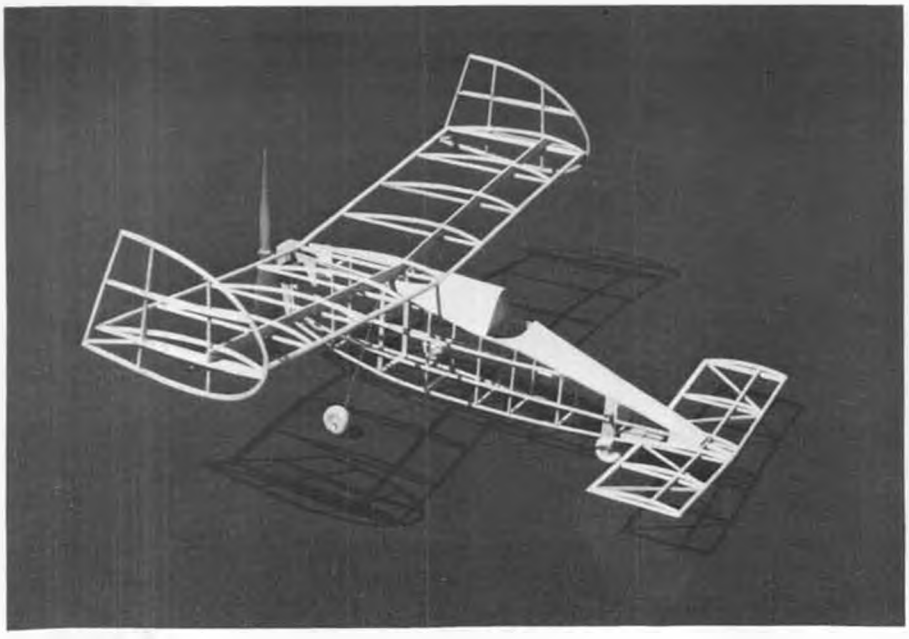
Tonda Alfery's formed-foam Peanut Spitfire has been a top placer in recent Czech indoor contests. Photo: Pavel Jelinek.



R.M.-12

By WALT MOONEY... This month the Ol' Perfesser digs deep into his bag of Peanuts for this model, a canard that will give a Fike or a Lacey a run for their money, if you build it light!

• Canard configurations are not my favorites; I think they are oversold by their proponents. However, the three-view of this little canard design by Radu Manicatide looked as if it could be made to fly as a model and was interesting. The model might have flown directly off the drawing board, so to speak, except that the first attempt was indoors, and the model flew into a wall. The first canard, the structure of which shows clearly in the skeleton photos, was demolished. A new canard was constructed using harder balsa and a bamboo leading edge. The second attempt at flying resulted in an impact with a basketball backboard which demolished the second canard. The third canard was built as shown on the plans and has survived several impacts. The model is a little more stable than on its earlier test flights because the canard is heavier and the model's center of gravity has moved to the position shown on the plans. In spite of the large vertical fins and the deep aft body of the design, it has a slight dutch roll in flight indicating that the real airplane was probably marginal as far as directional stability is concerned.



The R.M.-12, designed by Radu Manicatide went through several design changes before arriving at the configuration you see here.

The R.M.12 makes into an interesting peanut and has enough wing area to make it look like it might be a Fike or Lacey beater. If you can keep yours off the wall, a light propeller and a lightly constructed canard might make it so, but mine did not turn into a Fike beater although it flies quite well.

CONSTRUCTION

In spite of its somewhat different configuration from the more common peanuts, the model construction follows time honored building techniques.

Start the fuselage by building two fuselage side frames exactly alike directly over the plans. When these are dry, remove them from the plans and separate them using a thin razor blade. Then assemble them into the standard fuselage box by adding crosspieces between the top and bottom of each upright. The fuselage cross-sections are essentially rectangular back to the back of the cockpit; behind the cockpit the top longerons are closer together than the bottom ones for two bays, and then the bottom longerons come completely together at the very back end. Formers F-1 and F-2 are cut from 1/32 sheet and cement in place at the front and back of the cockpit respectively. Soft sheet balsa is used to cover the top of the fuselage forward of the cockpit. Two triangular pieces of 1/32 sheet and a small block are used to cover the top aft of the cockpit. There are two stringers on each side of the fuselage made from 1/16 squares. They are cemented to the outside of the fuselage box everywhere except at the very last upright where they are butted flush against it. A small carved block forms the very front of the fuselage.

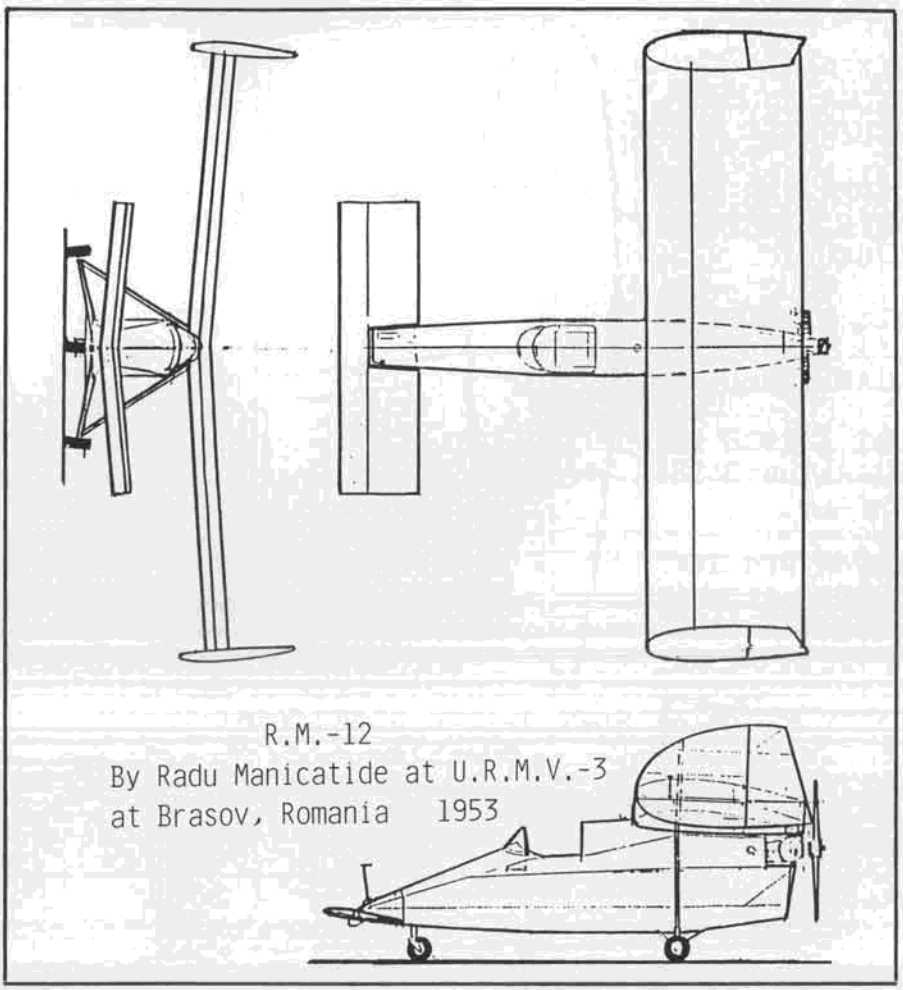
Bend the landing gear wires to match the plan, only half a pattern is shown on the

front view. Remember to install the nose wheel on the wire before completing the bends. Cut a piece of 1/8-inch thick balsa to fit in the first bay between the bottom longerons, and install the nosegear wire on it before cementing it in place. Cut the F-3 crosspiece and use it to replace the square one in the fuselage box to support the main landing gear wire. The main wheels may be retained on the wire with a small blob of cement.

The thrust block is made from four pieces of 1/8 sheet balsa laminated together. Alternate the grain direction so the block will resist splitting. The most forward layer should be shaped and sized to be a snug fit in the very aft end of the fuselage box. Carve the rest of the block to the shape shown in the top and side view. Make a hole in the block to accept a small thrust bearing and cement it in place being careful not to plug the hole in the thrust bearing with cement.

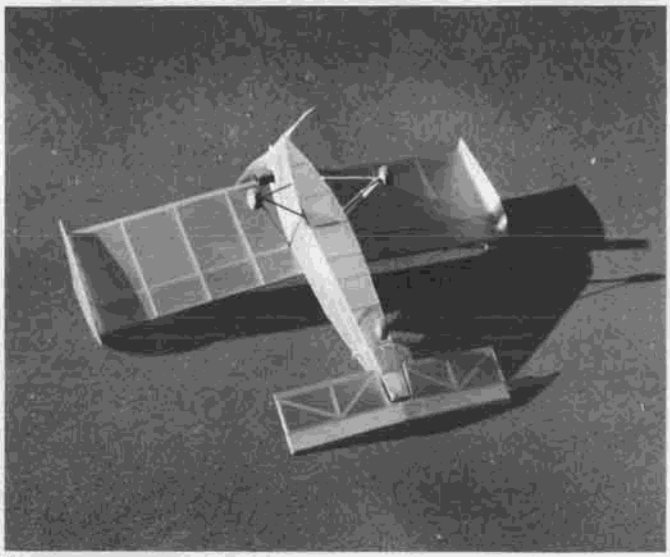
A pusher propeller is required for this design. The one on the model in the photos was modified from a conventional Sleek Streek plastic propeller. The freewheeling ratchet molded into the front of the propeller hub was cut off flush to make a smooth thrust surface, and a similar freewheeling ratchet was cut into the aft end of the hub. Standard methods were used to bend a propeller shaft hook and install the propeller on the thrust block. A flat washer or small bead or even a sequin should be placed between the propeller and the thrust bearing on the shaft to reduce friction.

Make the vertical tail outlines around a cardboard or balsa from using two strips of 1/32 by 1/16 balsa strips laminated together using white glue. When these are dry, construct the left vertical tail directly over the plan by pinning one of the outlines in place over the plan. Fit the two spars and the trailing edge in place and cement the joints. Now add the two ribs, noting that the lower rib is cut and angled down at the rear spar. When the left vertical is dry, remove it from the plans and make an outline/spars/trailing edge assembly for the right side. When this is dry, remove it from the plan, and using the left one as a guide, add the ribs on the other side of this assembly so that you end up with a left and right vertical tail.

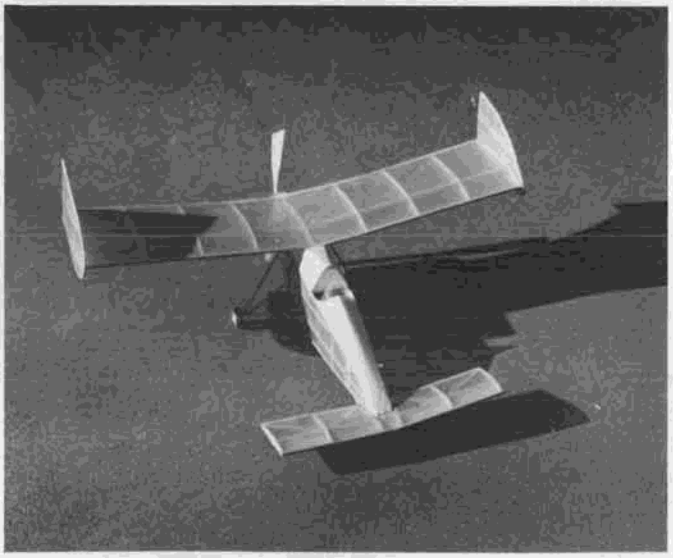


Build the bottom surface of the wing directly over the plan as a flat panel unit. Make up a wing spar with the dihedral break at the center. Cut an upper chord pattern out of some suitable material and slice at least nine rib top caps from firm 1/16 sheet balsa. Trim a small triangle of material off the trailing edge of each cap so it will fit precisely as shown on the wing rib pattern on the plan. Now cement the left half of the wing spar in place on the top or the bottom surface assembly. Cement the outer four left-hand top rib chords in place. Cut the wing leading and trailing edge about two-thirds of the way through, making a narrow "V" notch at the cut to allow for wing dihedral. Now bend up the left wing half until the right-hand side of the spar is in contact with the right lower surface and cement it to the ribs. Try not to separate the leading and trailing edges completely while making the dihedral break, but in any case cement the center joint. Remove the wing from the

Continued on page 72



Undercarriage view of the R.M.-12. Be sure to install nosewheel on wire before you finish bending the gear wire!



Plane requires a pusher prop, and the Perfesser modified a Sleek Streek prop, which works fine.

ALL PARTS ARE BALSA UNLESS OTHERWISE NOTED.

COVER THE MODEL WITH LIGHTWEIGHT TISSUE.

ALL WIRE PARTS ARE .020 DIAMETER.

USE ½ INCH IN DIAMETER BALSA WHEELS.

MOTOR PEG IS 3/32ND ALUMINUM TUBE.

WING LEADING EDGE IS 1/16TH BY 1/8TH HARD BALSA.

WING SPAR IS 1/16TH BY 1/8TH MEDIUM BALSA.

WING TRAILING EDGE IS 1/16TH BY 1/8TH MEDIUM BALSA.

WING PLAN VIEW

THIN TRANSPARENT PLASTIC

SOFT 1/32ND SHEET TOP COVERING.

CARVED BLOCK TOP, 1/32ND SHEET SLOPES.

TOP LONGERON

BOTTOM LONGERON

3/32ND DIA. MOTOR PEG.

FUSELAGE TOP VIEW

TOP CHORD SLICED FROM 1/16TH SHEET.

BOTTOM CHORD IS 1/16TH SQUARE.

WING RIB PATTERN.

UPPER TAIL RIB 1/16TH THICK.

LOWER TAIL RIB 1/16TH THICK

F-2

F-1

F-3

LAMINATED TAIL OUTLINE, 1/16TH SQ. SPARS AND TRAILING EDGE.

CANARD AIRFOIL

CUT DOWN SLEEK STREAK PROPELLER MODIFIED TO WORK AS A PUSHER.

VERTICAL TAIL PLAN

1/8TH SHEET LAMINATIONS

CANARD PLAN VIEW

CANARD PARTS:
3/32ND DIA. BAMBOO LEADING EDGE.
1/32ND PLYWOOD BOTTOM PLATE.
1/16TH BY 1/8TH HARD BALSA SPAR.
1/16TH SHEET RIBS. 1/16TH SQ. DIAGS.
1/16TH BY 1/8TH TRAILING EDGES.

F-1 F-2 F-3

THRUST BLOCK DETAIL

SIDE VIEW

SIDE FRAMES HATCHED FOR CLARITY

½ FRONT VIEW

RM-12

Walt Mooney 08-29-87

Free Flight

By BOB STALICK

• Did you accomplish your free flight goals for the year? I know that I did not. I had set several for myself for 1987. One was to attend every meet in the Northwest that was offered. I didn't. I intended to build a Nostalgia model for all classes from 1/2A to C. I did that. I intended to complete my often postponed Brown-powered Megow Quaker Antique, and I just might finish this one before the end of December. So, what were your goals? It's time to begin thinking about what you plan to accomplish during 1988—it's just around the corner.

DECEMBER MYSTERY MODEL

For the past several months, I have been running some obscure designs for your consideration. This month it seemed appropriate to give you a bit of a respite from the little-known, and to present one to you that should be more identifiable. This ship is one of those curiosities. It was never featured in a major article in any of the modeling press, but it was well covered in photographs and contest reports. A number of currently active and successful F1C fliers cut their teeth on this design. Many derivatives of this model became the subjects for magazine construction articles themselves.

Now, if you look closely at the three-view, you could easily mistake it for Sal Taibi's standard, The Spacer. But, it isn't, although it was obviously influenced by the Spacer. It was the second FAI design that I ever built, and I built two of them during the mid-1960s.

So, if you think you know what it is, write the name of the design and the name of the designer on a card or letter and drop it in the mail to Bill Northrop, c/o *Model Builder* magazine. If you have the correct names, and you are first in line with the answer, you stand to win a free, one-year subscription to *Model Builder*. Good luck!

DECEMBER THREE-VIEW—Hipperson's Coupe d'Hiver No. 11

Dave Hipperson is a longtime free flight competitor from England, where the Coupe event has taken on the aura of an art form. Dave's No. 11 Coupe has many of the features that mark the current state of that art: high aspect ratio wing, long wing tips, long tail moment arm, big propeller, and long motor run.

The three-view features full-sized root wing and stab ribs plus all of the important dimensions, so you can easily scale it up for use here in the USA.

Tyler Weissenberger holds her dad's Berkeley Korda Powerhouse 26 PeeWee 30 ship. Greg enlarged the plans from the original 26-inch span to the maximum 30 inches allowed.

DECEMBER DARNED GOOD AIRFOIL—The Grant X-9

The late Charles Hampson Grant was a fixture of the early model press. C.H. had a regular column, and he frequently used it to promote his theories of free flight design, sometimes in friendly give and take with other early notables such as Carl Goldberg. Grant's series of airfoils were used on many and varied designs from the mid-thirties through the late forties. Lately they have fallen from favor for several apparent reasons: 1. the current model trend is balanced in favor of short engine run models that climb very rapidly, in contrast to the slow flying ships of Grant's day; 2. streamlining and lack of fuselage protuberances on today's ships is the norm, whereas it was the way things were back when.

The X-9 is a typical Grant airfoil. It has a rounded nose entry, slight undercamber, and is quite thick. It could be used on any model where stability and ease of trimming are paramount considerations. Typical spar structure would be internal with a large dimension leading edge. The trailing edge is not so thin as to be a problem, so the standard trailing edge stocks could be used. It is a good section for larger, slower flight sport models including rubber-powered ships.

And for you old timer types who have been looking for the coordinates for this section so that you could finish up that ship, here they are just for you.

GEEF 250 UPDATE

Last month I commented that I expected that the Geef 250 would be granted Nostalgia status. Since I wrote that article, I have heard from Bob Larsh, one of the NFFS Nostalgia Rules Committee Members. Bob

Vic Cunnyngham Jr. with new Maxi 1/2A, at the '87 Nats. Photo: Fries.

Vic Cunnyngham Sr. about to launch the Galaxie. Galaxie was once kitted by Anderson Engineering and will soon be back in business as Galaxie Models, with it being the first kit off the production line.

notes that the Geef 250 will be included in the next set of Nostalgia eligible designs, when it comes off the press around the end of 1987. For your information, I have included the rectangular stab drawing for the Geef 250, featured last month as the Three-View. The rectangular stab can be used in place of the stab shown in the three-view and still be legal Nostalgia ship.

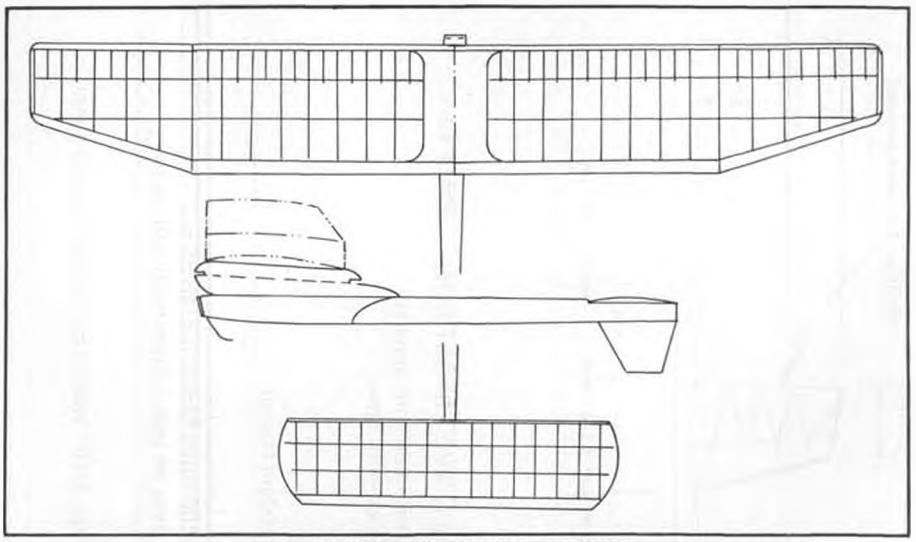
THE CASE FOR AN AMA FREE FLIGHT NATIONALS

As an occasional participant at the AMA Nationals, it is not my place to knowledgeably comment upon the various venues that the AMA selects to hold its annual Nationals events. I do know that free flighters as a group are usually not appreciative of the amount of organizational energy and thought that is part and parcel of planning a multi-faceted extravaganza as the Nationals. In fact, it's been my observation that unless the flying conditions are less than perfect, criticism and invective flow from the mouth and pen of the free flight spokespersons. This fact was readily brought home to me as I covered the Reno Nats for *Model Builder* magazine.

However, the number of letters I have received of late, and the comments—both sublime and ridiculous—carried in the free flight newsletter press make me wonder if this year the fit has finally hit the shan. So, like a true researcher, I talked to some of the N.W. folks who did attend this year's Nebraska Nats. The result: the 1987 Nats free flight location was both extremely windy and impossible as a chase site. It appears as though the 1988 Nationals have been set to occur at Virginia Beach, Virginia. No outdoor free flight site is available within proximity of Virginia Beach, although a number of locations have been promoted, none are even close to suitable, according to Jim O'Reilly, writing in the latest issue of the *Okie Flyer.*

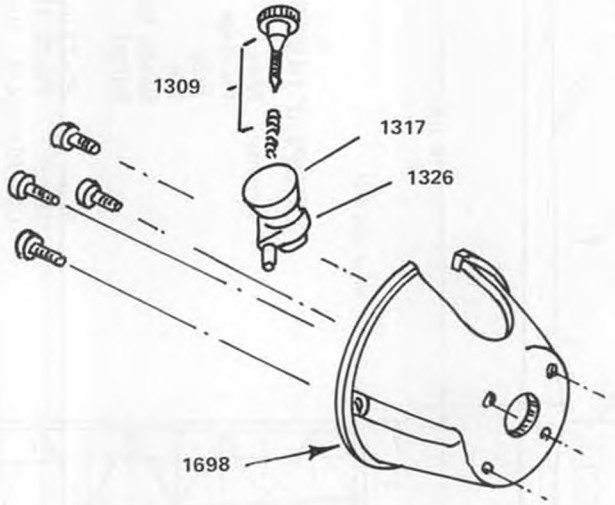
Sandy Frank, longtime AMA free flight category manager at more Nationals than I can remember, notes that it is the AMA V.P. who makes the determination of the Nats location, and that little consideration is given to the free flight site, when the final votes are tallied.

Carl Fries, longtime free flighter and one of the founding fathers of the National Free Flight Society, is promoting the concept of a separate AMA-Sponsored Free Flight Nationals. Carl notes that he has attended many Nationals from coast to coast, and he intends to not attend any more unless the free flight site is more apt to be flyable. Lest you think that no free flight sites exist in some parts of the USA, O'Reilly notes that a number of sites are customarily used for local and regional free flight activities, and they are more suitable than those used during the past several years. He suggests consideration of Galeville, New York; Pensacola, Florida; Bong, Wisconsin; Wright



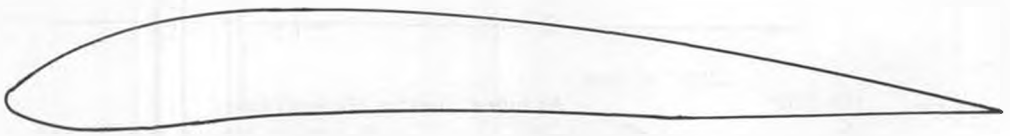
DECEMBER MYSTERY MODEL

JOE McGUIRE'S PEEWEE MODIFICATIONS



Numbers on sketch refer to Cox engine parts numbers.

GRANT X-9



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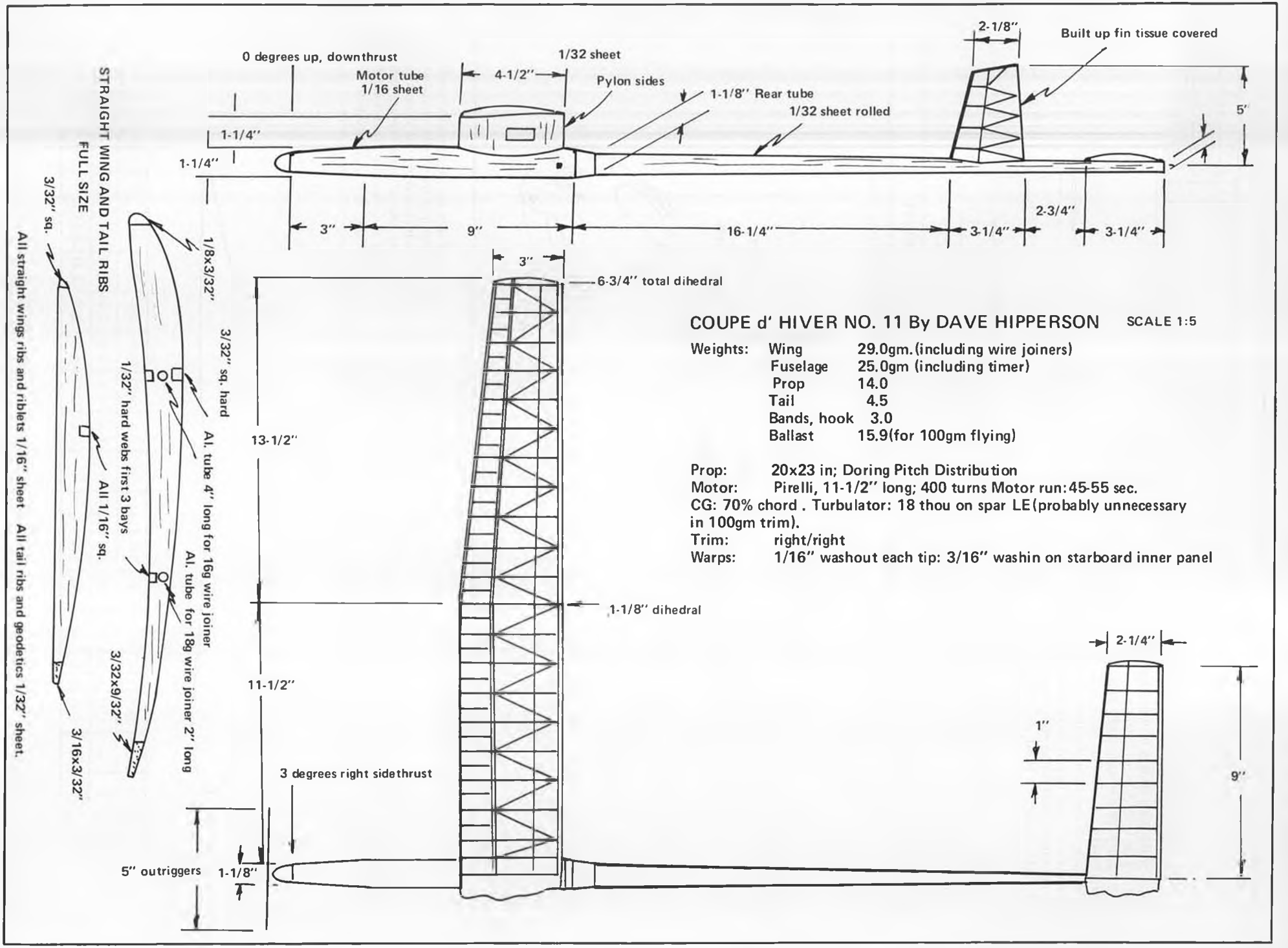
UPR	0	-	3.37	4.78	-	6.97	-	8.64	-	9.47	9.3	8.57	7.44	5.97	4.24	2.2	-	0.05
LWR	0	-	-1.5	-2.1	-	-2.48	-	-1.73	-	-0.8	-0.47	-0.54	-0.74	-0.83	-0.63	-0.37	-	-0.05



COUPE d' HIVER NO. 11 By DAVE HIPPERSON

SCALE 1:5

Weights:		
	Wing	29.0gm.(including wire joiners)
	Fuselage	25.0gm (including timer)
	Prop	14.0
	Tail	4.5
	Bands, hook	3.0
	Ballast	15.9(for 100gm flying)

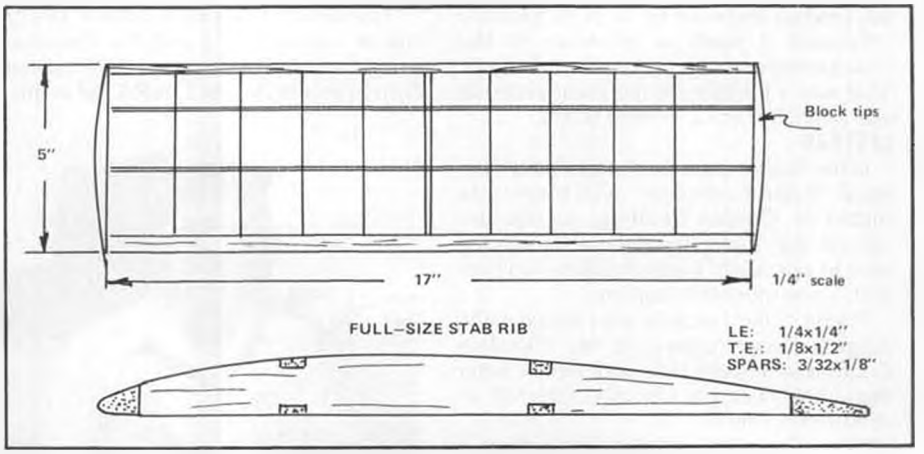
Prop: 20x23 in; Doring Pitch Distribution
Motor: Pirelli, 11-1/2" long; 400 turns Motor run:45-55 sec.
CG: 70% chord . Turbulator: 18 thou on spar LE(probably unnecessary in 100gm trim).
Trim: right/right
Warps: 1/16" washout each tip: 3/16" washin on starboard inner panel

Chuck Dorsett's torque-actuated winding stooge. He's doing a much better winding job now that he uses Bob Wilder's stooge.

Here's Dorsett's field support system. Winder by Wilder, snazzy aluminum flight box by George Batiuk. I understand that George will custom-make these model carrying cases to order.

Field, Ohio; Denver, Colorado; the new Arizona site; Taft, California; Sacramento, California; and Madera, California. No inquiries have been made as to the availability of any of the above sites, but any of them would be more suitable than those used during the past couple of years.

Maybe the time has come. As much as many of us enjoy the opportunity to view the other forms of model flying, most of us would not drive a thousand miles to see an R/C pattern meet or a control line combat meet, but we would drive that far or farther if the promise of both a good site and the prestige of the AMA-sponsored free flight contest were at the end of the road. The concerns that most affect free flighters are easily defined: a good site is large enough that with the usual wind conditions the model can be retrieved easily either on foot or using a motorbike without interfering with other events; a good site has wind conditions where the models are not subjected to damage during flight (one to two mph is desired, but six to eight mph is tolerable);



Nostalgia-eligible Geef 250 Alternate Stabilizer(see November issue, Free Flight).

and a good site is located where either camping or motel facilities are located within reasonable driving distance (for me, reasonable is anything within 40 or so miles—for others, it is probably much closer).

Maybe the time has come. With the Virginia site appearing to offer very little to the competition outdoor free flighter, why not give a separate free flight Nationals a try for 1988. I am certain that a number of folks will find many reasons why such an idea cannot be implemented. Maybe the time has come to find some folks who will find the reasons why such an idea can be implemented.

WISE SAYING

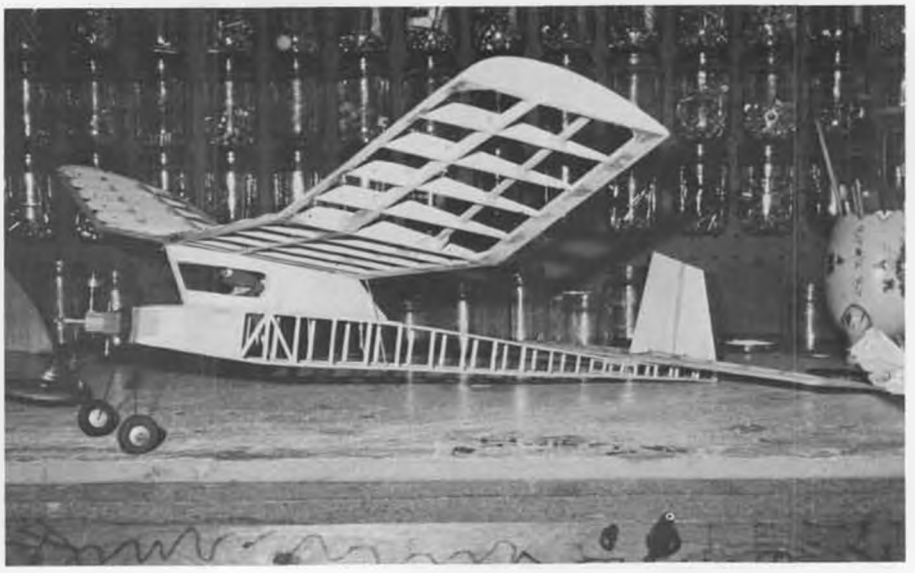
Nothing so needs reforming as other peoples' habits.

LESSER KNOWN SOURCES FOR FREE FLIGHT PLANS

I know that most of you are aware of the wide range of plans that can be purchased from *Model Builder* magazine and the

Continued on page 100

Dick Williamson built a copy of Toshi Matsuda's Zero for the NWFF Champs and flew it in 1/2A Gas with a T.D. .049. Ship is plenty hot, eligible for Nostalgia events.



Greg Weissenberger's Jasco Paamaster readied for Pee Wee 30. Greg hails from Tustin, California.

Control Line

By MIKE HAZEL PHOTOS BY THE AUTHOR

• This month's column might be a little on the short side, as the deadline is coming right up and I'm still digging out from having attended the Lincoln Nationals. There is a multitude of domestic duties to attend to (almost caught up!), and oh, the shame! I haven't put the toolboxes or models away yet.

CORRECTIONS DEPARTMENT

Two items here from the September issue. First, J&J Sales is no longer manufacturing fiberglass props. They were listed as having this product under the racing parts directory.

Second, I made a reference to the Quickie Rat event going into the rule book. That was a mistake, as the event proposal was killed by the CL contest board.

LETTERS

In the August issue there was a sketch entitled "Radio-Controline," which was submitted by Gordon Codding. As was discussed, this looks like quite an intriguing idea to play with. Gordon follows up here with some more information.

"Hello, Mike, I noticed your sketch in the August issue covering my "Radio-Controline" system. I like your sketch better than mine! Nice job. (*Thanks to the* MB *art department. mwh*)

"After digging through the battered box of photos I came up with these two as being the only clear ones worth sending. One photo shows the RTP mast I use here with bicycle front axle and hub firmly screwed into a fitting on the top. The mast is heavy water pipe and fittings that slides into the ex-Navy tripod of heavy steel tube with chains to hold the legs from spreading (found that in a local garage sale) this whole rig is then clamped onto a Vee-shaped steel beam structure that used to be the front end/towing/mount for a mobile home. I couldn't move or bend it with a small car! It will restrain a .60-speed model!

"The three models shown in that photo, and the close-up are: Cox electro-charger Spitfire with battery recharge system, made of thin plastic and with left-hand prop for torque reduction. This I fly as a control line model swinging freely around the pole. Next is a foamie Cessna which I found in a garage sale, stripped of the house paint, and with a Kraft (now Kyosho) electric 05 motor system and two-channel Cox R/C with the right-hand stick/gimbal assembly rotated 90 degrees so both sticks work fore/aft giving me throttle (on/off) and elevator. The third is the Kraft Chipmunk R/C model that uses an Aero Sport Two R/C system.

"The Cessna is about to have a .15 glow engine installed in it and the Chipmunk will get a Cox 09 R/C engine. Both will have drop-in mounts for the Cox R/C set as this is going to be my standard set from here on. In the use of "normal" R/C equipment I find that the two-stick/two-channel set is not normal airplane control practice. . . real (full-size) planes simply do not operate with two sticks, so if these can have the 'rudder' stick assembly rotated 90 degrees (unscrew the mount of the gimbal and try it) then you have what is needed. For those with a three- or four-channel set available, simply use the throttle and elevator servos and ignore the others.

Bruce Duncan of Vancouver, B.C. built this nice-looking 1/2A speedster; it goes 110+.

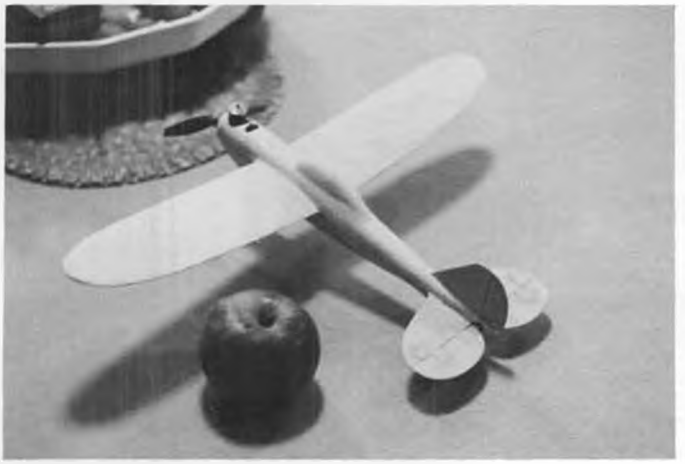
"I did a lot of testing of this system with a 50-inch span Sure Flite Spitfire (I use foamies for testing new ideas), and it worked fine. I would also recommend that these Sure Flite models are great for control line usage. They have symmetrical airfoil, plenty of strength, can easily accommodate scale detail, and can easily be altered to other scale designs; the Spitfire can be converted to a Heinkel He-70 light transport of 1933, the P-39 can be converted to Jackie Cochran's Northrop racer with the Curtiss Conquerer "needle nose" engine, combining parts of the P-39 and Spitfire you can get a Hawker Hurricane, and the Pete racer can become a Supermarine seaplane racer (or the old Jim Walker 'Fireball' UC model). A smooth finish is required to kill drag; I have covered them with clear plastic Ultra Thin sealing tape (the only way my Cox Canario R/C would fly! I also used it as Radio-Controline)."

Thanks for writing, Gordon. If anyone else has worked on this, let us know.

Also in the mailbag department comes this note from Bill Dahlgren in response to a piece also in the August issue:

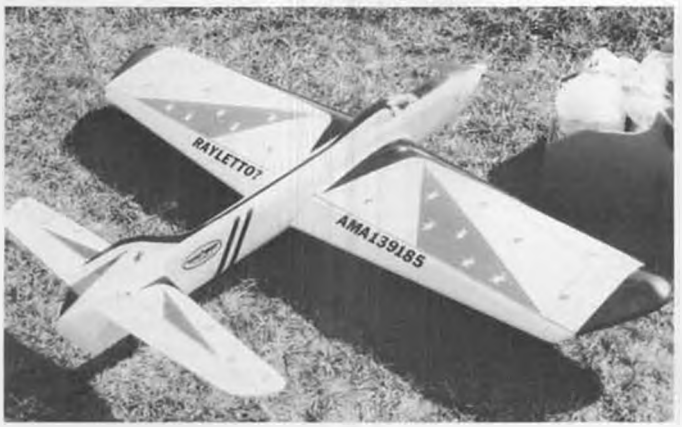
"Read your column containing the Bruce Doyle letter and couldn't help commenting. I'm not convinced that the free flight and R/C ranks are filled by people who couldn't hack spinning in circles, but Doyle hits the nail right on the thumb with his observation that it is the choice of the manufacturers and advertisers to ignore the potential of the total CL market in favor or turning a fast buck on the big ticket items that has caused much of the decline in the amount of visible control line flying.

"I doubt also that the McCoy Sportsman could be manufactured today for 15/20 bucks, but why would anyone want to duplicate an admitted dog anyway? The



Hmmm, a fruit fly? Apple shows relative size of Duckworth's baby Fireball, with .020 power.

James Duckworth sent this photo of his Fireball Junior. Cox TeeDee .049 power.



This Rayletto? was built by Ray Mathis. Canopy configuration gives the design an interesting twist between classic and contemporary.

Some of Gordon Codding's airplanes. Note electric powerplant on the unpainted Cessna.

$2.95 Ringmaster of my salad days sells now for $22 and the $15 Fox 35 Stunt retails for around $40, which, considering inflation, ain't bad. Furthermore, I've seen new Foxes discounted as low as $23, and, inasmuch as zillions of the things have been made, they're available used for anything down to $10. Mate one of those engines to a (still in production) Ringmaster, and you're in business! The problem lies not in the availability of the good themselves but in the difficulty faced by a novice in finding out where to get the stuff, where to fly the finished model, and where to find others with similar interests. And it is here that the manufacturers, advertisers, and yes, the AMA fall on their faces.

"For what it may be worth, there *were* a number of ARF CL models of which the ultimate was probably the foam Mustang marketed by Cox, complete with one of their .15 Sportsman engines. Why didn't it make it big? I've no idea, though I can think of several possibilities, none of which had anything to do with the virtues of the model itself.

"It's an interesting situation—for all practical purposes control line flying (as a large scale activity rather than the present highly specialized contest scene) finds itself much as it was; back in say, 1950. Lots of potential participants but with limited means for bringing them together. What to do?"

What to do, indeed. Thanks for writing, Bill. The topic of the CL market being lost in the overall (R/C) market is one theme we have covered on more than one occasion. Let's keep promoting ourselves, no one else will do it.

Also in the mailbag department is another newsletter. This one is titled *Aero-Mail*, the news of the Norfolk Aeromodelers. This group is headquartered in the southern coast area of Virginia. The club membership appears to be numbered at about 30, with interest well spread over stunt, combat, racing, and carrier disciplines. The newsletter is of very high quality, also. For more information on the club, write to: Cam Martin, 1540 Bridle Creek Blvd., Virginia Beach, Virginia 23464.

Received a note from Tom Dixon who reports that he has a new catalog in the making. Included in the new catalog, and available now, are some British CL kits. A few of the Mercury and Keil-Kraft product lines are offered, including the Crusader, which Tom says is the British equivalent to our Nobler. Just in case you don't already know, Tom carries the Merco and Fox engine product lines, does custom stunt engine rework, has a very large selection of CL stunt plans, and also sells the very high quality Bolly composite props. His complete address: Tom Dixon, 1938 Peachtree Road, Suite 401, Atlanta, Georgia 30309.

Glen Simpson's AM-1 Martin Mauler sports an OPS 65 with tuned pipe. It'll turn 107mph. Not AMA legal, but for local 'Quiet Carrier' event.

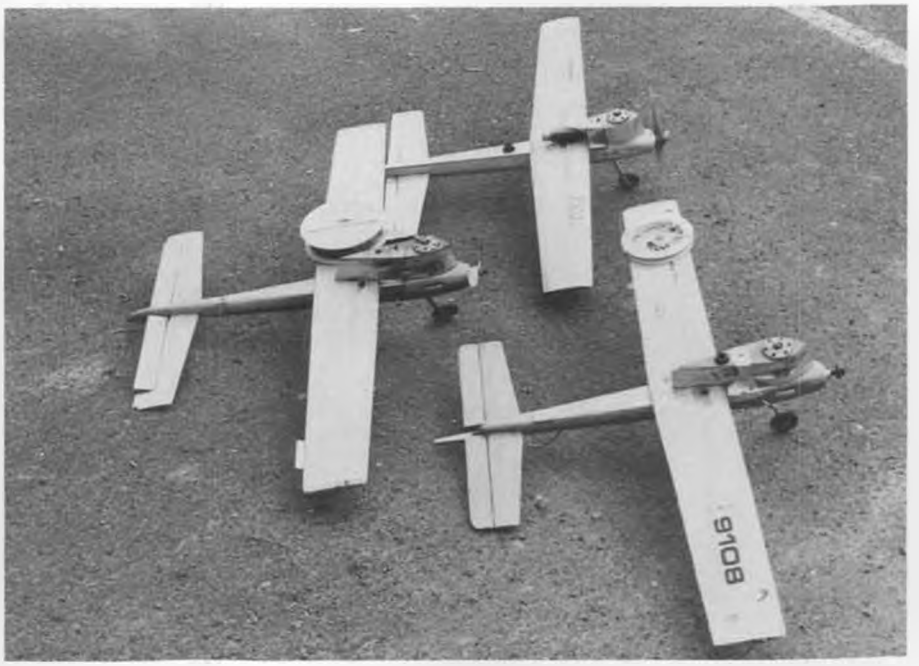
Here's an interesting piece from the Orbiting Eagles Newsletter, from Omaha, Nebraska, Bob Furr, Editor.

Hints for Hinges, by George Lieb.

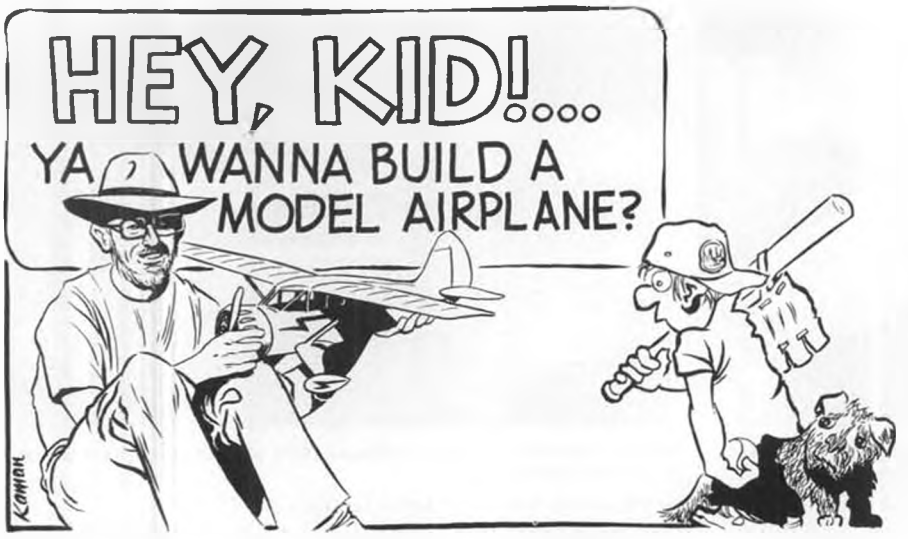
"Here's an idea to make the job of hinging control surfaces easier. This is for cloth hinges. You do use them; don't you? They can be friction free and if done right there is no control surface gap. They are also cheap. Part of the secret to getting good results with them is to use the proper material. Nylon reinforcing tape is the best material. The cotton cloth with pinked edges still sold by Perfect ages and eventually falls apart. The other half of the secret is to use plenty of them. Put hinges all the way across with no spaces between them.

"Now, here is how to make the job easy. First, install all the hinges on one of the two surfaces to be joined. Say, all on the stab or all on the elevator. Aliphatic resin makes gluing them down very easy, and since it is water-based, it washes off your fingers. Put a little glue where you want the hinge spread it out, then wait about a minute and apply

Continued on page 68



Trio of racers from the NW Rat Race Contingent. From left to right, Salter, Hazel, and Green.



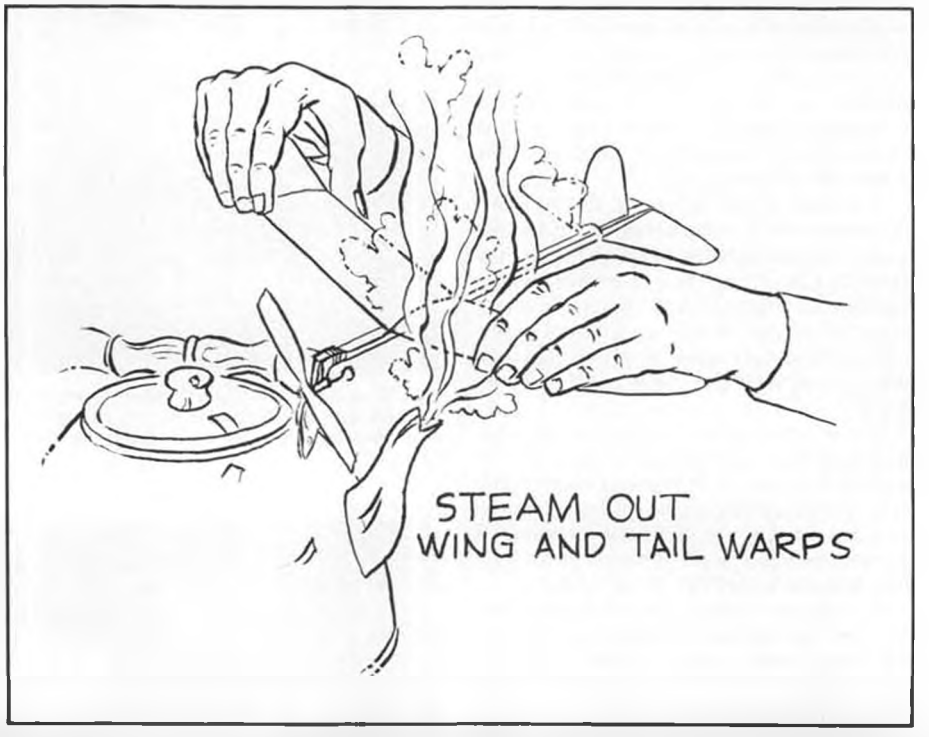
By BILL WARNER

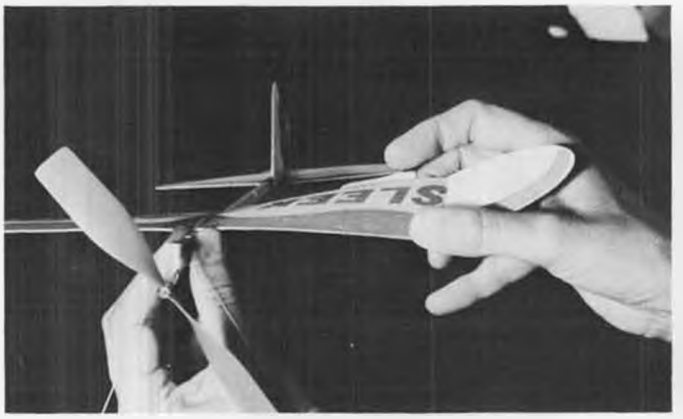
Illustrations by JIM KAMAN

• Of the first fifty models I made in my life, *one* flew. The one that did, did so purely by accident. I just sort of got everything close to "right," and it puttered off over the daisies with its little rubber motor spinning gaily. Wow! What a thrill! Unfortunately, because I didn't really know what I had done right, it was over a decade before I got another one to fly! That's the problem, flying, or trying to fly, all by yourself. The second model that flew for me inspired the same feelings in me as seeing your mother-in-law drive off a cliff in your new Porsche. Here's how it happened.

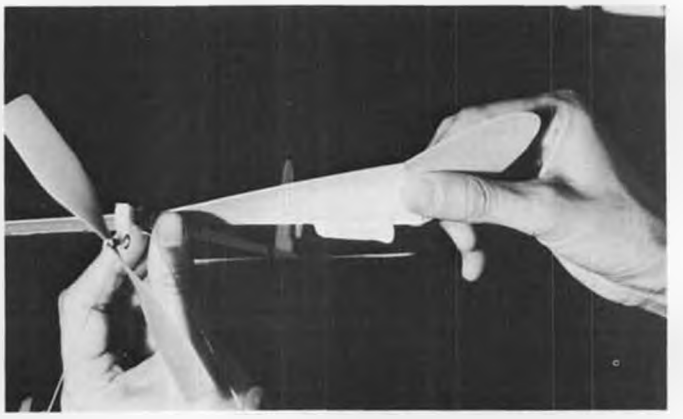
After a number of years in the Marines, in college, and being a motorcycle fanatic, I settled down to teaching junior high school. The first thing they ask you is, "Can you sponsor any clubs?" As there was no motorcycle club at this particular school, I replied that I could probably start a model aeroplane club. That meant that I had to get back into the swing, so I stopped by my local model shop and picked up the ideal beginner's model, an engine-powered three-foot span free flight gas model. Building it was not a problem, I was good at that. But getting it to fly, haw-w-w-w-w-w! I took that cotton picker out to the flying field *every day* for six weeks, with no success! The engine gave me fits, either due to plugged fuel passages, blown gaskets, or other gremlins. When I finally got *that* sorted out, the crashes began. Every flight was fast, short, and discouraging. Then one night as I was repairing the wing while working my second job (most teachers have 'em!), one of the chaps who happened by got into a conversation about planes. I told him what my problem was, and he asked me if I had taken the warps out of the wing. Warps? What are warps? We heated the wing over a hot plate and twisted it in the opposite direction from the way it had twisted itself and checked it on the flat top of a desk. On my way home that night I lost it out-of-sight. "Full tank" Warner had never dreamed such a little thing would make such a difference! Well, that guy sure knew his stuff.

His next advice to me was to get a *Sleek Streek* and bring it to work. He made up some little tabs from the gummed flap of an envelope and stuck them on the trailing edge of the wings, the rubber, and the stab. After taking the warps out, we flew it inside the office space. He showed me how to make adjustments to keep it from hitting the ceiling or the walls. By the time the night was over, I had learned more about flying models than I had in the previous twenty years! Since then, having had the good fortune to live in Los Angeles and fly models with some of the best, I have learned a great deal more, but that session with the Sleek Streek was the turning point. If you pay close attention, maybe I can pass on some of these "secrets" to you so that





A wing twisted like this is said to have 'wash-out.' In flight, airflow will push this wing downward, in this case rolling plane to the left.



A wing twisted like this is said to have 'wash-in.' In flight, airflow will push this wing up and roll the plane, in this case to the right.

you too can start losing your models instead of just smashing them up!

SOME BASICS

Assuming that you made your B.A.R.F. just right from last month's article, you will want to stop and think of why each part of the aeroplane is there. Nothing is for decoration. Even the printing on the wing is to make sure you put it on facing the right direction! So, recheck each part. The fuselage not only holds the motor, but keeps the wing and the tail in just the right position. The rudder is on straight to keep the plane flying straight ahead. The stabilizer is positioned with the leading edge lower than the trailing edge so that the airflow (which is called the "relative wind," coming from the front) "sees" the top side of the stab and not the bottom. This makes it hit the top side and it pushes on it a bit, creating higher pressure and forcing the tail to go downward a little until it is flat in the airflow. Guess what this does to the position of the fuselage with the wing glued to it? Yep! When the tail is forced *down*, the nose goes *up*. . . are you still with me? Now, guess which side of the wing the relative wind "sees"? The *underside* of the wing is now being hit by the wind and higher pressure created, which forces the wing *up*, which is exactly what you want! Can you see why the stab must be set as it is? We say the stab has *negative incidence*. Some people prefer to set the stab flat and put *positive incidence* in the wing (leading edge higher than the trailing edge). The important thing is to make sure the wing is going to have a positive (leading edge higher) angle of attack as the model flies through the air. Full-size aeroplanes are no different.

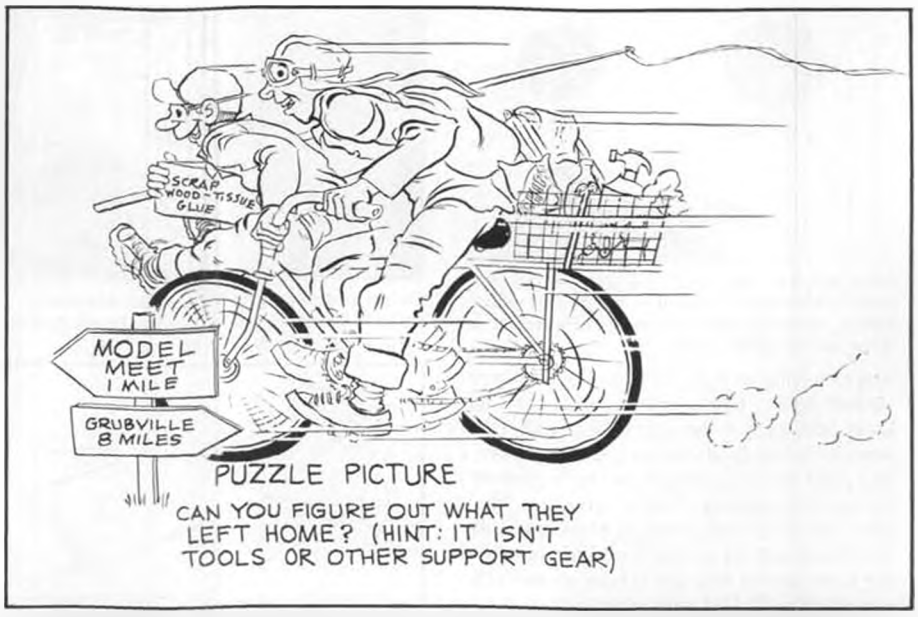
The *center of gravity* (C.G.), which is often shown on a model plan as a little circle with a cross in it with two of the sections filled in, is located under your wing. If the lift of the model is not over the center of gravity, the model will not want to fly level. If you don't believe me, add some lead to the nose and see if the model doesn't dive in. Add some to the tail and see if the model doesn't swoop upward just the same as if you'd built in too much negative incidence in the stab. You have to balance the weight *and* the aerodynamic forces (the push and pull of the air on various parts of the plane).

You will notice that, on close inspection, the propeller shaft is pointed downward toward the front a few degrees. When the plane starts on its flight, the rubber is wound tight, and puts out a great burst of power which gradually runs down as the motor unwinds. That means that the model flies much *faster* in the first few seconds of flight. Adding this built-in *downthrust* to the propeller makes it want to pull the front of the model down during this power burst, when the faster-flying wing is making more lift than we need. If you did not have it, the plane would loop or *stall* (nose comes up, then drops like a roller coaster).

If you have everything put together exactly right, the model will fly. But what if it is *almost*, but not quite, right? That's where "trimming," or making small adjustments comes into the picture.

BEFORE YOU GO TO THE FIELD

I once spent a half hour taking all the warps out of a six-foot gas job's wing and tail parts only to find that when I got to the field I had left the fuselage at home. The moral of the story is to have a checklist just like pilots of full-size planes do before even thinking about taking off. The first thing to do is to gather some supplies together.



Adjustment tabs can make the model easier to get flying. They are not necessary if you don't want to try them. Envelope-flap tabs will work. Aluminum soda cans keep adjustments put.

For the Sleek Streek, you have to have a rubber motor, and the one it comes with is not very good. You can link a bunch of smaller rubber bands together to get lower power, but the best thing to do is get some 3/32-inch or 1/8-inch flat rubber and make it up into loops. A loop 10 inches long will provide a *shorter run* than one 13 inches long. A motor 13 inches long will give *less power* than one 10 inches long. Start by making three motors; a 10-inch loop, a 13-inch loop, and a 16-inch loop. You will start with the longest, as tests should be made under low power. A motor made from 3/32-inch rubber gives less power than one from 1/8 inch. There are also power differences in certain brands. FAI rubber (available in small amounts from Peck-Polymers or Hannan's Runway) is a heavier rubber than Sig contest rubber, and therefore a 1/8-inch wide Sig strip can be expected to be less powerful, but run longer, than FAI. Some modelers prefer to buy smaller-sized rubber and use a couple of loops. Just remember that too much power is worse than not enough for *testing*, because a *small* twist in a wing can cause *lots* of trouble at high speed.

After you make up some different length motors, *lubricate* them with either ready-made rubber lube such as FAI's "Slick" or Peck's "Super Slippery." Actually, I use a mixture of glycerin and green soap made by boiling tincture of green soap (from your local drugstore) to get rid of the alcohol and then mixing it with castor oil (from the same drugstore). In a pinch, you can use just castor oil or other slippery stuff like baby shampoo, though you will probably want to throw the rubber away after flying, as this is not good for it in the long run. One

How much is 'just a bit?' To give you an idea about how much to bend in twists and adjustments, we'll use the thicknesses of a nickel, a dime, and a credit card.

Steam and twist in a little wash-in(about a nickel's worth) in the left wing to counteract torque roll. Check on a flat surface.

Putting in a little down aileron tab will give about the same effect as steaming in wash-in to correct for torque.

way of lubing motors is first to tie them with square knots. Chew some saliva into the knot and pull it up *tight*. You can even stretch the ends and have a friend throw a few tight turns of thread and tie to prevent the knot loosening. A little lube in a "Baggie" with your motor makes it easier to lube it without getting so much on your hands. If the knot comes out, you'll have to wash the motor off well and retie it again.

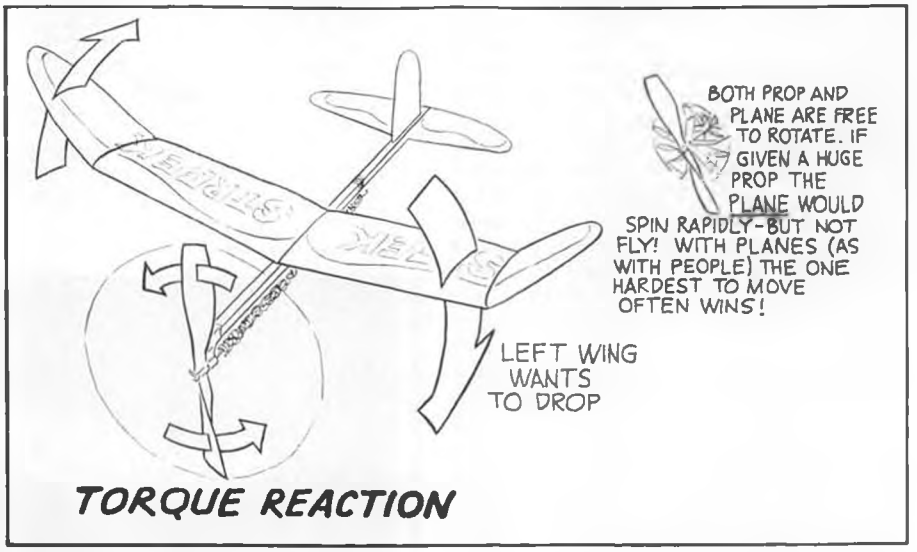
To wind the motor, a mechanical winder is very helpful. Peck's five to one winder is excellent. You can get their plastic sixteen to one, but I advise against it as the handles tend to break off easily. A hand drill will work, using a bent nail (head *behind* the chuck jaws to prevent pulling out), but will only wind at three to one; sort of slow for this size rubber. If you use the hand drill, check how the chuck end is put together. Some cheapie brands let the whole front end slip out when the cranked gear wheel gets loose from wear. You *can* get by without a winder, but it takes *forever* to put in over 1,000 turns. . . .

The last stuff to throw in your "go" box of junk you are taking to the field is a tube of quick-drying (*not* instant) glue, a bit of modeling clay for balance, and some extra rubber. A copy of this magazine with the flying advice will top off your equipment. And, by the way, don't forget the model!

PREFLIGHT

Check all the glued parts of the model by wiggling them a bit to see if they break off or are loose. Easier to fix it now than out on the field.

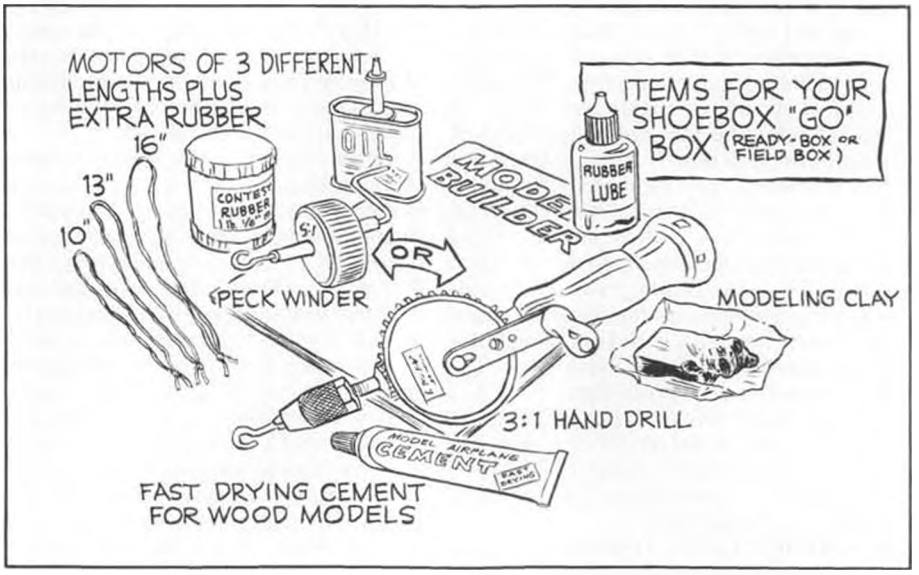
Close one eye and hold the model out about two feet and view under the wing. If you can see any twists, hold the wing over steam and twist in the opposite direction. Repeat this until the wings have no twists in them that you can see. Do this for each panel of the wing. Now, put a little *intentional* warp in the left (the one with "Sleek" printed on it) to give it a little more lift than the right wing. This is because you are going to fly your model in left circles, and the left wing wants to drop because it is flying a little slower than the right one and because the model wants to roll left as the propeller rotates right (called torque reaction). The "wash-in" (increase in the positive incidence) should be about .075 inch (thickness of a nickel) as measured at the front of the wing about where the first "S" in "Sleek Streek" is located. While you are steaming, you might want to put just a little left in the rudder by bending the trailing edge of same to the left about .050 inch (thickness of a dime). Nothing need be done to the stab except to make sure that it is flat.



Put a drop of oil on the prop shaft where it passes through the white plastic bearing block and a drop on the place where it comes out through the front of the prop to make certain everything spins freely.

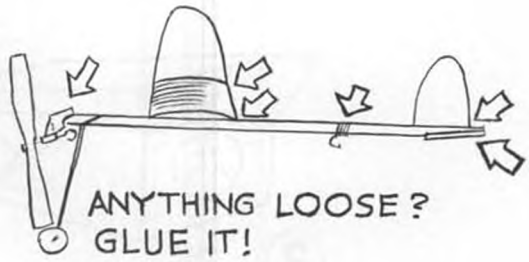
On a full-size aeroplane, there are certain parts of the wings and tail which are moved by the pilot during flight to control the plane. These are called "control surfaces." They are usually things that go up and down or to the side, which deflect the airstream. When we put some "wash-in" in the L.H. wing, it was to deflect downward more of the air passing under the wing. This extra downwash resulted in forcing the wing upward a bit, giving more "lift." We could do the same thing by attaching a tab to the rear of the wing and bending it down or up to give the wing on that side of the plane more or less lift. This is what pioneer aviator Glenn Curtiss and others used to control their "roll" (the Wrights used wing-warping to do it). This is adding what we call an "aileron" tab. With it, you can make flight adjustments more easily on the field. You can add a tab on the rudder which can be bent right or left to control the "yaw" of the model (way the nose points). Another on the stab can be used as an "elevator" to control the angle of attack on the wing, giving the whole wing more or less lift.

These control tabs do not *have* to be added, but may make it easier to adjust your



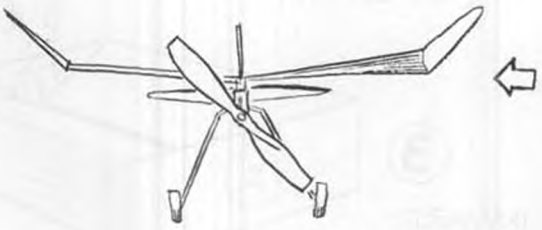
PRE-FLIGHT CHECK

1



ANYTHING LOOSE?
GLUE IT!

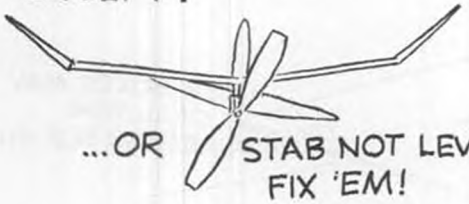
2



ANY WARPS? STEAM 'EM OUT WHILE TWISTING IN OPOSITE DIRECTION

RUDDER KICKED RIGHT OR LEFT?

3



...OR STAB NOT LEVEL? FIX 'EM!

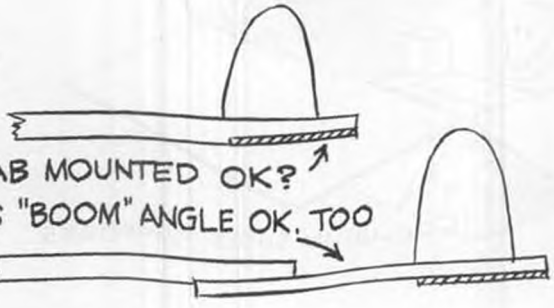
4

WING MOUNTED LIKE THIS

... OR THIS

...NOT THIS

5

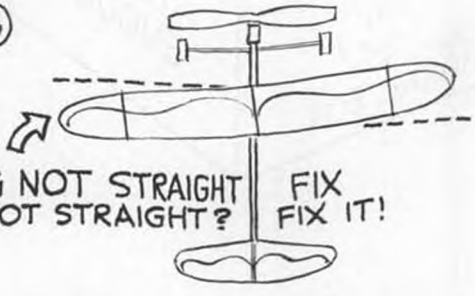


STAB MOUNTED OK?
THIS "BOOM" ANGLE OK, TOO

OR THIS

NOT LIKE THIS

6

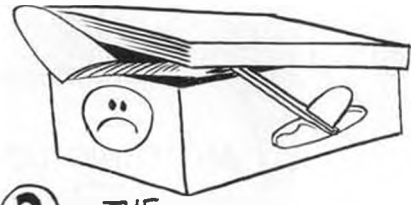


WING NOT STRAIGHT
WING NOT STRAIGHT?

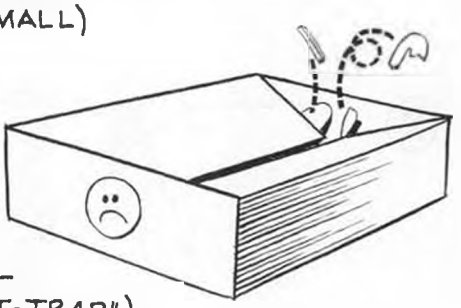
FIX
FIX IT!

PROTECTING YOUR MODEL

1 THE "CRUSHER" BAG

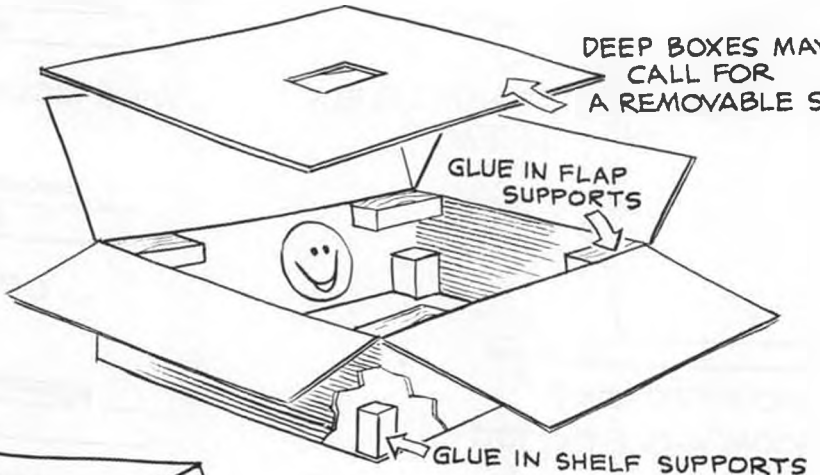


2 THE SHOE-BOX GUILLOTINE (TOO SMALL)



3 THE INWARD-FOLDING MODEL-CRUNCHER (OR "CAT-TRAP")

4 THE IMPROVED CAT-TRAP



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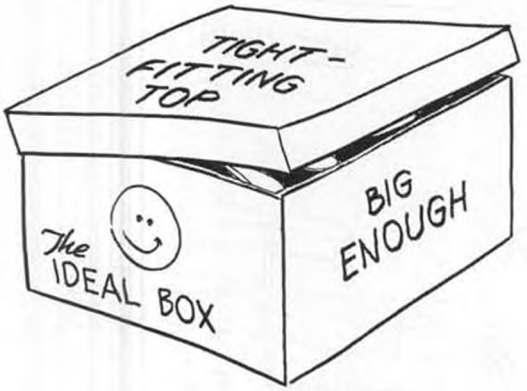

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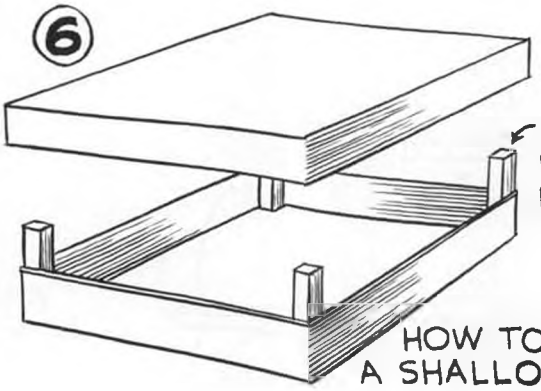

HOW TO ADAPT A SHALLOW BOX

plane for the first time out. What one generally does is to breathe heavily on the wing or tail part one wants to bend or twist while holding it twisted in that direction, and then letting it spring back to its new position. This may have to be repeated several times before it stays. Using steam or heat is better, but you may not have a stove on the field! One thing to avoid when using control tabs is to *not crease them*. They are not supposed to flop up and down or be hinged like the surfaces on a full-size plane. If they do flop around, your plane will do something different each time you fly, and that is exactly what you don't want! You could even cut them out of aluminum soda cans instead of paper to make sure they don't bend too easily (rough up the can material well so glue will stick to it). One other problem with using tabs is that you must never bend them without reason, as they *do* affect your flight very seriously. Never bend a tab more than about .050 inch at a time, as too much tab bend is worse than not enough in many cases. If, for example, you bend an aileron tab down 90 degrees (straight down), it will give *lots* of drag, and not much lift, and will pull the wing to the rear, tightening the turn. That may be what you want in some cases, but for right now, start with all your control tabs in a neutral position, neither up, down, right, or left.

PROTECTING YOUR MODEL

Finally, you should have a box to keep your model(s) in which is not only large enough to get your models in without parts hanging out, but which has a lid that can't fold down inside and injure your models. Fold-down flaps can be blocked up with a piece of wood glued inside to stop them. Never use a sack, as they are worse than using nothing at all, guaranteeing a crushed plane. Boxes protect models from accident, cats, and rain. Another tip is to carry your glue, winder, and other heavy stuff in your pockets or in a shoebox, but never in the same box as your models. You'll find out why later, the first time you drop your box and the glue goes through your tissue-covered wing!

I had hoped to get you into the air this month, as it's starting to get cold outside, but I decided that we just had to spend the necessary space on preflight. It is *so* important. Many a flying session has been ruined because the plane was not prepared right, protected, or because something important was left home. Next month, we fly! (In your school gym, if we have to!)

A special order sheet including all the stuff you may not be able to find at your local hobby store is available for a self-addressed, stamped envelope to Peck-Polymers, Beginners, P. O. Box 2498, La Mesa, California 92044; phone (619)448-1818. They stock Sleek Streeks, winders, small packages of rubber, rubber lube, etc. Their regular catalog, which is $2, is free with your first order.

Until next month, you might want to try making a couple more Sleek Streek B.A.R.F.s to replace the ones that you have put into the neighbor's trees so far, not being able to wait for the upcoming flying lesson!

Happy landings! •

Big Birds. . . . . *Continued from page 11*

"Every time I fly either one of these birds the same thing occurs; guys come over looking for the Quadra under the cowl and just can't believe that an O.S. SF .61 flies a 10-foot aircraft with power to spare."

Emil noted out that although these birds fly slow, they aren't floaters, and that no special tools, equipment, or engines are needed in order to build and fly 'em.

Both the Kitten and Sportster plans are $24.95, and plans for either fuselage alone are $14.95. A glass cowl is available for $17.95, just in case you're not too excited about making your own. And in case you'd like something a bit smaller, $17.50 will get you a set of 1/4-scale plans.

A REALLY BIG ROBIN HOOD

BIG Al Doerr, who loves to build B-I-G Birds, somehow found the time to crank out three different sized Robin Hoods.

Two of them, the "80" and the "99" were built from World Engines kits, but Al wasn't quite satisfied with these "small" birds and just had to go them one better, so he scratch-designed and built a 140 incher.

This great BIG Robin Hood weighs 28 pounds, has 3100 square inches, and a wing loading of 20.8 oz./sq. ft. For power Al stuck an OPS Maxi Twin up front, and it swings a 24 x 8 at 5600 rpm. According to Al, "It's the best-flying airplane I have ever built."

THOUGHT OF THE MONTH

From Doc Mathews, "God does not deduct the time spent building and flying model aircraft from a man's life span."

Al Alman, 16501-4th Avenue Court East, Spanaway, Washington 98387; (206)535-1549. Don't forget that our old 72MHz freqs won't be legal after December 21, so get your equipment updated ASAP.

Flying safety is no accident! •

Insiders. . . . . *Continued from page 49*

and this new Bostonian design from Bob's drawing board. The photo shows the "bones" of a very attractive bird. If you build it for strictly indoor use (Bostonian on the West Coast is a 14-gram event, mostly flown outdoors), we suggest making it of 1/20-inch squares and 1/64-inch sheet ribs to get it down to about 10 grams.

Here is some ordering info if you want to get the kit now, in time for Christmas building:

Peck-Polymers has just released its new Bostonian "Pup" kit, 16-inch wingspan, rubber-powered model. Designed by Bob Peck for sport or Bostonian contest, features all movable controls for easy adjustment. After adjustments are made, a small drop of glue keeps them in place. Flights of over four minutes are possible outdoors with thermals.

The kit is complete except for glue and paint. You will find high quality balsa, a clear full-size plan, instruction with photos, precision nylon bearing, prop wheel, wire, and tissue.

Pup kit stock number is PP-30, and the price is only $7.95. Available from your dealer or direct from Peck-Polymers, P. O. Box 2498, La Mesa, California 92044. •

Control Line. . *Continued from page 61*

the hinge and rub it down good. When all the hinges are on, apply a second coat of glue and let it dry thoroughly. Now, here is a trick. Break out your Monokote iron and iron the hinges around the corner. They iron right down and make joining the two halves a snap. Now tape the two surfaces together and then finish the hinging job.

"If you want the job to go really fast, just apply the aliphatic resin to the wood, and after it's dry, just iron the hinges on! They will iron right down just like Monokote. Apply more glue after ironing to be safe.

"Closing the gap in control surfaces will reduce drag on your model, and it will go faster. But to go really fast, you need to take a hint from the U.S. Government. They have done modelers a great favor without even knowing it. Of course, they probably wouldn't have done it if they had known it would help any of us! They have proved that they could prevent anyone from going too fast in automobiles by the simple idea of requiring that all car speedometers read only 85 mph. We all know that since the 85-mph speedometers have been installed, no one has ever exceeded that speed.

"Now with that knowledge, we have an easy way for getting more RPM out of our engines. Merely buy a tachometer that has a higher RPM reading. Now, when you tach your engine, it will automatically rev higher in order to keep up with the new tach. Finally there is a way to get more power from all your engines."

Thanks for the, uh, tip, George. I am carrying out this concept in my speed flying now. I have a special stopwatch that reads only up to 9.0 seconds. Now whenever I fly any of my ships, they will always be going at least 200 mph! You read it here first!

FLASH! U.S. FAI TEAM TRIALS RESULTS

During late August and early September, special contests were held around the nation to determine which individuals would have the privilege of representing the United States at the next World Championships for CL. The next World Champs take place in Kiev, Russia, during the summer of 1988.

The events flown at the World Champs are: Precision Aerobatics, Team Race, Combat, and Speed. All of these are of the FAI event variety, which means that except for PA, .15-size engines are used.

In each event, there are three members who will be in the US contingent, except for Team Race, where there are three teams of two members.

In the Precision Aerobatics event, the top qualifiers were: Jim Casale, Paul Walker, and Bob Baron.

In Speed, it was Carl Dodge, Chuck Schuette, and John Newton.

In Team Race, the top duos were: Jeff Hollfelder/Tim Gillott, John McCollom/Tom Knoppi, and Stew Willoughby/Bob Oge.

The top Combatters were: Tom Fluker, John Stubblefield, and Steve Kott.

Congratulations to all on the fine perfor-

mances. Good luck in Russia!

Next month it's back to Racing Stuff! Keep your wires dry. Mike Hazel, 1073 Windemere Drive NW, Salem Oregon 97304. •

Choppers. . . . *Continued from page 13*

out the remaining range of t/c stick travel. Using the point setting, the rate setting, and, oh, yes, the low end throttle trim level as well, you can fine tune your helicopter to help achieve that ideal constant rotor speed.

IDLE UP-2 is used for aerobatics. It also has a POINT trimmer and a RATE trimmer, but they're both located in the back of the transmitter. Here you want to maintain nearly full rotor speed throughout the range of collective travel. There is also a trimmer designated LOW PITCH-ROLL. That permits you to have yet another low-pitch setting for just aerobatics. You might like this one to be -4 or -5 degrees so that you can maintain altitude with full rotor speed while inverted in a roll or split-S.

THROTTLE HOLD is one of the most important features of a helicopter radio. Two main functions are performed at the flip of a switch. Throttle setting instantly goes to a preset position—generally the lowest reliable idle you can get. Secondly, the operation of collective pitch separates from the throttle. That duplicates the effect of a dead engine, but without actually killing it Using throttle hold you can practice autotrotations without having to restart the engine each time. Also there's the advantage of being able to abort the auto by simply switching off the Throttle Hold.

Throttle Hold has its own low-pitch setting, found, again, in back of the transmitter. It's designated LOW PITCH-HOLD. Set the negative pitch for the best autorotation. For my Competitor that's about -2-1/2 degrees. The Schluter fliers say that -5 degrees works best for them because of the wider Schluter rotor blades. Directly below the LOW PITCH-HOLD trimmer is another trimmer designated HOLD DE. You can set a zero- to three-second delay in going from normal low pitch to throttle hold low pitch. Robert Gorham uses the full three seconds in going from his normal -2 degrees to the -5 degrees he uses for autos. This gives him a smooth entry into the auto, without the sharp drop that would spoil the maneuver. Robert likes to have that extra negative pitch to give him more control in shooting for his target spot; also to speed up the rotor if he needs to.

When you go into throttle hold mode, your end-point pitch adjustments are bypassed. This gives you the benefit of all that top end pitch that you had to take out to keep from loading down the engine. That extra pitch may come in handy in an auto to brake your chopper as it approaches touchdown.

More next month. •

Simply Scale. . *Continued from page 37*

when, where, and how they must fly. While it is quite true that this structure exists at competitions, I feel that since the exact cir-

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cumstances and rules apply equally to everyone, why not just sit back and relax and let the contest's chain of events guide you to showing and flying your model at your own events guide you to showing and flying your model at your own special designated time. I feel that to enjoy a scale competition you must watch, listen to, and enjoy the other modelers and their models in the same way we do when we go to a fun-fly. After all, if you are there mainly to show and fly your model and enjoy the company of others, then what's the difference what place you end up in. I personally find it more interesting to watch each model fly, in its own turn, a planned pattern of scale-like maneuvers emphasizing realism in every part of the flight. To me, this is the most challenging way of presenting your model. After all, whether it is a fun-fly or competition, that is what we are doing, presenting our models for the enjoyment of ourselves, other modelers, and the spectators, usually in that order of priority.

Even if we feel we could never win, maybe we don't have enough or any documentation or maybe we can't fly all that well, why not enter anyway. It's a great learning experience and really builds up some enthusiasm to improve for the next time. That's why there has been established different levels of competition; Sport Scale, Stand-Off, and FAI. There are events for everyone, no matter what type of model or level of expertise.

In closing I would just like to say a few words to all those guys out there who work hard to run contests and judge models at them. I commend them heartily for their efforts. I only ask that they continue to give encouragement to the newcomer, no matter how ill-prepared for competition he may be. A few words of encouragement and some helpful suggestions will go a lot further to developing the level of our competitions than will impatience, criticism, or indifference. Let's keep contests fun.

Don't forget to send in your photos and letters. Other modelers always want to hear about your latest project.

Just a small thought for you to ponder: What do you get if you install a Perry carburetor on a Como .40 engine? Think about it. Until next time, keep flying—for the fun of it! •

Peanut. . . . . . *Continued from page 53*

plan and cement the final center top rib chord in place.

The construction of the canard is also done over the plan, but because of the bamboo leading edge and the plywood bottom plate it has to be built one side at a time. Cut the bamboo leading edge to length. (I used a cooking skewer as a source for my bamboo.) Bend the dihedral angle in the bamboo. This can be done by hand using a little trial and error. Cut the bottom plate from 1/32 plywood and bend the dihedral in it also. This dihedral angle bend is small enough that neither the plate nor the leading edge should break at the bend, but they should hold the dihedral angle permanently. Make the canard spar from 1/16 by 1/8 balsa.

Pin the left-hand side of the spar down on the plan and the left trailing edge and cement three ribs in place. Slide the left-hand side of the plate under the ribs and cement it to the ribs and where it is butted against the spar. Add the leading edge and the 1/16 square diagonals that run between the spar and the trailing edge.

When the left-hand assembly is dry, push the right-hand side of the leading edge, plate, and spar down on the plan, and install the right-hand ribs trailing edge and diagonal braces.

All the major structure has now been constructed and should be prepared for covering. The leading and trailing edges of all the surfaces must be shaped to the cross-sections shown on the plan. Typically the

leading edges are rounded and the trailing edges are tapered to a triangular section. Take a couple of lengths of paper clip wire and poke them through the canard spar flush with the plate and all the way up to the leading edge. Cement them firmly in place on the top of the plate.

Now, using 240 or finer sandpaper, smooth all the structural components so there are no unwanted bumps or strings of cement, etc. Cover the model using your favorite lightweight tissue. The model in the photos was covered with red Japanese tissue because I like red and I don't know what color the real plane was. Bill Hannan who helped generate the three-view presented from several photographs and a couple of three-views with obvious errors wrote to Romania, but his contact was unable to get the color scheme. The photos that I have seen make the airplane look like some relatively dark color but could also be flat aluminum. Bill's three-view looks very good with respect to all the photos I have seen.

Final assembly consists of cementing the fins to the wings, cementing the wings to the fuselage, and installing the canard surface. This is done by poking the wires, extending aft of the canard spar, through the block on the front of the nose and into the filler balsa that supports the nose gear.

Details include the windshield, the dummy engine cylinders, and the landing gear struts. Medium Williams Bros. dummy cylinders were used and are cemented to the fuselage but not to the thrust block, which must be removable so the rubber motor can be stretch wound for maximum turns.

When the model is completely assembled, check it over carefully to see that everything lines up properly and that there are not any noticeable unsymmetrical warps. The model in the photos has a little washout that warped into each wing, but the washout is symmetrical and probably is really a little help in preventing a tip stall and subsequent spiral dive. The model should balance somewhere near the CG shown. If it doesn't, ballast it with modeling clay until it does. Try a hand-launched glide either over soft grass or from a very low altitude to determine at least approximately the correct canard setting. The trailing edge of the canard needed to be an eighth of an inch below the fuselage on the model in the photos, which is significantly more up elevator than shows in the three-view.

This model is sure to attract some attention at the model field. Have fun with your R.M.12. •

Electric..... *Continued from page 35*

doing this so-called testing for fifteen years! We know how much noise a good prop makes, and it is very little, whether geared or on direct drive up to 16,000 rpm.

There are two sources of noise that a good prop might make that are not its fault. One is the overspeeding, the prop is turning beyond its practical design speed (tips are going supersonic), the other is off centering. The latter would be due to a motor or engine that had a bent shaft or in which the prop holder had been manufactured so that it is off center. Hopefully, this is rare. Balance your props, and fly quietly!

A few columns ago I passed on some info from Les Adams on the inexpensive (cheap!) little camera selling for $3 just about everywhere, including supermarkets. Les set up one for aerial photos. Well, Al Weber (of the servo board throttle fame) tried it, and I am impressed! You really get a lot for such a tiny investment. Take a look at the photos, which tell the story. Al has the camera and the trigger servo mounted on top of the wing of his motor glider (it appears to be an Olympic 650). The mounting is really simple, just slip the wing rubber bands over the servo lugs or put the servo on a plate for more area for the rubber bands. Al is using the 3.8:1 Leisure gearbox with the RX540 Technipower motor, and older prop is Al's own design. The quality of the pictures is as good as most Instamatic 110 photos, that is, fair. Al says that you do have to turn the motor off to get clear pictures, the shutter speed is slow, and the vibration will show up in the photos. Two of the photos, a sunrise at Pompano Beach in Florida and the high rises along the beach, are especially good.

The camera does not have a motor wind, so it is one shot per flight, but that is not really a big deal. If you want to take lots of shots per flight, consider buying the Ansco M35 motor advance camera, it is autowind, takes 35mm film, and only weighs 7

ounces. Most 05 motor gliders could carry it. It is reasonably priced, retail is $35, but I have seen it discounted on sales to as low as $20. I have one, and the photo quality is much better than 110, and fair compared to most 35mm cameras. I haven't flown it yet! Thanks, Al, for the info; you sure have a neat flying area!

Bob Kopski sent a correction to me on the Astro DC-DC Super Charger Modification article in the September '87 *Model Aviation*, page 83. Bob has already issued this correction in *MA*, but it is worth repeating it here if you missed it. In the drawing showing Q1 and R4 (control pot), the word "emitter" should be changed to "base" for Q1, and the word "base" should be changed to "emitter." There are two wires on the right, and there the word "green" should be changed to "yellow" and the word "yellow" should be changed to "green." Once this is done, all is well. The original setup does not work; it blows fuses. It does not destroy anything, so do the changes, and you will be in business. Bob was very embarrassed by this, as it all got by his proofreading, but I know how very hard it is to get a technical article printed correctly. It seems that there is always a slip up, examples are the frequent corrections in *Radio-Electronics* magazine and the corrections needed for the Cano throttle. It happens to all of us. Keep on writing, Bob!

I mentioned awhile back that Astro has new output transistors for the DC-DC charger. If you wish to charge to these, have Astro install them. I did it myself, and it was a challenge! The change still drops quite a bit from start to finish. Bob's improvements should help, see the *MA* article.

A quick mention, since I have not had time to finish testing and cannot give you all the details yet. I ordered the Kyosho AP-20 motor from Tower Hobbies. It is listed for $15.99. It is a lovely little motor, just right for 035 planes. I think any plane that flies well with a Cox Baby Bee .049 will fly well with this. It seems to like six cells best, on a 5-1/4 x 3 or 5-1/4 x 4 Top Flight, or Cox 6 x 3 gray prop, at better than 13,000 rpm. Very good! I recommend an AA six pack, to keep it light. The motor weighs four ounces, an AA six pack is five ounces, so a well-built 049 plane with a light two-channel radio should come out between 20 to 24 ounces. 200 to 250 square inches should be about right. Have fun!

One last piece of miscellany, then enough! Puget Sound Electric Model Fliers (PSEMF) are now off and running. They have a quarterly newsletter which is well worth the measly $5 it costs to join. Send your $5 to Ben Almojuela, 1941 Sixth Avenue West, Seattle, Washington 98115. Like all newsletters, this one rests heavily on the shoulders of Ben and Bernard Cawley, so when you join, send a newsy letter along with your five bucks, so they will have things to publish! While you are at it, I suggest you ask especially for the second issue of the newsletter, which has excellent articles by Ben on the Cano speed control and the Al-Tec gearbox, and what gearbox to use by Bernard Cawley. Well, for now, enjoy the holidays with silent flight! •

R/C Soaring. . *Continued from page 45*

dinates and a print out of the computer's drawing of the section. The contradiction between the coordinates as originally published may have been a typo. Certainly with the TE at +/- .3 percent you have a more realistic TE thickness.

Included with the airfoil info was yet another photo of Marilyn, this time in much warmer weather judging by the greenery and Marilyn's attire! You see, I told you he was proud of her!

The caption information found on the back of the photo indicates that this is a two-meter belonging to Marilyn called "Manic Monday" (wish it was Sunday. . .get it?). It has an Eppler 214 section wing with a flat, one-piece center section that is 36 inches long with flaps the entire length. Mirage-type dihedral is present, but not quite obvious in the two-dimensional photo. The wings have an area 744 square inches big and are stabilized by a horizontal stab that is 14 percent of 104 square inches. The Manic Monday weighs 40 ounces for a wing loading of 7.7 oz./ft. squared. The fuselage is one of Terry Luckenback's two-meter designs molded in Kevlar and epoxy. The fuselage only weighs 4.5 ounces.

The last Rich Border photo I have to share with you is a wing hold-down system that appears to be a really good compromise be-

tween the good old #64 rubber band and steel bolts.

Rich says, "Terry Luckenback used a hold down like this on his 16-foot X/C. By tightening the cables down 'just snug' the wing can slip if you catch a tip, but can't lift up." Apparently there are two socket head bolts which hold the cables in place. There must be some kind of loop in the end of each cable crimped in place by a brass tube, although I can't be 100 percent sure. The rear end of the two cables must be permanently bolted or glued in place, staying with the fuselage. It looks like a clever idea.

If you'll note, there is another clever idea just ahead of the cables, namely, a Dodgson-type elevator compensator for the flaps. The servo closest to the cables is the flap servo, and the first servo is the elevator servo. The white arm pivots on the output arm of the flap servo so that the elevator works normally. However, when the flaps are moved, the white elevator arm pivots at the opposite end pulling some down elevator compensation in the process. Neatly done, Rich.

AIRFOIL OF THE MONTH: EIGHT-PERCENT E374

Elsewhere in this magazine is a report on a contest where I witnessed the flying performance of a remarkable electric-powered glider called the Voltera by Chuck Hollinger of Costa Mesa, California. Chuck took the venerable Eppler 374 section and thinned it down to eight percent. This resulted in a remarkably fast and flat-gliding model that was still able to thermal well.

You will need to build a wing using this section very strongly though, as it is pretty thin. If I were to build a slope racer or a multi-task electric glider as for FAI/F3E I think I'd give this one a serious nod. Build it with plenty of carbon and a good, strong shear web!

"PAUL'S THING," AN ELECTRIC GLIDER

Lately good mail from the East Coast has been on the rise, and the following letter from Raleigh, North Carolina, follows closely behind Rich Border's New Jersey contributions. This one was submitted by Paul S. Smith, and it reads as follows:

"Dear Mr. Forrey, Enclosed are some pictures of a pod and boom electric sailplane that I more or less scratchbuilt—threw together may be a better description. The wings are from a Goldberg Electra that I landed too hard and wrecked the fuselage of. (*That's not hard to do, I've seen the Electra's fuselage structure—wrf*) I built the stab using Airtronics' Olympic II plans with my modifications for high rudder horn and rear exit elevator horn control. The pod and boom are my design, and I think they are unique. Maybe they aren't, but I haven't seen one before.

"I took a Black Baron Film tube (a MonoKote tube will work too, but it is a large diameter) and covered it with two-ounce glass cloth and epoxy. I wrapped it in a spiral motion and applied Hobby Poxy 1

because I was afraid that the slow set epoxy would sag to the bottom of the tube. Then I poured epoxy down inside the tube and swabbed it out with a paper towel and rod like cleaning a gun barrel. When it dried, I had a very strong and straight boom.

"I used an Astro Flight 05-geared Cobalt motor with a 12 x 8 Master Airscrew folding propeller and an Astro Flight electronic on-off control. The guys in my club, RISE, call it "Paul's Thing." Ron Normark gave me your name, by the way!

"Please watch for my electric Old Timer kit that will be introduced at the 1987 Chicago Show by Guillows. I hope you will like it. (*Okay, I'll look for it—wrf*)

"I am new to your magazine, but I have really enjoyed your June issue. You have a good format, and I will be a regular reader from now on. Yours truly, Paul Smith.

"P.S.—Also included are photos of my newly completed 160-inch (*E-gads! wrf*) Olympic II. I blew up the plans and scratch-built it. Its functions are: rudder, elevator, spoilers, flaps, and tow hook release. The radio is an Airtronics 7SP Module."

Thank you very much, Paul. I'd be willing to bet that monster-size Oly's a real dead-air or light-air wizard. Your pod and boomer looks really nice too. I wonder how much it ended up weighing.

That's going to have to do it for this month. Hope to have you back next month for another edition of "RC Soaring." Find lots of hot air when you fly, Bill Forrey, 5815 E. La Palma, #281, Anaheim Hills, California 92807; (714)777-4514. Call me after 6:00 p.m. (but before 9:00 p.m.) West Coast time. •

Hannan. . . . . . *Continued from page 51*

lovakia, Germany, and the USA. The variety was outstanding, ranging from Wright brothers' designs through modern home-builts. Flying was conducted outdoors during a two-day period, and weather conditions appeared favorable. We expect to present more complete coverage next month. However, in the meantime we extend our congratulations to the organizers and contestants!

AND IN CZECHOSLOVAKIA

Lubomir Koutney and Pavel Jelinek have described some of the indoor scale model activities in their country. Contests were conducted in four different locations during the 1986/87 winter season. As is usual in Peanut contests everywhere, the choice of subjects was remarkable, and included airliners and seaplanes, which achieved durations of about a minute.

One indoor meeting attracted over 70 Peanuts and introduced the Pistachio category, with ten models entered. We enjoyed Lubomir's comment about them: "Only a totally crazy fanatic modeler can build these super-little models. . . I built three!"

PIONEERING PISTACHIOS

Tiny flying scale models are not a recent development. Ken Hamilton sent in a 1932 advertisement offering ten different kits ranging in size from six to eight-inch wingspans. Ken owned such a model at the time, a Curtiss A-8, which featured a hollowed balsa fuselage, thin sheet balsa wings, and a very small diameter propeller: "The weight, coupled with the tiny prop resulted in a quick buzz of a flight. . . we used to hand-wind the model (stretching and lubing the motor were unknown to me then), then set it down on our porch aimed out over the rear lawn. It would race over the smooth concrete, climb a small amount, run out of turns over the lawn, where it would glide steeply down and tumble upon snagging in the grass, no harm done. As best as I can picture, the flights were all of 30 to 35 feet, a far cry from what experts are achieving today with lighter models, better propellers, longer motor runs, *and* a bit of know-how, totally lacking on my part."

INTER-GNATS RESULTS

Thanks to *the Hangar Pilot* newsletter, we have a summary of the Fifth Annual Florida Pistachio Proxy meet. Among the highlights were five models exceeding one-minute duration, and David Aronstein's Russian ANT-25 establishing a new world's Pistachio record of 2 minutes, 21.5 seconds!

Three weight classes were sanctioned: Category I (less than two grams), Category II (two to three grams), and Category III (over three grams).

CATEGORY I

Place Builder Model	Weight (grams)	Scale Pts.	Best 2 Flights	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

3 Don Martin, [illegible] 14	16	800	411	450
4 Millard Wells, [illegible]	12	655	1251	1217
5 Mark Allison, Turbo Porter	14	845	116	297
6 Don Martin, [illegible]	16	684	576	562
7 [illegible]	10	514	[illegible]	2213
8 Patty Smith, [illegible] (Patty's first ever model!)	12	611	1042	1061
9 [illegible]	13	810	504	116
10 Jim [illegible] (Japan), Dornier	10	107	495	320
11 Millard Wells, [illegible]	13	[illegible]	382	112
12 David Anderson, [illegible]	10	495	503	318

CATEGORY II

Place Builder Model	Weight (grams)	Scale Pts	Best 2 Flights	
1 [illegible]	22	[illegible]	[illegible]	102.4
2 Charles [illegible]	21	690	569	580
3 Millard Wells, [illegible]	25	680	620	580

CATEGORY III

Place Builder Model	Weight (grams)	Scale Pts	Best 2 Flights	
1 Mark Allison, [illegible]	11	884	118	142
2 [illegible], Farman Sport	42	919	501	48
3 Don Martin, Dornier 212	18	840	400	355
4 [illegible] (Japan), Smith	90	1011	120	120
5 Millard Wells, [illegible]	10	248	362	459
6 [illegible] (Japan), Anderson	55	[illegible]	117	167
7 [illegible] (Japan), [illegible]	40	814	180	140
8 Millard Wells, [illegible]	15	764	[illegible]	142
9 Millard Wells, Cessna [illegible]	10	640	150	157

Although it may seem tedious comparing all these statistics, much can be learned by examining the affects of scale judging points, weights, and duration times. Since this is the newest of scale model events, and the one best-suited to international proxy competition, this detailed analysis seemed justified.

To more thoroughly appreciate the performance potentials of Pistachios, as well as the fun involved, see them in action on Mike Arak's videotape. Priced at $19.95 plus $3 postage and handling from Arak, 10900 S.W. 61 Court, Miami, Florida 33156, we consider it both instructional and inspirational!

BEAM-POWERED AIRCRAFT?

The old expression "on the beam" may take on new significance in the near future, according to newspaper reports sent in by Ed Whitten and Mark Fineman. Radio frequency waves from ground-based transmitters would be converted into useable energy for propulsion in aircraft or space vehicles, according to Canadian and American researchers. The concept is not new, having been explored by Nikola Tesla about 1899. In theory, beamed-energy could keep a craft aloft as long as desired, since flight duration would not be limited by fuel on board. Practical experiments are currently (if you'll pardon the pun) underway.

JET-X AVAILABLE

It used to be JETEX; however, the 1987 name is JET-X, according to Peck-Polymers, who are now marketing the products. In addition to the engines and fuel, they offer spare parts, wicks, gaskets, and an instructional booklet relating to maintenance of the engines and design of suitable models. Send a stamped, pre-addressed envelope for more details to Peck-Polymers, Box 2498, La Mesa, California 92041.

MODELS IN MEDIA

Recently R.H. Growald, a writer for the *San Diego Union* newspaper, interviewed Tom Arnold, of the Scale Staffel model club, and we would like to share a few of the comments: "A model-airplane builder knows what goes up may come down with a Good Grief. Tom Arnold knows. . . . Arnold stands in his garage. It is a hangar. Model planes hang like decorations on a Wright Brothers' Christmas tree. Some dangle rubber bands from open noses. Some

have propellers cut from cottage cheese tubs. Some are just ribs without the clothes of paper tissue."

After explaining that his hobby dated back to his early youth, Tom mentioned that he had once wanted to be a Navy flier and maybe an aeronautical engineer. However, at Annapolis academy he was amazed to find nothing but graphs and charts and math. No pictures of planes. No romance. Thus the return to modeling. "Now, with a model I can conceive the plane in my mind, build it with my hands and then I am the test pilot, and I don't get lost in details." Asked for his wife's reaction to his hobby, Arnold smiles: "Karen approves. She says model planes keep me out of the bars and away from strange women."

MODEL FLYING: THE FIRST 50 YEARS

Compiled by Vic Smeed, this fascinating publication follows in the footsteps of *50 years of Aermodeller.* Comprised of hundreds of plans, illustrations, and advertisements in scrapbook form, the compilation touches lightly upon the pioneering period before successful full-size aircraft, then proceeds in greater detail from 1903 to 1950, employing abstracts from such magazines as *Flight, Flying Aces, Flugsport, Air Trails, Modele Reduit D'Avion,* and *Model Airplane News.*

All types of flying models, including gliders, rubber-power, "gas" (steam, CO_2, and compressed-air also), control-line, and radio control are featured. The accent is upon the unorthodox types, with a liberal sprinkling of flying wings, canards, and even some autogyros. Designers mentioned read like a modeling who's who, as witness this random sampling: A.V. Roe, Louis Palhan, Joe Ott, C.H. Grant, E. Fillon, Henry Struck, Carl Goldberg, Earl Stahl, Claude McCullough, Sal Taibi, Frank Zaic, and, well, you get the idea.

If you think there is *really* anything truly new in this hobby, consider a four-cylinder, four-cycle engine produced during 1913! Or, how about a book published during the 1940s called *Darn These two-Cycle Engines!* It's all here and much more.

If you have even the slightest interest in the historical aspects of model building, you should obtain a copy of *Model Flying; The First 50 Years.* If unavailable from your local bookstores, write to the publishers, Argus Books, Ltd., One Golden Square, London W1R 3AB, England, for ordering information.

SIGN-OFF TIME

Abstracted from the *Florida Aviation Historical Society* newsletter, this item from an unidentified St. Petersburg writer: "It is with utmost urgency that I caution members about an imitation compass called the *Tates.* Tates look like (ordinary) compasses, however, they don't all point north. Many have 385 degrees; some are divided into fewer than 263 degrees. Often those that do have a north, have a reciprocal of west—or sometimes east. *Extreme caution is urged*—for he who has a Tates is lost!" •

Chickums. . . *Continued from page 41*

won't need any fastenings to restrain it unless you are going to stunt with your plane a lot heavier than normal! Depending on your planning, you may need a hatch to cover the aperture in the pod or fuselage that you are not using. Of course, these apertures should be the size of the outside of your "sunshade."

No illustration is given for the above. Its whole design depends on the camera you use and the airframe you will put it in. The above description is pretty clear and is intended as a starting point to the design of your own Custom Camera Module.

The almost-simultaneous development in the Paypod Saga, which is what my good friend Colin Borthwick in Australia calls it, was the incorporation of a variometer in the system. Ah, Borthwick, I knew him well. Yet, his Merrillyn . . .a veritable Creature of Delight, indeed . . .with eyes like start of twilight fair, from twilight too, her dusky hair—but all things else about her drawn from Maytime and the cheerful dawn. Alas, I digress, and we must trade pentameter for variometer with greatest haste and flair, for I hark the measured tread of our Lord Northrop on the pave of the stair!

The testing of the excellent variometer marketed by Ace as the Thermic Sniffler was reported on in the May and June issues of *Model Builder* during the initial tests of Paypod. This instrument measures the rate of change in altitude as an easily-detected change of frequency telemetered to the variometer receiver. Planning to develop a frequency-to-voltage analog for this equipment, thereby providing "numbers," we decided to put it on the shelf for awhile pending such development.

Having obtained the Condor Tele-Tachometer TT-01 we decided to incorporate it into Paypod's instrumentation, since this system provides telemetered airspeed and engine rpm. Airspeed will be of great assistance in determining the time between exposures when flying a "mapping" grid, and both parameters will enable in-flight data to update and expand the propeller research published in the January and February issues of *Model Builder.* We, like everyone involved in R/C, have a mortal fear of anything producing radio frequency noise or that may de-tune the R/C receiver by changing its "ground plane" due to an excess of airborne wiring. This resulted in a *lot* of testing before we took Paypod out for a flight test!

The normal installation for the airspeed

sensors would, of course, be in the wing. We wanted the tele-transmitter in the wing (so that its antenna would be perpendicular to the R/C antenna for minimum interaction, R/F-wise). Such an installation requires two long two-conductor cables passing the R/C receiver in the fuselage on its way to the pod. Putting the airspeed transducers in the wing would triple the problem! Therefore, we built a short wing with a symmetrical section at zero degrees incidence, span 16 inches, and chord 1-1/2 inches into the top of the pod, and mounted the airspeed transducers on its tips out of the prop wash. Paypod is no longer a monoplane, but is now a sesquiplane!

Rainer Wiebalck, of High Sky, sent us a tiny altimeter module and a four-position electronic switch ESS-4 (also tiny), both compatible with the Condor TT-1! As if this wasn't enough, two days later he sent an opto-coupler, which electrically removes all telemetry wiring from the R/C circuit. This wiring the electronic switch brought into the picture, since it uses the flap control circuit to position the ESS-4. The airspeed sensors could safely go in the wing! However, the pod position is more versatile for the uses of Paypod. The finalized Paypod Telemetering Schematic is presented in Figure 1. As flight-tested, the two Airspeed sensors were used in ESS-4 positions 2 and 3. Since the test, Rainer has sent me a Rate of Climb/Descent Meter prototype! I have shown this transducer (Figure 1) in ESS-4 position 2, and either the High Speed or Low Speed in position 3 via a manual selector switch which, incidentally, is provided in the TT-1 system purchase. It could be actuated with another channel, but a manual selection is satisfactory for Paypod's purposes. If I decide to telemeter this change (when not using the retract switch for photography) I can put a microswitch on the photo servo to provide this function. Testing of this new meter is in process and will be reported in the next P&F&CT when editorial space is available to it. It is an exciting instrument, as are all of Rainer's creations. By the time you read this, all the equipment will be available from Condor. No instructions for use of any of this equipment is presented in this P&F&CT due to space. Instructions for each instrument will be complete and clear, at once intuitively obvious to the most casual unlearned savage, as Sylvestor likes to say.

One suggestion, however, is to standardize your connectors. I come off the telemeter battery, go through a switch, and terminate on a female connector "bus" of five Molex connectors Hot-Stuffed together with 1/8-inch balsa spacers. This whole assembly is cemented firmly in the pod and is of easy access. I also use female pins. On each module plugged into this bus, I use male plugs with male pins. I included a spare, just in case Rainer comes up with another module! Also, the use of Molex connectors for power and the Futaba connectors for inputs/outputs eliminates horrible mistakes!

The testing has definitely established there is *no* interference with or degradation to the Futaba operation, and I have the *old* six-channel model, five years old and due for a checkup—the last was two years ago! I don't recommend this schedule, but that's the way it is! There seems to be a tad of interference with the tele system, which is on 40.695 MHz and the R/C on 72.590 MHz. However, it is occasional, quickly clears, and causes no safety problem. The tach fluctuates between 3550 and 3650 (should read 3600) when "reading" a fluorescent light on either the 15,000 or 30,000 rpm scale. It is entirely possible these glitches may be attributed to the proximity of the Futaba trannie.

The High Sky Altimeter was checked out in an altitude chamber, using a large jar, the Hangar 3 shop vacuum, and an Airguide Altimeter, this equipment shown in one of the illustrations. An aquarium aeriation valve was used to vary the pressure within the jar. The normal leak of the jar (they don't make seals like they used to) was a help, for with the valve wide open to the vacuum it was possible to reach a simulated altitude of almost 4,000 feet. A plot of the Airguide readings versus the High Sky readings was linear. . . but with exactly a ten-percent error throughout, the Airguide being the lower! We took the Airguide over to our local mountain, zeroed the Airguide at sea level and took it up to 3,000 feet, according

to the highway surveyed elevations. Both going up and down the Airguide read almost exactly ten percent low, and the sea level altitude reading was very little changed. Rainer did an excellent job. By the way, the only adjustment is the ground level altitude zero, which must be done before each flight, like any altimeter, so provide a "tweaking hole" in the side of the pod (or fuselage). The meter is temperature compensated in regard to its electrical components and will respond only to changes in barometric pressure.

One last remark concerning my visit to San Antonio. Charlie took me over to Don McClusky's workshop, where I met his very nice wife Marie and his extraordinary machine shop. He showed me a scratch-built Orwick and an absolutely gorgeous Baby-Cyclone. It has that free "dance" feel when slowly turned through compression. The only original part was the stack—he hasn't made that part yet. He even does his own foundry work. He and his son are doing this magnificent work, but he has no present desire to "go commercial"! Those engines Colin Borthwide and Merv Buckmaster wold declare "loverly"!

See ya in the Chicken House, y'hear? •

Ramblin'. . . . . *Continued from page 39*

was truly enhanced. It might take a couple of columns to show you how much fun their Nats was.

But although they may have needed contestants, I think Leo simply offered me, in true Australian warmness/friendship, a chance to fly his new reserve thermal glider. And the JR transmitter was already on Mode I. About 90 percent of the Aussies fly on Mode I, so I was right at home. I tend to be a contest flier. I like to strain myself among other contestants. Like Avis, I try harder at contests. My own present competition glider is an original design I call the "Florida Flyer," and it's now over 10 years old. It is a superb handling 100 incher of non-orthodox original design that has only failed to place once in about two dozen meets, including the US Nats. I strongly believe the bottom of a thermal glider's wings should be so smooth a fly can't land there; I strongly believe the top of a thermal soaring glider's wing, starting at the high point or earlier, should be covered with a textured or *non-smooth* material. The Florida Flyer is covered this way, and its directional control is so fine that spot landings are where I've done most of the winning with this old model that locals say is the only R/C glider in the USA eligible for monthly social security payments!

Well, Leo's loaned glider was Solarfilmed on the bottom and Solartexed on the top. A few hand tosses showed the dihedral/rudder combination was just superb for close-in steering to a landing tape measure. One winched test launch showed arrow-straight ascent, and it circled best tightly to the left for some insignificant reason. The glider is named "Stepp 3," was designed by Rex Brown and Leo's son, Mike O'Reilly, who's been on Australian FAI glider teams and knows what he's doing. Gawd, I had an absolute winner in my hands and knew it! It didn't matter that there were 35 other entrants (thermal soaring was their single biggest Nats event). I was so thrilled with the Stepp 3's flying, I'd even forgotten new-friend Leo's warning not to beat him or son Mike with the loaned glider. Hertz, my name is Avis, and I'm gonna eat you alive!

The Aussies throw the FAI rulebook to the winds for many modeling events, just as is done in the USA and many other parts of the world. The thermal gliding event had a neat set of rules and a totally *unique flying system* that I've never seen. The contestants were divided into teams of five fliers, as such I actually had four helpers as I flew. My team was Rex Brown, the co-designer of the Stepp 3 I was flying; Murray Scott, the publisher of one of Oz's two model magazines; Mike Frizell, the state secretary of the South Australian Aeromodeling Association; and Lester Vine, from Adelaide.

All this team would let me do was *fly*. Boy, was I ever well-taken care of! They plugged up the model's battery, checked the wind, launched after getting the flies off my eyeballs, and even shielded the sun from this Yank's face. Then they bug-sprayed me in

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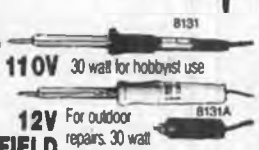

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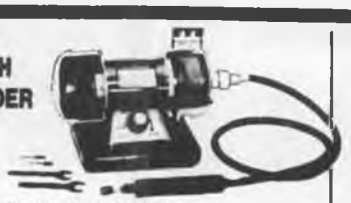

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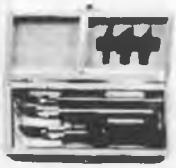

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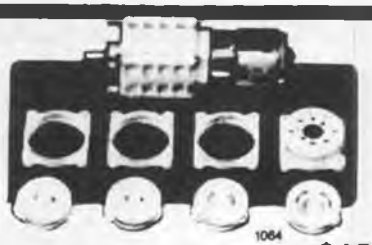

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Polk's model craft Hobbies

flight with Aerogard to help keep the flies, which are Australia's National Bird, out of my line-of-sight. Fun!

On the first day we were to make four flights and four on the second and final day of this event. Gliders were flying on a given set of frequencies. Over on the other side of the Waikerie Glider Port 1/2A and Quarter Midget was being raced on another separate set of frequencies. Every fifteen minutes there was a glider flight by each team. In the 15 minutes there were four minutes of "get ready" time, or "prep time" and 11 minutes of flying time available in which an 8-minute flight was considered a max, along with added landing points on a 100-meter tape measure. In each 11-minute flying time you could launch as many times as you wanted, as long as you were down with your landing scored at the end of the 15-minute period. So if you either got a rotten launch or settled in "sink" you could quickly come on down and the four-man crew of yours would get you re-launched with real efficiency.

The winches had their turnarounds 200 meters upwind, and if you didn't like the winch, there was a 175-meter long towline available to you for one of your team members to *hand tow* your R/C glider to altitude. Nice option, huh? Every 15 minutes 7 gliders were nearly simultaneously launched at the sound of the hooter into an 11-minute flight "window." It was a pretty sight that defied sandbagging.

Scores were normalized each round with the top scorer getting 1,000 points. My score after my first flight was 1,000 points. My score after the second round was 2,000 points. My score after the third flight was 3,000 points! I was riding my own personal thermal and people were asking, "Who's Richmond? Where's *he* from? Did somebody from Australia lend him a glider? Who's the traitor? Who okay'd *his* visa application?" But it was all in fun (I think). I dropped a bit in round four at the end of the day, but still I held one helluvva commanding lead.

That night John Pond, the Plug Sparks editor who was my roommate, warned me I'd be fresh meat in the morning as R/C glider guiding resumed. Pondy was right. First joke I heard the following morning was when they asked me, "Stu, how do ya' separate a pair of *fighting crocodiles*?" I answered, "dunno." And they answered, with much laughter and smiling, "give 'em a Yank!" I think *I* was the Yank, and they were looking for the fighting *crocodiles*! I even wondered if they were gonna start chanting at my launch time, "go home, Yank!" But they didn't.

I really had no worries, my crew of four took as much delight as I did; it was the best fun we were having, except I *was* in the lead. As sure as sink is found near a thermal, I found sink for the next four flights and ended up in the middle of the pack with a tremendous amount of fun and four of the finest new Australian friends a model builder could have. It was all thanks to a loaned glider. I wanted to find out more about this Stepp 3 thermal glider. It's at least as good as my Florida Flyer. Leo O'Reilly is deep in the model airplane business in Australia. He's a major importer and also does or has done for him some manufacturing to his specs. His son Mike is with him in the business too. Father and son are tough competitors, and *both* ended up beating me in the glider event. Both flew Stepp 3 gliders.

Co-designer Rex Brown told me it is sold as a partial kit with ply sides and balsa fuselage parts too, full rib set and odd-shaped parts. The buyer supplies strip wood and some sheeting. Mike O'Reilly says it's a Task A Thermal Glider by Oz standards, uses a Clark Y airfoil with turbulator spars, has no wing sheeting, owes some heritage to the Paragon. Mike had flown on Oz's World Champ glider team in '77, '79, '83, and '85. I asked Mike who was the better glider guider, he or his dad Leo. Mike said, "Well, he's caining me at *this* contest, but I usually have a better edge on him. But he's been flying thermal gliders for 20-odd years, that experience all shows." Mike told me the Stepp 3 partial kit can be ordered from Model Flight, 42 Maple Avenue, Keswick, S.A. 5035, Australia, for $50 plus $10 postage in American money. I've got a kit, and it's not for sale. Leo presented it to me at their Nats Banquet in the very best of friendship. I was truly honored and happy. Isn't that the thing model building is all about? And what did the gang of glider guiders at the Nats end up calling me? The term of endearment was, "Stu, not a bad ol' bah-stead."

And next month: Compressed air and the world's biggest four-cycle engine, along

with R/C scale, racing and rubber, while "Ramblin' Down Under." •

Fan Jets. . . . . *Continued from page 23*

significant portion of the flight line. In addition to the SR-71s, F-18s, and ME-262s that Jack brought last year, three F-15 Eagles and two F-14 Tomcats were included in this year's collection. The F-15 design is approximately 1/8 scale at 92 inches of length with 62 inches of wing span. The three examples each weigh roughly 21 pounds and are powered by twin Dynamax Fans with O.S. .77 engines. The performance of this design was exceptional. It was fast and highly aerobatic, but the landings were truly a thing of beauty. Don Kinch, the pilot for Jack Tse's group, demonstrated that the nose wheel can be held off the runway during roll-out until the model has decelerated to nearly a full stop. The design looks so promising that Bill Harris of St. Louis, Missouri, has elected to build two examples for scale Masters competition next season.

While the F-15s were impressive, Jack's F-14s were the talk of the weekend. It is hard to imagine radio controlled models more complex than these F-14s. Some of the unusual features include: rotating main retracts, spoilers for roll control, differential stabilators for combined roll and pitch control, variable geometry (sweeping) wings, and the twin engines (also Dynamax O.S. .77) functioning through scale inlet and exhaust areas. Jack told me that these F-14s were based on the 1/10-scale models developed by Larry Wolfe's Jet Hangar Hobbies (12554 Centralia Road, Lakewood, California 90715; 213/860-7612) for the movie *Top Gun*. Jack and his group, (Fred Steenson, Gary Strong, Winston Curtis, and Don Kinch) worked all winter to develop the structure and systems for these Tomcats. One of the F-14s flew five times during the weekend. At 1/10-scale and 21 pounds, the Tomcat seemed to be penalized by excessive wing loading. The takeoffs were long and the landings were fast. However, the most dramatic problem was that the model had difficulty maintaining altitude in a bank with the wings swept. This was demonstrated vividly when Tom Cook, one of the most experienced jet pilots at the fanfly, crashed the Tomcat on its fifth flight as he lost altitude during a low turn with the wings in the full aft position. Tom was upset by the accident, but it was apparent to all present that the impact was beyond his control. Jack plans to continue development of the F-14 since he is certain that it can be tamed and made as flyable as his F-15 and F-18 designs. The new Tomcats will be enlarged to 1/9 scale to lower the wing loading and permit even more detail. Jack is producing fiberglass, foam, and machined specialty parts for his designs on a custom

basis. He can be reached at Suite 102, 3040 Palstan Road, Mississauga, Ontario, Canada; 416/275-7256.

Bob Fiorenze arrived with a Jack Tse F-18 Hornet powered by twin Dynamax Fans. Bob finished his Hornet in the prototype color scheme, and it was among the most attractive models at the rally. Bob is one of jet modeling's highly accomplished pilots, and he demonstrated this fact all weekend by putting the Hornet through an incredibly energetic series of maneuvers. The Hornet appeared to be every bit as impressive as Bob's famous "Black Bunny" F-4J Phantom.

Chuck Daley of Video Specialties, Inc., P. O. Box 4557, Monroe, Louisiana 71203, (318)343-1150, videotaped the entire weekend's flight activities. He hopes to release a professionally edited and duplicated production of the rally within the next few months. Judging from the quality of Chuck's Southwest Fan-Fly tape, The Belleville material should be a "must" for anyone who wants a record of the current state-of-the-art of jet modeling.

Clearly, the second running of the Belleville Fan Jet Rally was a success. The event is growing in the number of participants and spectators. Hopefully, it will become a permanent annual event at Mountain View Airport. •

Stahl's Gypsy. *Continued from page 32*

center joint, provide dowels for mounting the wing, and do something about the landing gear attachment, as a minimum."

Plug Sparks. . . *Continued from page 32*

News, not too many (outside of the boat people) had a machinery setup to turn out a Silver Crown.

Also, in those days, every free flighter was extremely weight conscious; hence, engines like the Hornet, McCoy, and other racing engines like Hassad, failed to appeal to the average Joe, who felt his model would be unable to handle the power.

Nowadays, use of such type power is quite common, especially in the Radio Assist old timer categories. Just imagine being able to use one of these rare engines, a .90 cu. in., in one of the larger O/T models employing spark ignition. Something like this stirs the imagination!

This engine, when first produced, held the Class C Racing category in speed boats. This marine engine was clocked at 39.24 mph, a not bad speed for 1940. In addition to the engine drawings, Atwood also offered plans to his 25-inch plywood racing hull enabling one to duplicate Atwood's winner.

Atwood offered the hull drawings for $1.50, the engine drawings (two sheets) at $2.50, and a set of 10 engine castings for $5.00. A special combination of $7.50 would get the whole works.

For those technically minded, the aluminum cooling fins were "bolt-on" type a la Baby Cyclone style. The engine featured split crankcase castings, each identical, of aluminum alloy. The crankshaft was also split, each individually balanced, with a single connecting rod between counterweights.

Atwood employed a double intake, as it turned out the size of a single intake was too small for this large high-speed engine. With two intakes, the engine could be more easily fine-tuned for maximum rpm.

In the July 1941 issue of *Model Craftsman*, the new Champion engine (which most of us recognize in this latest form) offered an interchangeable of dural rod for the previous Champion engines. This first model, "Champion" was a real buy at $14.00 as it included flywheel, coil, con-

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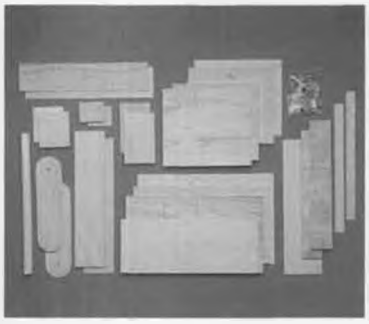

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denser, and tank. After the war, the price jumped four to ten dollars.

At that time Atwood was still operating as Champion Products Co., 1104 Architects Bldg., Los Angeles, California.

40 YEARS AGO, I WAS . . .

Maybe we ought to say fifty years ago, as the year of 1989 is rapidly approaching. 1939, if you will remember, was the year that Dick Korda registered that phenomenal flight of fifty minutes in the Wakefield Finals.

As a matter of fact, the very first flight of the day by Korda virtually wrapped up the win right then and there. The weather in the Chicago area is like this with perhaps an hour or two of excellent thermal weather. Witness Joe Konefes' flight with his Buzzard Bombshell circling overhead for 47 minutes. Why didn't the other boys take advantage of the lift? This was because lunch hour was declared at 12:00 and no further flying was permitted except for those that had taken off before the deadline! As Sal Taibi reports, it was enough to make you gnash your teeth as you ate the box lunches distributed to the contestants.

Naturally, thereafter, the afternoon breeze came up making any flight up to ten minutes a rarity. That's what makes free flight so popular, the luck of the draw on thermals.

The foregoing was brought about by Frank Zaic, who was so kind to forward two photos sent by Nat Polk who was the Contest Director for that particular Wakefield Annual. Try that one for a trivia question!

Photo No. 11 depicts Nathaniel Polk giving the trophy to Bernarr McFadden for formal presentation to Dick Korda (holding his winning model). This columnist would be most interested in knowing the three other people in the background. Any guesses out there? How about Bert Pond on far right?

Photo No. 12, also sent by Nat Polk, shows the sensational takeoff method developed by Louis Garami for his Atom-powered designs. (Garami was again twenty years ahead of his time with the VTO launch.) The model shown is the "Pioneer" one of the series of models developed by Garami for Polk. Most old timers will remember the Haymaker, Yahoo, Eve, and others.

Garami was a great believer in the small model. As such, it could be carried aboard the subway to the flying field with no damage. A large car was not required to go flying. A real breakthrough for urban fliers!

GUARANTEED MODEL RETURN

On the Strato Streak this writer used in Australia, a return notice pasted on the model attracted the attention of many modelers. If the foregoing in Photo No. 13 doesn't say it all, then you have no chance of ever retrieving your errant free flight. With tongue in cheek just in case you can't read the message, here's what will get your model back every time:

"This is an experimental aircraft used in scientific research of upper Atmospheric Wind Conditions and Cosmic Ray Penetration. Due to the vast technical knowledge required, this machine is useless to even the most intelligent layman. I am a struggling young scientist of limited financial means and would appreciate any information leading to its return."

Don't blame me, this is a concoction of Tex Newman's, this writer's younger buddy who practically guarantees the return of any model bearing this message. Haw-w!

READERS WRITE

Our old friend, Jerry Persh, of 4908 Sauquoit Lane, Annandale, Virginia 22003, writes to send in Photo No. 14 showing the prize award time at the Annual Spring Brainbusters meet. Andy Van Dover is seen giving out the prizes to the Juniors.

Jerry goes on to say the Brainbusters Club, who hold their meets at the Petersburg Airport deserve a lot of credit. They have been holding spring and fall free flight annuals for as long as Persh can remember.

As can be seen in the photo, the Brainbusters heavily promote the Junior events. They are so dedicated to the perpetuation of this hobby, very few Juniors ever go home empty handed.

Of particular interest was the fact that Hurst Bowers, AMA Museum Curator, and Frank Ehling, former Technical Director, brought out some free flight models to join the fun. Although neither placed, they had to admit they had a great time. Best part of all is that only two models were lost in the woods. Way to go!

MORE READERS WRITE

While at the SAM Champs at Seguin, I received Photo No. 15 from Karl Hatrak of an old design by Mickey DeAngelis (Trenton Terror fame) called the Miss Fortune X ("X" meaning experimental).

If one looks carefully, the model is decorated with the I.G.M.A.A. (International Gas Model Association of America) Unit No. 20. Even better is the old NAA number on the wing! For those unaware of the I.G.M.A.A., this was a gas model association started by Charlie Grant, Editor of *Model Airplane News*. (I still have my card!)

Eventually the I.G.M.A.A. got so big, it was turned over to the Junior NAA which became AMA, a formal division of NAA. This was brought about by the pernicious attitude of Lawrence Shaw, National Director of the Junior Birdmen, a very influential flying group sponsored by the Hearst newspaper chain. Shaw, unfortunately, witnessed a near miss with a gas model at a


R/C E-Z BEE
Make your first flight successful, easy and fun!
Never touched a radio control transmitter? Don't worry. You can successfully fly the Cox E-Z Bee your first time in the air! Uncomplicated single-channel control, superior aerodynamics and the dependable Cox .049 Babe Bee engine make your E-Z Bee the easiest radio control airplane to fly.
Unique 'up elevator' with every rudder movement enables your E-Z Bee to maintain altitude while executing turns. As a result your E-Z Bee will climb hundreds of feet under power. The light weight construction and lofty 55" wing span keep the E-Z Bee gliding gracefully long after the engine stops running.
As you gain more skill your E-Z Bee advances with you. Just add a second servo and reinstall the existing second push rod for completely independent elevator control.
Make sure your first flight is successful, easy and fun! Ask your local hobby store for the Cox E-Z Bee.
COX
COX HOBBIES, INC.
1525 E. Warner Ave.
Santa Ana, CA 92705

contest and immediately declared gas models as "off limits" at any Junior Birdmen contest. It got to the point where the Massachusetts legislature was considering a ban on gas models. We owe "Old Charlie" a debt of gratitude for his leadership in modeling, especially in gas. His K-G design was a quantum leap in gas model design.

YANKEE WRITE-UP

Received a nice letter from Edward Heyn of SAM 56. Ed reports inasmuch as he is located at 30 Marion Avenue, Norwood, Massachusetts 02062, he flies with the SAM 7 group. He submits Photo No. 16 showing a Ray Beaumont "Sticker" from July 1942 *Model Airplane News*. As sort of an afterthought, he says the arm is his.

Ed had to cut out flying large gas models as three knee operations did him in. Just too much effort to launch them! He says this photo was to remind this columnist there is an East Coast. Ed, all I can say is, I can't print it if I don't have it.

I have been after George Armstead and the boys for info. I do receive their *Yankee* newsletter, but unless you have one or two photos to go along with results, the write-up gets rather dull. Ya hear that, Carmen!

CONTEST ANNOUNCEMENT

Pay attention now! Just received a notice from Dick Bringgold, 937 E. Lois Lane, Phoenix, Arizona 85020, that the Southwest Regional Modelers Association and SAM 31 are again putting on the 38th Annual Southwest Regionals Model Airplane Championships on January 17 and 18, 1988.

Please note that the new site will be at Eloy, Arizona, located on Highway 10 between Phoenix and Tucson. This field, also convenient to Interstate 8, is located on four sections of abandoned agricultural land. No wires, poles, buildings, or hills; in short, perfect! No room for hitting obstructions here!

Those not interested in Old Timers may write for *Free Flight*: Al Lidberg, 614 E. Fordham, Tempe, Arizona 85283, and for *Control Line*: Richard Bynum, 8549 E. Bonnie Rose, Scottsdale, Arizona 85253.

FREE PLUG DEPARTMENT

During my absence, I received some very interesting literature from Al Lidberg of 614 E. Fordham, Tempe, Arizona 85283. Al sent in some interesting photos and a new plans catalog. This catalog features many of his plans that have appeared in *Model Builder, Model Airplane News,* and *Model Aviation*. Twenty are reprints (with permission) and ten are brand new.

CO_2-powered replica-type old timers always draw much interest. Biggest problem, at present, is the lack of events for this type of power, hence, few opportunities to fly them. Al says the pee-wee "Answer" shown in Photo No. 17 is one of the neatest O/T models ever.

To get the above, send one dollar for his catalog. If you order a plan, the catalog comes free!

THE WRAP-UP

Seems like this writer simply can't keep up on the obituary notices. This time it is my good friend, F. L. Swaney, commonly called Frank. (Real Name is Faun Louis Swaney. . . Faun a good old Irish name.)

Frank was originally from Indiana, a member of the "Anderson Johnnies" before moving to Long Beach, California. Frank was one of those active in administration work. In addition, Frank ran a very successful hobby shop that was eventually torched by vandals. After that Swaney worked for California Hobby Distributors in sales.

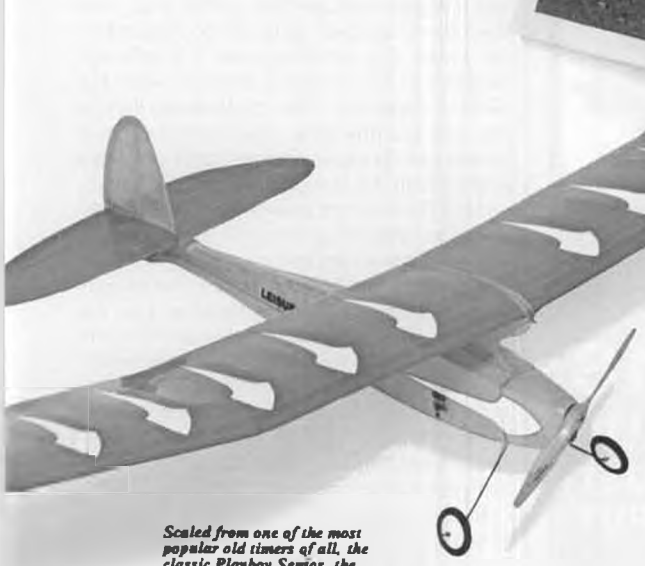
An interesting sidelight of the 1963 Nationals at Los Alamitos NAS was the hobby store Swaney set up in the work hangar. Besides helping to officiate the Nationals, Frank found himself actually sleeping on a cot in the hobby store area to accommodate all the night owls.

One other interesting facet of Frank's modeling activities was the setting up of a Mexican-type AMA modeling organization. Frank was invited by officials of Mexico to help set up the basic organization. Swaney spent close to a month south of the border doing such an excellent job that ever so often we used to call Swaney "Senor."

After retiring from active sales, Frank moved to Colusa, heart of the rice fields. When asked why he moved north (other than to get away from L.A. smog), he answered that Colusa with all its trees, homes, etc. reminded him very much of Anderson, Indiana, of course, without the wintertime snow. We'll miss Frank's cheery smile and generosity!

Just after the time we "putting paid" to this column, I received a telecon from Vic

New! The Leisure Lanzo Bomber electric R/C kit. Easy to build, light weight motor glider for "old timer" competition or sport flying.



Scaled from one of the most popular old timers of all, the classic Playboy Senior, the Leisure Playboy is a stable, easy to fly design just right for electric flight.

Leisure introduces lunch hour R/C flying.

When you own a Leisure electric flight system, your R/C flying isn't limited to weekend trips to a remote flying site. Leisure has made quiet, clean and economic electric flight a practical reality. Now any park, field or vacant lot becomes your flying site, anytime, anywhere, even lunch hour in the city!

The Leisure 500 series 05 stock motors are low priced but powerful. Available in direct drive and geared versions these motors are an inexpensive introduction to electric R/C.

The Leisure Playboy and the new Lanzo Bomber are excellent R/C electric airplane kits for the beginner and more accomplished flyer alike. Originally designed for free-flight, these stable airplanes combine powerful take-off and climb capabilities coupled with minimum sink rates to give long, enjoyable flights and slow landings. For the more advanced flyer the Leisure Wasp can accomplish aerobatic maneuvers within a small airspace – just the thing for limited flying sites.

Want to try an electric R/C airplane with quickie 500 performance? The Leisure Wasp can give you exciting aerobatic flights of 8-10 minutes that you will never forget.

Because these R/C airplanes are electrically powered, if your flying site neighbors don't see you they will never know you're there. When we're talking electric power, we're talking quiet!

To power the Leisure Playboy, Lanzo Bomber, Wasp and the many other electric R/C kits now appearing on the market, Leisure offers its' 500 and 600 series 05 electric motors. Compact and powerful, these economically

The Leisure 600 series 05 motors are ball bearing, all metal motors. Also available in direct drive and geared versions, these motors deliver maximum power for longer flights.

priced motors are manufactured to precise tolerances and material standards to insure maximum reliability and long life.

Think of it, no more hard starting, troublesome engines and no oily mess to clean up after each flight. Turn on the radio, flick the airplane motor switch on and you're flying.

Leisure offers a complete line of fine accessories including chargers, battery packs, switches and connectors. Leisure's total system approach to R/C electric makes it easy to get into. If you haven't tried R/C electric flight you're missing out on a lot of fun!

Leisure Electronics is the natural choice for all your R/C electric requirements. Sixteen years ago we pioneered the use of electric power in R/C cars and airplanes and we have been constantly introducing new products to make your electric R/C hobby more convenient and exciting. See your R/C hobby dealer or send a stamped, self-addressed business size envelope to us for our latest catalog and technical bulletins.

Leisure

22971 "B" Triton Way, Laguna Hills, CA 92653.

Cunnyngham advising me that Woody Gregory of Anaheim, a true Southern California modeler, had died on August 11. Woody was associated with numerous free flight clubs, but when it came to old timers, he was one of the staunchest members of the SCAMPS, SAM 13. During the last few years Woody had to curtail his old timer activities considerably and his mobility had dropped proportionately. The So-Cal O/Ters will miss Woody. •

Electronics. . . *Continued from page 19*

pecially those in favor with electronic R/C car racers, are being regularly charged at three to four times capacity (three to four Amps!). However, the other side of that particular coin is that the life of such cells is drastically reduced, a fact which is accepted in that phase of R/C as a trade off for short charging times and fast speeds. In flying, we need the longer cell life and greater reliability that lower charging rates give us. Most modern cells will safely take rates higher than the C/10 (50 mA) that most system chargers work at, but unless one has the maker's data on a particular cell, my advice is to stay away from anything over C/1 (500 mA) rates.

The other Ni-Cd charging basic fact is one they share with all rechargeable batteries: the charging voltage has to be higher than the voltage of the battery being charged. In other words, there is no way that a 1.5-volt source is going to charge a 4.8-volt battery, not here in California nor in Arkansas where Ohm's Law applies equally well. Additionally, the higher the charge rate, the higher the charging voltage must be.

What then is taking place here? Are our Arkansas fliers courting disaster by flying with batteries with less charge than they expect; are they just plain luck, or is there some kind of electronic legerdemain taking place?

The answer is some of the latter, as the 1.5-volt glow plug output is actually putting out a higher voltage! But, if that is so, why then does our glow plug not go west when we know that anything over 1.5 volts applied to it will definitely result in short but violent fireworks? The explanation lies in the way that the glow plug output of most power panels works; it does apply a voltage higher than 1.5, but does so in short bursts, so that the *average* power does not exceed the glow plug requirements. At this point, things began to get more and more intriguing, so I did some tests to determine exactly what is going on. For a glow plug, I used a *new* K&B idle bar plug, it being an excellent plug and which should be quite representative of the ones used by most of us. I do not have a variable rate glow plug supply equipped power panel, but I used a fixed rate Hobby Shack/Pilot DX panel, which will nevertheless provide us with valid data.

In making these kinds of measurements, it is important to not introduce any errors. For example, just inserting an ammeter in series with the battery leads will not give us a true current reading, as the instrument itself has some resistance which has now been introduced into the circuit and will affect its operation. The effect is that the current with the meter in place is not the same as that without it! Also, at high currents, even the resistance of the clips will introduce a noticeable error, but in spite of everything, we obtained some useful and interesting data.

First the glow plug. With 1.5 volts applied, and measured *at the plug*, thus compensating for lead and series ammeter losses, the current flowing was 3.6A, almost twice the 2A I had heard about and was expecting. It also glowed like the smile of a novice after his first landing, far brighter than I would set a variable driver. Applying Ohm's Law, we can then calculate the hot resistance of our K&B plug as .416 ohm, and a power consumption of 5.4 watts.

The next test was made with a single Ni-Cd cell, as being representative of the real world. In this case, the voltage *at the plug* measured .8 volts, and the current has dropped to 2.3 amps. The intensity of the glow had also diminished to one not looking quite like the plug is likely to expire any moment. Our calculator now yields .348 ohm resistance and 1.84 watts of power.

Bear with me—all of those figures will start to make sense eventually. Now, I turned my attention to the plug driver. Sho nuff, as seen on my oscilloscope, working into our faithful K&B companion, we find that it is hitting the plug with 5.3-volt pulses of .26 millisecond duration once every 6.2 ms. This works out to a 6.46 ms frame rate, and further yields an average .0402 percent

of the time that the 5.3 volts are actually being applied to the plug. The power in this case is 2.71 watts, and the plug glows with an intensity higher than it did with the single cell, but less than the full 1.5 volts.

Well, then, let's get back to the original subject, that of using the power panel glow plug output as a charger for 4.8-volt receiver batteries. As stated earlier, inserting an ammeter into the circuit will also introduce an error. It is one I am willing to live with in most cases, but not acceptable when it comes to battery charging, which to me translates directly into airplane longevity. While I did fool around some with more of those figures I just talked about, my most worthwhile test consisted of simply attaching a previously discharged (down to 4.4 volts) *known good* pack of Ni-Cds to the power panel, and letting it cook for one hour. Upon discharging the pack with my Ace R/C Digipace, an instrument I know I can trust, I found that 135 mA had been restored back into the battery, which also gives us the charging rate of 135 mA.

The results then are that while the method described to Richard does work, it does so at a far lesser rate than he was led to believe. Either his friends have a lot of unexplained crashes, or they are just plain lucky and not actually using as much battery power as they believe they do. The Ace Digipace method of checking batteries, charging methods, and calculating actual in-flight current consumption is one of the best types of insurance I know.

This is a *good* idea! I don't usually have a need for field charging, but my field box will now include some jumpers with which I can top off on those rare occasions when I do, when a switch is accidentally left "On," or I have doubts of any kind. One caution—when you are making up your jumpers, be extra careful that you wind up with the correct polarity, especially in the connections at the power panel, which is usually equipped with color-coded but not physically polarized connectors.

There is actually a side benefit to this method of charging, one which is also used by the M.E.N. C50/4 Charger. Those high-voltage peaks help to keep the cells clear of internal "whiskers," as high resistance shorts that grow within the cell are called. They tend to degrade cell performance, and I have often found that older cells that start to test lowered capacity will go back to their normal ratings after a couple of charges on the M.E.N.

BUILDING YOUR OWN?

Winging our way up the East Coast, we land next in New York. In LeRoy, to be exact, wherever that may be, where we hear from Daniel Raiber. Dan writes:

"I want to get started in the R/C model sailplane hobby, and I need some advice. Is it possible to build my own radio (transmitter) and, if so, where can I get the plans? I have an electronics background and would enjoy it. Any information on this subject will be appreciated. I truly enjoy *Model Builder* magazine."

This is not a new subject, but then, as in Dan's case, there are always newcomers to the hobby. First off, I need to ask Dan, Why? No, that is not a disrespectful question—there are a number of "whys" a person would want to build an R/C system.

If the idea is solely to save money, I would not hesitate a moment to say: Forget it! There are many unique parts, such as gimbals, servo mechanics, etc., for which there are limited sources and will generally cost more to purchase than will a decent manufactured system. If you wish to establish a cost reference point, consider the price of a Futaba Conquest PCM which I have been flying with great success and complete confidence, and can recommend without any reservations. My best educated guess is that building a system from scratch would cost that much, in money, not to mention time.

In my opinion, the only valid reason for building R/C flight equipment is because a person gets pleasure out of creating things, and in this case has the necessary background which Dan claims to have. After all, building and creating is what model airplanes are all about, recent-day ARF fliers notwithstanding. In this case, there is not much current material available on the subject, at least in this country. Both British and Australian magazines have had "build your own R/C system" articles within the last couple of years, but here in the land of plenty the trend seems to be the other way.

Actually, Dan, gathering the necessary hardware would probably be a terribly frustrating experience, and you might find your creative urge satisfied by putting together a system from a kit. Even in that there is little choice, but you should examine the Silver Seven equipment from Ace R/C. The transmitter can be had in any stick configuration you desire, with a choice of gimbals between excellent and adequate, and in all legal frequencies. It can be built as a basic four-channel system or expanded to as many as seven channels. Options include many of the features most asked for by experienced fliers, including a module for the ultra-complex mixing that some of the more sophisticated sailplanes require.

Other Silver Seven kits available include servos, and a couple of receivers, including a newly introduced narrow band unit claimed to meet the upcoming 1991 specifications. I have built and flown Silver Seven equipment and find it extremely versatile and reliable. Whichever way you decide to go, you'll need the Ace R/C catalog which describes the Silver Seven equipment in detail, but also lists most of the hardware and other parts you'll need to roll your own.

Please let me know of your decision, and good luck.

SERVO REVERSING

This is our last, but not least, subject for this month. Included is an item submitted by William Mitch, of Hebron, Indiana. Bill writes:

"Enclosed is a servo reversing circuit from *Modelar* magazine. It is a very simple circuit using only three components. It works very well, I have been using one for quite a while now."

No explanation needed for this one—if your servo works in the wrong direction relative to stick movement and you neither have transmitter servo reversing nor care to operate on the servo itself, give this one a try. According to Bill it is a winner.

This is the December issue, and time once again to wish all of you a Merry Christmas, Felices Pascuas, Frohlich Weihnachten, Joyeux Noel, Happy Hanukkah, or whatever the case might be. The approach of the holidays and the inevitable parties puts me in mind of a Newport Beach story. As you know, Newport Beach, California, is the home of *MB*, but you may not know that it contains some extremely affluent areas. The story goes: "Do you know what Newport Beach housewives make for dinner?" The answer is: 'Reservations'!

Kinda reminds me of the Princess! But then, everything does. . . Enjoy, and be well, my flying friends. •

Engines. . . . . . *Continued from page 24*

had four machined surfaces, and then the corners were lightly machined to approach a streamlined cross-section for the rod . . . a speed secret! As I looked into the rear of the crankshaft, it was like looking into the horn-shaped front of a musical trumpet, the outside of the flair is a whopping 9/16 inch. Like the Nelson, the intake window machined into the crank was tapered backwards as is seldom seen; no wasted volume. The needle valve's spray bar was a precision press fit. Five peripheal holes were the fuel inlet to the venturi, and the bottom of the venturi was tailored to fit the crankshaft's inlet window; something I'd not seen before. There was lots of hand-done beautiful "dental" work on the chromed brass sleeve. No sign of CNC machining, this CS 2.5 was more like a piece of handmade jewelry.

I phoned John Grigg before disassembly and the conversation follows:

Stu: John, through your courtesies, John Worth has loaned me the CS 2.5 engine, and I'm interested in a story for *Model Builder.*

John: Fine—let me explain to you where the engine came from and its background.

CS stands for *China-Shanghai*, and these engines are each handmade at the Aeromodeling School in Shanghai, China. The engine is FAI 2.5cc size for free flight and is highly competitive obviously because the Chinese have done so well with them. The engine is *totally* made within the walls of the school. We did see and tour the shop; we saw the turret lathes; we saw the whole operation.

Stu: John, how many do you think they make?

John: Each model builder makes his *own* engine or engines. If he can show proof in planning that he needs five engines, then he's given the materials accordingly (with the intense training), and he proceeds to machine up his own engines from castings and blanks. Each engine is individually made by the modeler who's going to fly it. The only way we came into possession of this engine is that four of the engines were "school" engines. They were made by the instructors working with the students, so that engine has both student and instructor talent in it. That engine has been flown too, in free flight models. It was used within China; I'd say they cleaned it, put a new spinner on it, and added a new plug to it before giving it to us.

Stu: It's a beautiful piece of craftsmanship. I'd love to look inside—

John: Oh, do it!

Stu: Okay, thanks. John, if the inside looks like the outside, it really might be a classic jewel.

John: I don't think you'll find much difference inside. You go right ahead and open it, and run it too if you want. I only ask that you not abuse it, so that we still have it for the AMA Museum when you're done.

(I'd borrowed Dub Jett's known winning engine to do a running comparison with this month's subject. I'd borrowed Steve Fauble's engine as a workmanship comparison as it's factory-made in China and is rated at 1.4 hp at *35,000* rpm.)

Stu: I promise I'll be ultra careful. I've got Russian "stuff" here that's one-of-a-kind too. Getting engines out of the Soviet Union is just about as rare as this Red Chinese engine. We just don't get them easily.

John: You *can't* get them out of China, unless they're feeling liberal at the moment. The modelers, by the way, who came over here for the '84 World Champs at Westover used these CS engines, although some Nelsons were also used. The Nelsons are purchased by the Chinese government and dispersed to the better ranking model builders who *may* want them. Many from the Shanghai area don't want the Nelsons, they prefer their own CS. If you run the CS against the Nelson, I think you'll find very similar performance, although the CS looks more "Rossi" in appearance.

Stu: John, how does a modeling enthusiast get accepted by the Aeromodeling School in Shanghai to make engines like this one?

John: Strictly on merit, Stu. The Chinese have approximately one million elementary schools, and in *each* of these schools aeromodeling is taught as a subject.

Stu: We're missing out in American elementary schools; aren't we?

John: Yea, and what that means is that in Mainland China they're developing a huge volume of talent at a young age. Not all go into model building, some will naturally go into full-scale aviation. Secondary or high schools also have aeromodeling courses taught. If you show a talent, say in aeromodeling, then you're allowed into courses in the secondary schools and proceed into more complicated modeling. From that point, the students go on to the Province's Aeromodeling School. Each of the 30 provinces has an aeromodeling school, so they have quite a number of students in training. Their Nationals include three competitors and a team manager and supporting crew from *each* province's aeromodeling school for each category of competition that's flown. Winners at their Nationals then go on to World Champ contests.

Stu: Model building has reached a high level, educationally, in China; hasn't it?

John: By all means, and the numbers are staggering!

Stu: We need to copy; we need to emulate.

John: I don't know how we can do it, Stu. If we could just get the ear of the USA public education systems—but they have to work under very tight budgets, and they must have football, basketball, track, and those functions that are internationally recognized as sports. Until we get model building *recognized* as a true sport, we have a problem. In the next World Olympics there will be two FAI Sport Aviation events, not modeling, one will be sport parachuting, I think, and I don't know what the other FAI event will be. It's on a trial basis. Now, if we could get FAI aeromodeling included in the World Olympics—that would be a step in the right direction!

Stu: John, this country has so many AMA members with talent, with communications skills, with enthusiasm. If we could ever get into education at the federal level and work down to local levels, we could succeed.

John, let's come back to the CS engine for a minute and counterpart Russian engines for the masses. The Soviets publish a 16-page educational manual like a brief text book with one of their diesels. It's a full lesson in theory of design and actual operation, along with trouble-shooting. The American engine manufacturers might be willing to include such a booklet in each engine they produce if it could be supplied to them. We need to get that done. It's almost too good in the USA. If we want something, we go to the store and buy it. We don't care what's inside. We buy an engine, and it runs; we buy a radio, and it works; we buy a stick of balsa, and we don't have to sand the sides. It's pre-done. It's a matter of dollar-value. John, how do we place a dollar value on this CS 2.5 engine.

John: I wouldn't know how to do it. The Chinese do *not* sell CS engines.

Stu: This CS is really priceless, John. It's a museum piece. Many thanks for this interview.

After much deliberation I chose *not* to run the CS against the Nelson. If the CS were to break on the test stand, it would be a shame. The CS is truly a museum piece, and that's exactly where it is as you read this; it's back in the AMA Museum in Reston, Virginia, for all who visit to see and admire.

RATINGS: I award a perfect "10" for design excellence and a perfect "10" for manufacturing excellence. That alone totals 20 points *without* performance points, a damned site better than I rate most engines *with* performance.

DID-YA-KNOW. . .

That O.S. is test-marketing their CZ .21 engine in Australia? And that it has a factory preset needle valve that's sealed-in-place; not adjustable?

AND THOSE LASERS

The British four-strokers I've been writing about and flying myself. . . I just heard the European .87 FAI Scale Champs held in Sweden was won by Pete McDermott flying a Sopwith Snipe fighter from WWI, powered by a Laser-90. I *told* you they were good! And a Laser "V" 120 twin was in Mick Reeves' fourth place Hurricane fighter too.•

FAI/F3E. . . . . *Continued from page 27*

limited. The largest turnouts are always the seven-cell events. It's a natural.

At the start of this treatise I mentioned that there was a group of modelers who were not allowed to enter this contest. These guys were the members of the 1986 US FAI F3E World Championships team and anyone who qualified for the US team selection finals. Locally, this meant the likes of Larry Jolly, Mike Charles, Rick Schrameck, Steve Neu, Felix Vivas, and Bob Gerbin, Sr., all topnotch fliers to be sure. Although there was more than a little resentment created by this move, I don't think there is any doubt that it boosted attendance.

And then there is the small matter of the money. Fourth place was to receive $150; third place, $250; second place, $600; and first place, a whopping $1,000! That didn't hurt attendance too much either. (I did hear some sour grapes about guys hating "money contests," but I doubt they would have come anyway.)

Industry support for the seven-cell F3E contest was nothing short of phenomenal! House of Batteries, located in Costa Mesa, California, donated the $1,000 first place prize. Airtronics donated the second place prize of $600, and the balance came from entry fees. Thanks very much House of Batteries and Airtronics!

Attracting the necessary help for running this contest was a big job for Felix Vivas. He drew all the help the contest needed by rounding up some incredible prizes for a workers-only raffle. Top on the list was an expense-paid weekend at Bally's Hotel in Las Vegas! Locally, there were two classy restaurants which donated prizes; the Arches Restaurant donated several cases of assorted wines and the Alley Restaurant donated a free dinner for two plus wine. Other donations came from High Time which do-

nated a vintage 1980 Dom Perignon; Astro Flight which donated cobalt motors, chargers, and speed controllers; and Keller USA (Steve Neu) which donated speed controllers and gold-plated connectors. There was almost something for every worker. Thank you sponsors, one and all.

ON TO THE CONTEST

Saturday, August 15, started out heavily overcast and breezy. By 11:00 the clouds were showing holes of blue, and the breeze picked up a little. That afternoon the sun was fully out, and the breeze probably was averaging eight miles an hour. Sunday's weather was also sunny and breezy all day.

Eighteen electric fliers signed up for the competition with ships that ranged from specialized F3E sailplanes to the standard thermal variety. Obviously some fliers had spent some time and money preparing and practicing for this event while others simply showed up to fly. Five rounds were flown in the two days with one of the rounds (the lowest score) being a throw-out round.

At the end of day one, there were two fliers with a commanding lead; Chuck Hollinger and Jerry Bridgeman. Both Chuck and Jerry flew planes especially designed for this event, and both were aileron equipped.

Chuck took a large first-round lead with the second highest score of the two-day meet: 484. He definitely had the right stuff for seven-cell F3E! He fairly consistently hit 10 to 12 laps in distance. His duration flights were all close to the five-minute mark with low motor run times. The only area he could have improved upon which would have won him the first place prize in the end was his spot landings.

Chuck did have one other problem in round four on Sunday: he overstressed his wings on a near turn in distance and folded them. The wreckage was a total loss. His score for that round, a zero, would be his throw-out.

Chuck flew the final round with his backup plane. Judging from his round five score of 432, his backup plane was flying pretty well. He bested his round two and three scores that were flown with his primary ship. Because I was impressed with the performance of his primary ship which he called "Voltera," I'm going to describe it in some detail.

Climb performance is the product of several combined factors: low weight; a clean, low-drag airframe; and good power. Chuck's model was very light with a total flying weight of only 41 ounces. Weight is of critical importance for maximum climb so he was in great shape here. The fuselage was a clean, low-drag, lightweight pod-and-boom design. A blue foam pod was carved to shape and laid over with epoxy and fiberglass. When the epoxy was cured, the foam was melted away with a solvent (acetone works well). The tail boom was fared into the pod so gradually that it makes me wonder if it too was custom made and not just an arrowshaft.

The wings were likewise very clean and efficient. Chuck has discovered a truly great airfoil for fast, high L/D flying at relatively high wing loadings: the good-old Eppler 374, but thinned to eight percent. The Voltera's high aspect ratio wing and relatively short 64-inch span kept the area down to 400 squares, and the wing loading up to 14.8 oz./sq. ft. In spite of the Voltera's narrow average chord of 6.25 inches, the speed was high enough to maintain a decent Reynolds number and some profile efficiency. The 10:1 aspect ratio wing combined with its rearwardly swept, sharp, parabolically curved wingtips probably kept the tip vortices to a minimum which is very important in reducing induced drag. All-in-all, Voltera just looked right!

Power-wise you can't do much better than Astro Flight's new six-turn FAI racing 05 cobalt motor with the Astro gear box. With seven 1200 mAh cells and a good folding prop (like a Geist) this motor in a 41-ounce glider will astound you! The Voltera used this motor and a handworked 11 x 11 folding wood prop that certainly did the job. It made the new Astro motor look like one hot setup.

At the end of the first day, Chuck and the Voltera had racked up 911 points. Second place to Chuck was Jerry Bridgeman with 899 points, but the next closest score after Jerry was yours truly with 802.

Jerry flew a design modified from a slope aerobatic pivot wing glider which we kits in semi-prefab form for $135. It is called the Snipe. For the F3E contest Jerry changed the pivot wing into a full span aileron job with preset (by hand) trimmable trailing edge for changing the Snipe's camber. The Snipe uses a Quabeck 2.0/9 airfoil which was in-

tended for camber changing.

The overall look of Jerry's plane was that of sanded gray primer on the wings with sanded red and yellow paint on the wing tips. It didn't look quite complete, but the air molecules didn't know the difference! On day two Jerry overtook the lead and won the contest!

The specs for Jerry's glider are: span, 70.25 inches; area, 408 squares; weight, 45 ounces; motor, Astro Flight FAI cobalt 05 direct drive; prop, 8 x 4 Rev-up thinned out and made into a folder; and battery, seven 900 mAh Ni-Cds. Control functions were aileron, elevator, and motor control. Jerry is now $1,000 richer!

Third place finisher was also the youngest competitor at age 16, Bobby Gerbin. Bobby had no practice with his ship before the event nor did he have any prior experience with F3E or F3B flying. Considering all of this he did remarkably well. Each successive round saw his score rise: 337, 388, 405, 420, and 486. By the end of the contest, he had his lap count up to 12 from the previous day's eights.

Besides becoming more familiar with his plane and the strategy of flying F3E, Bobby says he and his dad Bob took the model home and "cleaned up" the wing. The wing was from a Gnome HLG that was a couple of years old. They stripped off the old, multi-color MonoKote job; sanded the wing smooth; gave it swept, parabolic wing tips (thus adding four inches of span); and gave it a new one-color MonoKote job. He thinks that the model few even better in both distance and duration after the rework. His last flight *almost* hit 13 laps.

Bobby's plane was powered by an Astro FAI six-turn cobalt 05 on direct drive to a non-folding 7 x 4 Tai Pan prop. Seven 900 mAh cells provided about 1:15-worth of useable motor run time with this setup. The model weighed 33 ounces, so the climb was *excellent*. The model's span was 60/64 inches with 375 square inches of wing area, which made the wing loading a fast 12.7 ounce per square foot.

Bob made an interesting observation about the advancement of the state-of-the-art of F3E. Four years ago when this same club hosted the first US/International contest (see August '83 *MB*) round-high lap counts were 13 for the unlimited ships. Now we are seeing the same performance in the *seven-cell* ships!

Brian Chan finished fourth for the $150 prize. His plane was a bit more exotic than the others in that it was powered by a Keller 50/5; a five-turn motor for seven-cell use. This motor went in nicely inside a fiberglass fuselage that he modified from a "European glider kit" (hmm, wonder which one?). He called his electric creation "Nimrod." It had a foam core wing with 1/32 balsa sheeting and CF reinforcement strips to act as spars. Its span was 76 inches, and it had 512 square inches of wing area. Like Jerry's Snipe, it had the Quabeck 2.0/9 airfoil which is becoming quite popular in Europe as a multi-task section. Control functions were aileron, elevator, and motor control (via Becker speed controller). The rudder was not hooked up. The Nimrod had an all-flying, anhedral stab which he says helps keep the nose down in turns. The Nimrod was a bit heavy at '60 to 62 ounces."

The Keller 50/5 turns the Hobby Horn Tai Pan 11.25 x 7 folding prop at 6,500 rpm, and is probably running at 45 amps (although Brian didn't say so). The power supply was seven 1200 mAh Sanyo Ni-Cds which at that kind of output probably only gave about 70 seconds of useable motor run time. This factor became a problem for Brian in round one when he flew too high over the starting gate twice and had to make

three approaches before he finally made a good gate. After this there was hardly any power left to do his duration flight. His found one score was not surprisingly low at 194. However, his remaining flights were 359, 433, 468, and 419 for a total score of 1679.

Yours truly came in fifth with 1629 points. I flew a model which was originally intended to fly thermal duration events in the seven-cell class, a Larry Jolly Electricus (see *MB* Plan No. 3831). With its 72-inch span and 580 square inch area loaded down with 43 ounces of airframe and powerplant, it really needed one of the new Astro six-turn gear motors and about 100 less squares in its wing to be competitive.

It took my ship 50 to 60 seconds to get high enough to make a six- to eight-lap distance at which point I was out of time and altitude. A lighter, more powerful ship with a higher wing loading would have climbed in the 25- to 35-second range and been faster on the course. I did, however, have perhaps a slight advantage on the duration side of the course in that the Electricus was lightly loaded at 10.7 ounces per square foot (relatively), and the mild, seven-turn motor had plenty of reserve run time left after initial climbout in case there was no lift at all.

There were a number of other ships present which were competitive and deserve more recognition than I can give in the little space that remains.

Dennis Brandt flew an Astro five-turn direct drive cobalt-powered Electricus with a slimmed down wing and Eppler 374 airfoil. Given more practice time with this design, I'm sure Dennis' scores would have been higher.

Keith Finkenbiner flew a 45-amp, *Astro cobalt 40-powered* speedster with fiberglass fuselage, Quabeck 2.0/9 'foiled foam core wing of 80-inch span. It weighed 62 ounces, but spread out over 4.01 square feet of area this gave a reasonable 15.5-ounce wing loading. Keith's scores were 423, 268, 180. 454, and 414. His 180 round was a 12-lapper followed by a crash into the duration starting gate. Luckily for Keith it was the last round of day one and he was able to affect a *perfect* repair overnight.

Gary Westland of Costa Mesa flew an original design of 67-inch span, 385 sq. in. area, Eppler 193 section, 43-ounce weight, seven 900 mAh pack, Astro six-turn 05 cobalt gear motor with Geist folder prop. It was flying okay until it too hit the gate poles and Gary went to his backup ship.

Ken Gray flew a "Kind of a Firefly" design based on a local slope glider design by Dennis Cook of "Askant" fame. He modified the Firefly to hold a six-turn Astro 05 cobalt motor and seven 900 mAh cells. At 39 ounces flying weight, 72-inch span, and 375 square inch area, it looked like a real contender, but alas, on two different occasions and on two different wingtips Ken flew into the gate poles, once after an eight-lapper and once after a twelve-lapper. After the contest Ken was seen hacking off six inches of tip panel on each side of the wing and flying what was left. It flew even better!

Hatch Manell flew a thermal plane that was really pretty and did quite well in the competition too. It was the largest bird at the meet with its 90-inch span and 14:1 aspect ratio and 560 squares. For all its size, it didn't weigh much at all; 41 ounces (10.5 W/L). Hatch took ninth place with 1494.

John Lupperger and his friend Dieter Lamprecht got three planes ready to compete between the two of them; one two-meter Pilot Harlequin, one electric BODST, and a highly modified Firefly that John calls "Amplitude." John had trouble with his mo-

tor not putting out the ponies in his Amplitude. It wasn't until well after the contest that he figured out the problem, namely a dual rate switch on low rate. With his Futaba 7FGK transmitter, the little R4H micro receiver saw the "throttle" channel as flaps and the "rudder" channel as throttle, but with a proportional electronic speed control (KO Propo CX-II) you have to have full rudder to get full on, and that just didn't happen. John went to his Electro-BODST backup ship and finished the contest at a disappointing 13th place. (Just wait till next time though!)

Now that the big prize money F3E Seven-cell contest is over, there are many who are hooked on this type of flying and this type of model designing. Electrics are meant to be enjoyed in many different ways, but for this writer's time, money, and effort, this one has them all beat hands down. Next time I'll be ready with a design of my own. I hope to see you there with one of *your* own designs. •

Free Flight. . . *Continued from page 59*

other members of the modeling press both here and abroad. Some of you may not be aware that several cottage industries are in the business of supplying free flight plans that might be of interest to you. The most notable of these purveyors is John Pond. John has been in the plans business since the early 1960s, mostly in the old timer area. Lately John has added a large number of Nostalgia models to his list. For example, the Fried Fritter can be ordered directly from John at a cost of $4.50. John has a list of around 400 Nostalgia eligible plans. For just $1.00 you can obtain John's list—just ask for his Old Timer, Nostalgia, and Radio Control plans list. Send to John at P. O. Box 90310, San Jose, California 95109.

Bob Larsh is also in the plans business. Bob is one of the gurus of the Nostalgia scene and has begun a rather extensive collection of Nostalgia era plans. Bob's list is also available for $1.00. Bob can be reached at 45 S. Whitcomb Ave., Indianapolis, Indiana 46241.

The Hobby Horn, P. O. Box 2212, Westminster, California 92684, has a wide selection of old timer kits as well as a good selection of plans. These plans cover the old timer period as well as the Nostalgia period. A 64-page catalog of all of their products, including the plans, is available from them for $2.00.

Finally, the National Free Flight Society carries a wide range of plans—many of which have been Models of the Year—as part of their service. Additionally, the NFFS has assembled some beginners packages, using kits, engines, timers, and other components. All of these, including the specialty products that are carried by them, can be previewed in the Plans and Supplies Catalog. Contact for this catalog is Joe Wagner, 12 Cook St., Rowayton, Connecticut 06853. Include an SASE for a prompt reply.

ANOTHER WISE SAYING

Anticipation breeds frustration.

THAT UNUSUAL PEE WEE ENGINE

In the June 1987 issue of *Model Builder* Free Flight, I published a three-view of my Pee Wee Spacer. The pictures accompanying the article showed a Pee Wee engine without the built-in tank. I have since received a number of inquiries about that engine. For your information, the engine in

the pictures was obtained from MRL (Model Research Laboratories) during one of their promotional programs. The engine came from a Cox Helicopter R.T.F. plastic model and was provided sans tank. Instead of the usual Pee Wee tank, a round plastic backplate containing the needle valve assembly, venturi, and reed valve were affixed. The tank for this unit was a separate plastic gizmo. In order to get the engine ready to mount on the firewall of the Pee Wee Spacer, I simply squared off the round plastic backplate using a razor saw.

I don't know how many of these engines are still around, but if you go to enough garbage sales, I am certain that you can find one. Even though the modifications to the standard Pee Wee are simple and easily made (I have done complete Pee Wee rebuilds and tank modifications in less than an hour), some readers may wish to look for those tankless Pee Wees. Now you know what to look for—The Cox Helicopter is the one.

By the way, Bill Cranford, a fellow club member, informs me that he can mix and match Pee Wee parts from several engines and obtain serious increases in performance. He claims that he has done so and has increased rpm, using the same fuels and props, by over 1,000. Bill says that 19,000 rpm is not out of the question using the stock grey Cox .020 prop and Cox Racing Fuel.

If you are interested in doing a more complete and certainly more fancy modification to your Pee Wee, read on.

JOE MCGUIRE'S PEE WEE MODIFICATIONS

I recently received a letter from Joe McGuire, who is the proprietor of the Hobby Hut in Los Cruces, New Mexico. Joe sent along a sketch of his modifications to the Cox Pee Wee, and I have included them in this issue of *Model Builder* Free Flight. Joe's modifications are as follows (match this description to the sketch to get the full effect):

1. Remove the Pee Wee tank and turn it down on a lathe so only the front plate with the venturi tube on the back remains.

2. Drill and tap the venturi tube from the rear to accept a 5-40 thread. Do not drill all of the way through.

3. Modify a T.D. .020 tank by cutting off the portion in front that goes into the crankcase. (Note: the tank is used simply as an engine mount and cannot be used as a tank any longer.)

4. Cut a slot in the top and bottom rear of the tank to provide clearance for the needle valve and fuel line—note: they are off center.

5. Shorten the tank screws from the Pee Wee fuel tank, and screw T.D. tank and Pee Wee front plate to rear of Pee Wee crankcase, using the Pee Wee gasket.

6. Screw a T.C. .010 venturi and needle valve assembly into the venturi tube. Use Loctite on screws and the .010 venturi—be careful not to get Loctite on the venturi ports.

Obviously, this modification takes a bit more work and time than previously mentioned modifications, but it would be interesting to see just what kind of differences might exist in engine performance using Joe's recommendations. Worth a try!

STILL ANOTHER WISE SAYING

Logic is the art of going wrong with confidence.

GALAXIE MODELS

Back in the 1970s John Anderson was really active in the free flight kit business. Anderson Engineering produced the competitive Geodetic Galaxie and Galaxie 585 kits. These kits were notable for their completeness, band sawn parts, and excellent wood selection. Well, it's been awhile since you may have seen one of these kits on the market and with good reason. Just recently I talked to John, who informed me that he is moving from Portland, Oregon, to LaVerne, California, where he intends to get back into the free flight kit business. First run will be the Geodetic Galaxie design, which should be available shortly after you read about it right here. The business will be renamed Galaxie Models, and after the initial run of Galaxies, the production will be expanded to include Vic Cunnyngham's 1/2A Maxi design. If the quality of the new production comes close to matching the quality of the earlier kits, John should have another winner on his hands.

To say the right thing at the right time, keep still most of the time.

JACK'S MODELS SATELLITE KITS

I had the opportunity to take a good look

at Jack's new Satellite 320 GLH kit recently. Jack Moreland has taken over the production of Bob and Bill Hunter's classic free flight ship and has done a really superb job with it. The band-sawn parts are very well done, and the balsa selection is of high quality. I would suggest it enthusiastically if you are looking for a really high performance competition free flight. The cost is $27.95 for the 320-sized 1/2A. Other sizes are also available. Add $2.50 per kit on each order. Send to Jack's Models, 4036 W. 173rd Pl., Torrance, California 90504.

FINALLY, THE 1987 NFFS SYMPOSIUM

It is amazing to think that it's been twenty years since the first Symposium was published. I remember the discussion quite well. Carl Fries, Frank Ehling, and I were talking about the Symposium at the 1967 Los Alamitos Nationals. It seemed, according to Frank, that the publication of Zaic Yearbooks might be limited in the future, and something should be planned to take its place. Frank suggested the possibility that the NFFS should take the opportunity to not only fill the void but to seek to advance the scientific and artistic study of free flight. So, by 1968, the first NFFS Symposium was held and the proceedings were published. Bill Hartill was the first editor. Now, it's twenty years later, and the 1987 Symposium report is out. It's a dandy edition, thanks to the efforts of Don Lindley, who served as this year's editor. You can have one for your very own for only $13 plus $2 postage if you are a NFFS member. Add a buck if you are not an NFFS member. The publication is well worth the cost. Order yours now from NFFS Publications, c/o Fred Terzian, 4858 Moorpark Ave., San Jose, California 95129.

THE END DEPARTMENT

That's it. Fini! Another month bites the dust. Keep your powder dry, and thermals to all! •

Counter. . . . . . *Continued from page 9*

yours simply by contacting A.J.'s Free Flight, 4840 E. Leisure, Fresno, California 93727.

* * *

The installation of a gyro is greatly recommended for added stability when flying R/C helicopters, and Gorham Model Products has a rate gyro that's great for the beginner and expert because it automatically trims down unwanted activity in your helicopter while permitting your radio commands to be obeyed with less resistance. Reasonably priced, it is the most popular selling gyro in the U.S. Gorham Model Products, 23961 Craftsman Rd., Calabasas, California 91302.

* * *

Just for boat people: Ace R/C has a radio system tailored to the needs of the R/C boat modeler, the Nautical Commander. This radio system is built for the boater, with twin sticks for throttle/sails, and a single horizontal stick for the rudder. You get five proportional channels, four of which have servo reversing switches, a user-installed dual rate is available for the rudder function. Available on boat channels 62 through 84, and 27 mHz, plus the 50 and 53 frequencies that require a license. For more information, see your dealer, or contact Ace R/C at 116 W. 19th St., Higginsville, Missouri 64037.

* * *

J'Tec now has an Electric Motor Mount for all .25 to .40 electric motors. This mount is lightweight cast aluminum and bolts to the firewall in conventional fashion. The motor is held to the mount with an aluminum clamp which allows exchanging of motors for best flight performance. The large hole in the rear of the mount permits the motor to be mounted through the firewall or forward of the firewall for proper CG balancing or to fit the design of the plane. Contact J'Tec for more information and ordering instructions, if you can't find it at your hobby shop. J'Tec, 164 School St., Daly City, California 94014.

* * *

Byron Originals, Box 279, Ida Grove, Iowa 51445, has developed a true 180-degree, seven-second servo. Its full seven-second rotation teams with Byron's Dual Spool Air Valve to provide ample time for scale sequencing of both retracts and gear doors. Excellent for scale flap operation, the new servo is completely over center at full flap, eliminating battery drain. For more information, contact Byron Originals.

* * *

Royal Products, 790 W. Tennessee Ave.,

Denver, Colorado 80223, has a dandy little charger for 6, 7.2, or 8.4 car packs. The Royal 7.2/8.4 Charger features inexpensive overnight charging, and it's able to top off a fast charge. You can extend the life of your Ni-Cd batteries by using the Royal Charger to slow charge after every 10 fast charges. Look for it at your dealer or contact Royal Products.

* * *

Coverite announces the expansion of its unique line of peel and press graphics, including stars, letters, stripes, and trimsheets, which are now available in five colors. The full line of decorations provide numbers, letters, and stars in from one to three inches in height. These stickers are made of 100-percent cast vinyl and will withstand five years of outside use. They'll stick to most any surface, from wood, plastic, metal, fabric, to any painted surface. Once affixed to your model, they won't crack, peel, or harden. For more information, contact Coverite at 420 Babylon Rd., Horsham, Pennsylvania 19044. •

Jake..... *Continued from page 7*

Monsieur Ader's 1897 aircraft was based on an earlier glider design. It was powered by some kind of gasoline engine or engines driving some kind of propeller or propellers. Accounts translated from the French indicate that the aircraft was launched from elevated ground and landed on a meadow below. Depending on the translation, the descent is described as either "flight" or "free fall."

If these accounts are true, not to mention the claims of Langley, then the Wright Brothers finished no better than third in the powered-flight race. Personally, I see no holes in either story. So I have to conclude that both accounts are factual and that the Wright Brothers were also rans.

It's too bad, really. The originality of the Wright Brothers' accomplishment was one of my last remaining beliefs. The only two beliefs I have left now are the Tooth Fairy and political integrity.

Jake

* * *

Dear Jake:

Is it possible that you could explain the differences between PCM, FM, and regular radio control sets? I would be very grateful.

Newcomer in Natchez

Dear Newcomer:

No, that's not at all possible.

Jake

* * *

Dear Jake:

Hi, it's me, Tommy Smith. I'm pretty sure I'm in trouble again. Me and my friend Brad were shooting our model rockets. Mine came down on a rock and broke some fins off it. I glued them back on, but I was in sort of a hurry, so I launched it again before the glue was dry. When it came back down it had some feathers stuck to it. Brad says I'm in big trouble because they were whooping crane feathers, and whooping cranes are an endangered species, and if my rocket hit a whooping crane the FBI will be after me. I don't want to get arrested. What should I do?

Tommy Smith

Dear Tommy:

The FBI is not responsible for whooping crane harassment. If anybody is after you, it's probably the Wildlife Department or the Audubon Society. Whooping cranes are extremely rare, and chances are Brad wouldn't know a whooping crane feather from his elbow. You probably hit a passenger pigeon. They're already extinct, so you've got nothing to worry about.

Jake

* * *

Dear Jake:

Is it possible to combine my two favorite hobbies—hot tubbing and R/C flying—and do them at the same time?

Whirlpooler in West Covina

Dear Whirlpooler:

Only if you don't hold the transmitter under water, and only if you don't plug in the charger while you're still in the tub. If you do plug in the charger while you're still in the tub, you'll be combining two of my favorite hobbies—underwater break dancing and shooting lightning out the back of your Ocean Pacifics.

Jake

* * *

Dear Jake:

Care to tell us about your latest project? You keep telling us what everybody else is building and what kind of problems they're having, but we never hear what you're up to. What's occupying your workbench

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WANTED: Copy of "Peanut Power" and copy of Farman Long Nose Moustique P-Nut plan from *Modelar* magazine. Jim Carden, 76 Washington Ave. #51, Peru, Indiana 46970.

WANTED: RTF u/c planes from Aurora/K&B, Comet, Cox, Gilbert, Sterling, Testors, Wenmac, etc. Complete or pieces, buy or trade. John Fietze, P.O. Box 593, Lynbrook, N.Y. 11563.

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ENGINES: IGNITION, GLOW. Collectors, runners, used, new. Sell, trade, buy. SASE for list. R.L. Eirman, 504 Las Posas, Ridgecrest, California 93555. (619) 375-5537.

SCALE DRAWINGS AND PHOTOGRAPHS — Flying wings, Autogiros, Ducted Fans, One of a kind and others. Catalog $2.00 from Unique Aircraft; 8106 Teesdale Ave., N. Hollywood, California 91605.

RARE OUT OF PRINT MODEL BOOKS: Model Airplanes-circa 1935, Model Diesel Engines-1946, Model catalogs, many model engine instructions and parts lists. Send SASE to VINTAGE CLASSIX, Box 87, Elgin, Minnesota 55932.

1930s MODEL SHOP! Sawed prop blanks, WWI/Balloon/Streamline balsa wheels, Hinoki wood, color nitrate, sticks, tissue, bobbins, prop hinges, bamboo, old Scale/Contest plans, and more! Illustrated mail order catalog: $2. Oldtimer Model Supply, P.O. Box 7334, Van Nuys, California 91409.

ANTIQUE MODEL IGNITION PARTS, O.K., GHQ, Forsters, Delong Bantams, others. Excellent Timers, Needle Valves, Tanks, Point Sets, Cylinders, 1987 Catalog, 800 Parts, $4.00 pp. CHRIS ROSSBACH, R.D. 1 Queensboro Manor, Box 390, Gloversville, New York, 12078.

lately?

Hank in Holcomb

Dear Hank:

A very large rate, and until he leaves I'm not going anywhere near my workbench.

Jake

* * *

Dear Jake:

I run an exterminator service. I understand you're having a problem with rats. For a small fee, payable in low monthly installments, I will come to your house and submachine gun everything that moves in your basement. Interested?

Carmine's Pest Control

Dear Carmine:

I'll contact you as soon as I can coax my wife's cat into the basement.

Jake

AD INDEX

R/C Blimp . . . *Continued from page 18*

cluding preparation and clean up time.

Sealing is done using a Sears Craftsman 230-watt soldering gun with the plastic cutting tip. This narrow knife-edge attachment reduces the amount of plastic actually melted and is much easier to work with. Soldering irons might work, but I like the control that you get with a trigger and handle.

The first step is to draw a full-sized pattern on a large piece of paper and then cut it out. As you can see in the photos, I just tape sheets of newspaper together until I've got enough. The pattern shown on the plans is half-scale to fit it on the paper. If your model is significantly heavier than mine, or if you would like a little extra volume for other purposes, just make the bag longer in the middle. You may need to add a little extra volume if you are flying this model in a high altitude location such as Denver, as lift is directly dependent on the density of the surrounding air. For every extra three inches in length in the middle, you get about another 1.1 cubic feet (i.e., 1.1 ounces lift). Because half mil mylar is available only in 48-inch widths, this ship represents the practical limit in bag diameter. Large diameters would have to be made from the wider rolls of one mil mylar or polyethylene. *Be sure* to include places for the inflation/deflation tubes in the paper pattern. The small soda straw filler tube is located on the bottom, the large diameter deflation tube in the tail. I used a clear payload tube from a model rocket for my deflation tube with a tight-fitting balsa plug. You can use a 35mm film canister or any other large diameter tube with a tight-fitting lid instead. A small cork or piece of modeling clay is used to plug the inflation tube.

Spread the mylar (or the plastic of your choice) on a smooth concrete surface. The floors of most garages are ideal, but if you think yours may be too rough, a layer of newspaper will serve as a protective surface. Be sure that the floor is scrupulously clean, to avoid any sand or grit from wearing into and puncturing the bag as it is being made. I always sweep and then damp mop the garage floor before construction.

If you are using aluminized mylar, be careful to have the plastic side in and the metal side out, otherwise the heat seal will not stick. If you can't tell which is which by looking at it, try scratching away metal from one side or the other. If you still can't tell, try some experimental heat seals, and stress test the seams by pulling on them.

With two layers of plastic gently stretched across the floor with tape, place the pattern on top and hold it down with small weights to keep it from shifting around as you work. The plastic must be pressed together when you seal it. To do this, take a short, straight stick and place it on the inside edge of the pattern and while holding it down gently, draw your hot iron along the edge. The stick presses the plastic together and gives you a firm, straight line, which helps hold the pattern down as you work with it. I have found that designing the bag as a series of short straight lines is not only easier to build, but also gives a better looking bag when inflated. Be sure to overlap your heat seals as you make them, and watch out for smoldering paper. Setting fire to your project will almost certainly cause a delay in the building procedure.

Work quickly and smoothly. Too fast, and you may miss some spots or apply inadequate heat. Too slow, and you concentrate too much heat at once and melt excessive plastic away. Speed varies with the type of plastic used and the heat of the iron, which should glow a dull red for best results.

Gently lift the plastic and pattern from the floor, and then separate the paper from the plastic. Be careful: you don't want to tear your new bag. If all looks well, then you may tape the soda straw filler tube and large diameter deflation tube to the bag and proceed with air inflation. Use only dry or room air. Don't inflate it with your lungs. Besides hyperventilating yourself, the moisture from your breath will condense inside, making a wet, heavy bag. An airbrush pump or hair dryer blowing cool air works well.

Look for a slow, steady deflation of the bag when under a very slight pressure. Even an apparently small (1/16 of an inch) leak in the heat seal will become obvious in a few minutes. Most of my leaks occur at the compound curves around the filler tube, so this is the first place I look. Feel for leaks by holding your mouth over the suspected

area. Even small air flows will create a cool sensation on the lips. I have found through experience that using a soap solution around the seam to find a leak results in a complete mess, as the bag does not have enough internal pressure to raise a bubble. Scotch tape makes an excellent patch. It is important to the performance and pleasure of your model that you get all of the leaks now, if you can. It is very annoying to have to remove weight or reinflate your model every few minutes once you are flying. Finally, with the bag fully deflated, tape the aluminum tubes for the support sticks in place as shown, and you're done.

The fuselage is suspended from a series of lines made of heavy (button or carpet) thread, looped around both the suspension sticks on the bag and the fuselage. I also use clips (such as safety pins or paper clips) right where the lines meet at the fuselage, so it is easy to remove individual lines for movement around the aluminum tubes if necessary. Shorten or lengthen the lines using the device shown on the plans until the fuselage hangs level under the bag.

To prepare your model for flight, put together the entire keel assembly, minus any ballast, and loop the suspension lines around the places shown on the plans. Connect the suspension lines to the suspension sticks, which have already been slid into place on the bag lying flat next to the keel. With the deflation tube tightly capped, start inflating the bag with helium through the filler tube. At first the bag will be cumbersome and unwieldy as it is inflated because all the gas will run off to one end, but when it gets about half full it will begin to level out. Continue to inflate until the model starts to float, then alternately add gas and BB ballast until the bag is comfortably full and the model hangs motionless in the air. Don't overinflate. By "comfortably full" I mean that the bag is inflated to the point that tipping it forwards or backwards makes no static trim change. This can happen when one end is pitched up, and the helium in an under-inflated bag flows towards that end, causing it to raise up even more due to the increased lift of the gas, resulting in a very awkward permanent pitch attitude. (This principle is illustrated in the Time-Life book *The Giant Airships* where an overly long experimental blimp crashed in 1908 because all the internal gas rushed towards one end and burst the bag.) With the model floating free, slide the suspension lines/sticks forwards or backwards along the fuselage or bag as necessary until the model is floating level and parallel to the floor. Rotate the fuselage until it is hanging vertical (as viewed from the front), turn on the radio, and you are ready to fly your model.

It is best to fly with a neutral or slightly heavy ship. The heavier the ship, the faster you have to fly it to make use of dynamic lift. If you fly your ship with a slight positive buoyancy, it is entirely possible to sent it to the ceiling and not get it back until sufficient helium has leaked out.

If you plan on making flights over ten minutes at a time without landing, you may want to have some way of releasing ballast in flight. I've indicated on the plans the location of an optional droppable ballast device which can be set up to drop one BB at a time given extreme (with trim) up and then down control.

The instructions for making the bag were first published in my previous article, "Have You Tried LTA?" in the October 1981 issue of *MB*. That article, along with others, has been included in a short model aviation bibliography of LTA and LTA-related articles of which I am aware. The interested modeler should be able to get a lot of good ideas for new or different LTA projects out of these. If you know of any other articles that should be added to this list, please write to me (preferably with a copy of the article) and let me know about it. Anyone sending me an article or reference will automatically receive a completed list when I've got it all together. My address appears at the end of this article. If, after you've built this model, you would like to design your own LTA craft, you may want to consider some of the features that I've incorporated in the Silver Cloud. I would encourage variations on my design (like a pusher version or a semi-rigid design), but there are several details to keep in mind for your own model. These design details were developed over a long period of trial and error, and you may save yourself some trouble by learning from my earlier problems.

The use of a pivoting motor to provide vectored thrust gives great controllability even at zero airspeed. At the first IMS contest nine years ago, I had a blimp with a motor that turned only left and right. Bob Peck, of Peck-Polymers, had his own airship with a motor that pivoted only up and down. I could literally fly circles around Bob's airship, but it took me about forever to maneuver up and down. Bob's ship could move up and down great, but had a lot of trouble turning. The very next day Bob had designed and built a pivoting motor system that allowed the motor to move in all directions easily, and it is this system which I have used in each of my models since then. By putting the motor way out in front, you get the fullest effect of the motor to pull the ship around left and right. The weight of the motor in front also helps balance out the weight of the tail in back, allowing the rudders to be placed well rearward where they are most effective. I've seen model airships with the motor on the rudder for some really radical turns, but this requires a major reshuffling of components within the model which I find inconvenient.

In addition to vectored thrust, up/down control is provided by two pairs of "diving planes." Elevators, in their conventional sense, do not work well on model airships of this size. Because of their slow speed and the relationship between "static'tching force on the tail, with the greater of the two forces ultimately forcing the ship down. (See figure 2.) A better design would put the horizontal stab up in front where the lifting force of the stab could combine with the dynamic lift of the bag. My design puts a horizontal stab at both ends of the fuselage, allowing a level climb and dive attitude. You can experiment by taking off the rear, then the forward, then both pairs of stabs to see how this effects controllability.

The exact location of the center of gravity on the fuselage is not as critical on my blimp as it is on conventional aircraft. The cg shown is simply a suggestion that will make ground handling easier. When the cg of the fuselage is hanging directly under the center of volume of the bag, the model will float properly. Most of the removable weight of my blimp (the batteries and ballast) have been located near the CG to minimize any static pitch changes that may occur when adding or removing ballast, or when changing battery types. Once inflated, simply slide the suspension lines along the fuselage or move the suspension sticks on the side of the bag forwards or backwards until the whole thing is floating level. You don't have to add weight to the nose or tail to balance things out.

NOTE TO READERS:
Due to the length of Tony's article, we were unable to include all of it in this issue. If you purchase the full-size plans(see page 106) you will receive the complete article.

Workbench. . . *Continued from page 7*

convenience and realizing your thoughtfulness, we feel more obligated to mail an answer. In fact, you may laugh about "Please

check the appropriate square," but letters like that more than likely go back out the same day received! Just imagine receiving a stack of mail every day that measures about 12 inches high. It's gratifying, but at the same time, it's mind boggling, and once they start backing up . . . well, we know how the Post Office feels!

Dear Bill,

I am writing this letter for two reasons. The first is to put in my two cents worth on the observations you made in the "Workbench" column of the July issue. I quite agree with your decision to promote rubber-powered FF and not devote the entire magazine to R/C, but I cannot condemn the R/C giant-model people as some of the other readers have done. The reason for this becomes apparent if we examine the schism within our hobby today.

On one hand is the power/gadgetry/big-money branch of model aviation. Four cubic inch $1800 engines, ten-foot span planes costing up to $500, $65 spoke wheels, $30 bottles of glue, etc. typify the things I detest, yet they generate the sales dollars that have kept the few remaining hobby shops in business, and the ad revenues that make it possible for magazines like MB to survive.

On the other hand are the old-style builders and craftsmen, whose members include Peanut rubber, indoor, and other free-flighters. With the exception of Peanut rubber, all of these activities have been dying for at least 30 years. The present dollar volume of their modeling purchases is woefully insufficient to support an industry. Moreover, building stick and tissue models is not the most exciting thing to do in an increasingly fast-paced world. It took prefab R/C models to put enough excitement into model flying to make it competitive with the other pastimes of this day, and keep the hobby alive. So, as much as I hate to admit it, ten thousand dilettantes spending $1,000 each every year is a lot better for the model industry than one hundred master craftsmen spending $100 a year. Therefore, although I don't like large and noisy models, and wish everyone would spend his free time building stick and tissue rubber models, I appreciate the benefits provided by the R/C boys.

Now, to the second reason for this letter. In late July I ordered the March 1984 issue from your Box 10355. To make sure I got the correct issue, I not only specified in the body of the letter ". . . the March 1984 issue of Model Builder *(containing the Fabre Hydravion and Cloud Cruiser) . . ." I also printed "March 1984" in big letters at the bottom of the letter and wrote "March 1984 issue" on the check. Five weeks later I received the March 1987 issue. What does it take to get your back-issue people to send the right issue, sky writing?*

Sincerely, M. Salvati, Flushing, New York.

I'll answer your second question first. Skywriting might have worked up to a couple of years ago, but then we moved our office indoors. Now I would suggest using crayon for important notes, as our staff is more used to that form of communication. Hopefully you will have your March '84 issue before March of 1988.

I agree with just about everything you say regarding the fact that R/C helps to support the rest of the hobby, but I feel *that* support is more current than long range. A major portion of R/C is now in the instant gratification, ready to fly area. This is fine for the experienced modeler who needs to get something together for the coming weekend so he can keep his thumbs limber while his built-up model is being repaired or being designed and built. However, with only a very few exceptions, and the new Cox E-Z Bee looks to be one of those (we haven't tested it yet), there are no nearly or entirely ready-to-fly models that will allow a beginner to truly start from scratch in learning to fly R/C, and he'll certainly learn nothing about the hobby of model *building* from ARFs. True, if the beginner survives his first exposure to R/C, there is some hope that he will *then* begin to take the hobby seriously enough to want to learn to *build* and fly.

Another point you make, that building stick and tissue is not exciting, may be true, but neither is the assembly of a ten-foot plane with an $1800 engine in it. However, making the first flights with either aircraft can be exciting, and obviously the expensive plane wins out when the pocketbook pucker factor is applied! But I've been to a contest where the difference between first place and runner-up in a mere Peanut Scale contest depended on a flight of 26 seconds. The model was launched, stalled slightly after the initial power burst, pulled out inches from the ground, continued its flight until the power ran out, then glided down between two cars, then landed and rolled to a stop under a third. Total flight time 28-1/2 seconds. The applause from all who watched was deafening. I guess you could say the excitement of model flying is all relative.

Dear Mr. Northrop:

I am an Italian geotechnical engineer, working at the present in the Philippines, and will be relocated elsewhere shortly; I read Model Builder *thanks to an American serviceman from the Subic Naval Base, and he reads my Australian and Italian magazines. I am basically interested in free flight, but age (I am now 57 years young) and the constant monsoon here do oblige me to go R/C, mostly gliders and/or motor-gliders, which save chasing an errant model in swamps or rice fields (with leaches,*

snails, and an occasional snake to boot). I am also quite interested in flying wings, and the scope of my writing to you is to literally "pungulate" you with a moral bayonet to publish something more on this interesting subject. You and MB *are the sponsors of the annual Flying Wing Contest, and not a word has been noted by me on last year's contest. Could you kindly do something to cover this "grave" omission? Thank you in advance.*

Since I started to write and bother you on the flying wing subject, I would like to make some comments on another quite interesting subject; due to my profession I cannot be bothered by extensive workshop facilities, as most serious modelers do develop in a number of years. I am using built-up construction techniques on all my models, with models rarely going over the two pounds in weight, and/or 1.5m span (say 70 inches) for the gliders. Schoolyard scale is my favorite, and find the Cox engines suitable to my scope with the only impossibility to throttle them down in a sensible way. I am using with great pleasure the G-Mark .061 with its silencer; noise problems are not apparent in the Philippines in the out of town locations where modelers do congregate, but again I do not like to drive 30 miles to go flying, and do fly in parking lots/school sport fields which are nearby, and where noise is a problem. I found out that a box built up from balsa sides, and fitted under the fuselage with rubber bands and with the G-Mark silencer entering with a loose fit into the box (half a cigarette package size), is dampening greatly the engine noise, and at 10 meters away, while flying, the supersonic blades are more noisy than the exhaust.

In perusing your MB *July '87 issue, I agree with Mr. Richmond that noise in Europe is a problem, and I do agree also with him (as well as with your great hero, Duke Fox) that larger engines are more silent, when running slowly. But what about the actual size of the model which by necessity will be in the six-foot range, and the weight? I go schoolyard scale for transportation convenience, like many other modelers who are living in large cities and/or small apartments. I feel, therefore, that a magazine like* MB *which is really covering all facets of modeling and not only the rich portion of the hobby, could start a movement with some engine builder to develop an engine under the Icc (.06 cu. in.) capacity, long stroke, two-cycle, with a good idle, which could swing a nice 7 x 4 or an 8 x 3 prop to a hefty 10K rpm max and go down to say 1.2K rpm on idle. I would love diesels, but it seems diesels in USA are considered anathema. The old Mills .075 would be ideal, but unfortunately, cannot be throttled or silenced.*

On the good news side, I sent to your subscription department a money order for one-year subscription to MB, *which I look forward to read with pleasure, wherever I will be sent. I apologize for my long letter, and for your time to read it, and for my possible mistakes since American language is slightly different from my continental European English. Keep up with your efforts, and kindly receive my best greetings.*

Yours sincerely, A. Mizzan, Milano, Italy.

Your letter is long, but interesting to read, so no problem. We sorta got our signals mixed last year, plus there were problems with legalities at the flying site, so I hope we'll have a good report on this year's Flying Wing contest. The event has been going on for years; we only recently jumped in to make sure it would continue.

The exhaust collector box you mention is interesting in light of Duke Fox's experiments which have received much media coverage in recent months. I wonder how soon modelers will find a way to make the collector box, or bottle, less of an eyesore. The magazines have very little power to influence manufacturers in what directions to take. I guess, by the same token, we prefer that they leave the publishing business to us. I'm not sure how well a long stroke engine would do in under .10 cu. in. sizes. We've had little success in educating the modeling public on the advantages of diesels. Mainly it is again a problem of industry support. Diesels are capable of being effectively throttled, and they can turn bigger props with more torque than an equal sized glow engine, but engine and fuel availability has discouraged general modeling public interest.

Thank you for your subscription. I hope the postal services are able to keep up with your travels. Sometimes it's tough enough just getting a magazine to someone who remains in one location! •

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