

# MODEL BUILDER

ICD 08545

OCTOBER 1982

\$2.50

volume 12, number 129



R.A. BENTANIN *RAB*  
© 1982





Staggerwing Beech  
1/5 scale



Christen Eagle II  
1/3 scale



V-35 B Bonanza  
1/6 scale



T-34B Mentor  
1/6 scale



MiG-15 (ducted fan)  
1/6 scale



F-33A Beechcraft  
1/6 scale



Pitts Special  
1/3 scale



T-34C Mentor  
1/6 scale



Mirage (ducted fan)  
1/7 scale

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F-86 Sabre Jet  
Avail. in D & H  
models (ducted fan)  
1/8 scale



Kfir  
1/7 scale

General information about  
these new product re-  
leases found in catalog.

**NEW  
for '82**



P-51 Mustang  
1/5 scale



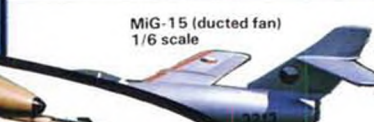
A-36 Beech  
1/6 scale



A-4 Skyhawk (ducted fan)  
1/7 scale



F-16 (ducted fan)  
1/8 scale



MiG-15 (ducted fan)  
1/6 scale

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Beech Baron 58  
1/6 scale



CAP 21  
1/4 scale

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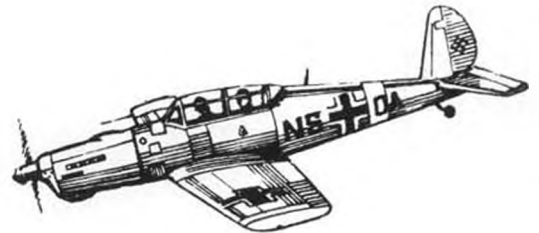
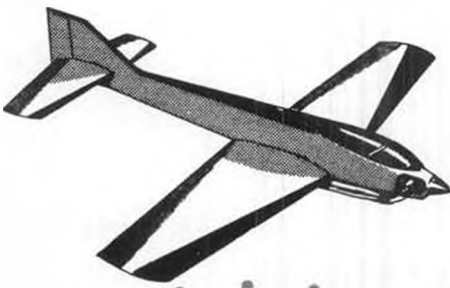
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**SWAP SHOP:** Bring your saleable items to the Swap Shop area. **NO DEALERS, PLEASE!** Rent a whole table for \$5.00 or half a table for \$2.50, in addition to general admission. You are responsible for conducting your own sales. IMS not responsible for lost or stolen articles.

**\*SWAP SHOP!**  
**\*GIANT RAFFLE!**

**GIANT RAFFLE:** Radio control systems, kits, engines, etc. will be raffled off Sunday afternoon. Tickets on sale during show. You need not be present to win.

# MODEL BUILDER

OCTOBER

1982

volume 12, number 129

621 West Nineteenth St., Box 335, Costa Mesa, CA 92627-0132 Phone: (714) 645-8830

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Cover: From an original 22 x 28-inch acrylic painting by aviation artist Bob Benjamin, of Olympia, Washington, this month's cover is the first of a now-and-then series. It's no coincidence that the airplane, Harold Krier's Great Lakes Special, is also featured in a 3-inch scale construction article by Larry Scott, beginning on page 15. Soon after Larry's material was on hand, we had Bob's preliminary sketch, and within a few weeks, it all came together. See "Workbench" for information on the availability of limited edition, full-size litho prints of Bob's painting, minus MB's cover logo, of course.

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MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC., 621 West Nineteenth Street, Costa Mesa, California 92627. Phone (714) 645-8830.

Subscriptions: \$25.00 per year, \$47.00 for two years. Single copies \$2.50. Add \$3.50 per year for postage outside the U.S. (except APO and FPO). U.S. funds only, please.

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**ENGINE:** The FK 50 is a 1:4 scale version of the world famous Continental engine that was used in many popular early light aircraft. This alternate firing 4-cycle engine is virtually free of vibration and very economical in fuel consumption. Only the finest materials have been used in its production. The FK 50 is designed with aerobatic flight in mind, and experiences no lubrication problems even in inverted flight positions.

**CYLINDER:** Produced from nitrated chromium-nickel low friction coefficient steel, finely honed. It is attached to the crankcase with a slotted hexagonal flange eliminating tension. To prevent distortion between the cylinder and cylinder head they are joined with a special non-slipping buttress thread.

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**COOLING FINS:** Extremely large design to assure proper cooling of the cylinder and cylinder head.

**PISTON:** Specially developed, with an upper compression ring and a lower oil stripper ring.

**VALVES:** Made of materials with very high heat resistance to avoid damage in case of overheating.

**CRANKSHAFT:** Machined from a single steel forging (not assembled) supported by three ball bearings and precision balanced.

**CARBURETOR:** For the FK 50 a completely new carburetor has been developed which provides the ideal fuel to air ratio at any RPM. This constantly proper mixture is then channeled to the intake valves through a preheating manifold system.

**CAMSHAFT:** Machined from low surface resistance alloy steel, supported by two ball bearings and gear driven.

**OIL PUMP:** Primary lubrication is produced by an oil pump located in the base of the crankcase. The oil pan must be filled with 30 ccm (1.2 oz) of castor oil.

**DIP STICK:** It indicates the amount of oil required, the maximum oil level is marked on the stick.

**FUEL:** The FK 50 should be operated on 98% methanol alcohol and 2% castor oil (or similar oil) for internal lubrication.

**OIL DRAIN PLUG:** Located in the base of the oil pan and contains an integral magnet which attracts any metallic particles produced from piston ring wear.

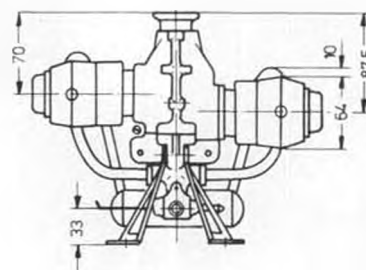
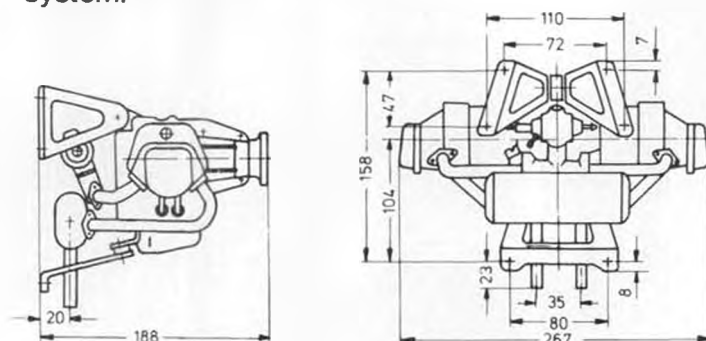
**MUFFLER:** This two-chamber muffler equipped engine is impressively quiet and environment pleasing.

**ENGINE MOUNT:** The engine is supported in three places with vibration absorbing rubber shock mounts.

**GLOW PLUGS:** We recommend the use of KAVAN glow plugs, art.no. 37.

**IGNITION:** In the future an ignition system will be available for the FK 50, permitting operation with spark plugs and an automotive gasoline instead of methanol fuel. The resulting increased heat was a consideration in the design of the large cooling fins.

**SERVICE CARD:** Enclosed with each engine is a reply card for computer registration in order to keep our customers up to date concerning future developments.



Conversion Metric to Inch

mm	Inches
7	28
8	32
10	39
20	78
23	91
33	130
35	138
47	185
64	252
70	278
72	284
80	315
87.5	345
104	410
110	433
158	622
188	740
267	1051



**KAVAN****Continental**

# FK50

MARK I

ART. NO. 250

Sug. Ret. \$ 1,500.—

## Technical Data and Features

Displacement	50 ccm (3 cu.in.) 2 x 25 ccm (2 x 1.5 cu.in.)	Glow plugs, KAVAN Super Speed, art.no. 37 Mixture preheater Oilpump Dip stick Magnetic drain plug Muffler Engine mount
Induction system	4-Cycle, MARK I o.h.v. (overhead valves)	Dimensions:
Bore	34 mm (1.338")	Width — from valve cover to valve cover 267 mm (10.51")
Stroke	28 mm (1.102")	Height — from lower mount to top mount 178 mm (7")
Maximum RPM	8,000	Length — from back of mount to prop washer 188 mm (7.4")
Idle RPM	1,200	
Horsepower	4.1	
Propeller (determined by aircraft)	46 x 30 cm (18 x 12") 50 x 25 cm (20 x 10")	
Weight	2,450 g (5½ lbs)	
Fuel consumption	500 ccm (16 oz)/30 min.	

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## from Bill Northrop's workbench

• • •

### COVER PAINTINGS

This month's first ever cover painting for Model Builder, was created in acrylics by aviation artist and model builder, Bob Benjamin, of Olympia, Washington. It's no coincidence that the subject on the cover and the feature construction article are the same aircraft . . . Harold Krier's Great Lakes 2T-1 Special. This has been planned for some time, as will other similar "coincidences" in the future.

We are thinking of working with Bob in offering limited edition full-size (22x28) color prints of this and future cover paintings (without MB's logo of course). Each print would be numbered and personally autographed. Approximate price would be around \$50 each. If any of our readers are interested, please let us know so we can start production with the Krier Great Lakes.

### ENGINE OR MOTOR?

Park Abbott, of Santa Rosa, California, writes as follows:

Dear Bill:

For gosh sakes, Bill, I can't stand it any longer. This is too much after all these years. I've just got to let it out and this will probably strain my friendship with 'ol man Pond, but that is just the way it has got to be, I guess.

If John keeps referring to our model airplane engines as MOTORS I'll probably lose faith in everything. Month after month in his Engine Of The Month section, he keeps referring to ENGINES and MOTORS alternately through his writings, and this is driving me up the wall.

Oh, I know what Webster's Dictionary says about this definition, but ANY real old-timer worth his salt knows these are ENGINES . . . not MOTORS. Motors are those things the guys use to power their

electric birds around the sky with.

In your May 1982 issue, on page 37, here we go again . . . my gosh, John. I quote, "After many hours of comparing notes with good MOTOR men, John finally came out with an ENGINE that retained all the classic looks and handling of the old MOTORS, but yet would run comparably with the contemporary ENGINES of its day." end of quote. (gasp-cough and eyes with tears).

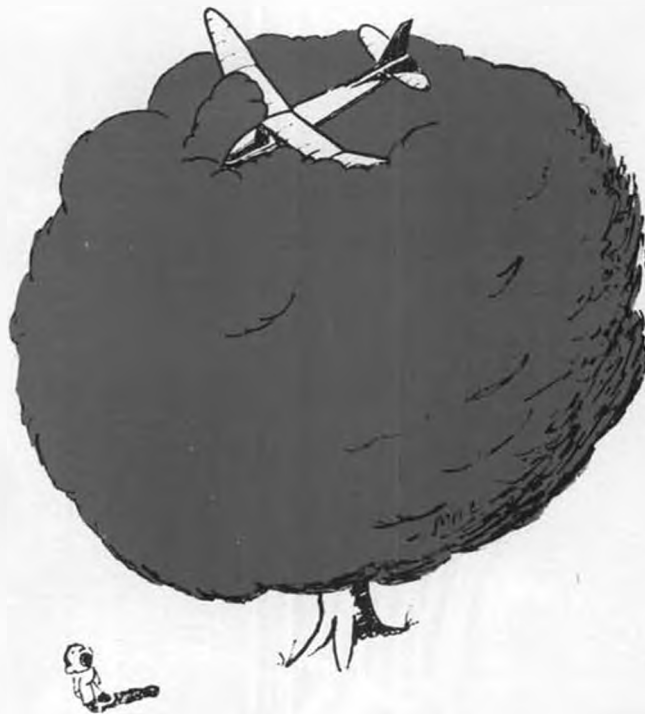
Well, Bill, I've said enough this time, I guess, on this item, and good 'ol John will probably throw in the towel on me and give me no more help on the field when I get stuck.

Please pass this on to him with my regrets, but Holy Cow, no more of this MOTOR/ENGINE stuff, as I don't think my nerves can stand it any more.

In the meantime, your mag is great and keep on as you are. I'm 57 and still in there with the Old Timer flying, but anymore of the above and my time could be cut short.

Well, Park, I'm partly with you and partly not. As far as I'm concerned, the noisy, dirty, greasy, smelly propeller-twisters we stick on the front of model airplanes are "ENGINES." The stretchy stuff you hook to the back of a model and to its propeller shaft . . . and sometimes twist one turn too many, is called a "Rubber Motor." And those funny round things with two wires sticking out that go "Hmmm" when you connect a battery pack to them are called "Motors" . . . "Electric Motors."

However, I'm afraid you're not going to be able to rest easy, Park. Being an Old Timer, you should know that the backbone engine of those good old days was manufactured by Bill Brown, of Brown Junior Motors! And as for modern times, think of the confusion if



"Models are made by fools like me, but only God can make a tree."

Chevrolet, Pontiac, Olds, Buick, and Cadillac were manufactured by GE . . . General Engines, that is!

Finally, in defense of John "Daddy Warbucks" Pond, all of us hack writers try to break monotony by avoiding use of the same word over and over in the same sentence. Alternating between "engine" and "motor" helps a little, but "mill", "gas-burner", and "power plant" get kinda hakneyed after awhile, too. Even gliders won't get you any relief . . . there are both "engine" and "Motor" driven winches!

### CONFIRMATION!

Art Phillips, Bloomingdale, New Jersey, wrote to confirm my recollection of building a Henry Struck design very similar to the "Contest Winner" rubber model we published as O.T. Of The Month in the May 1982 issue. The suspect model plan was published in the July 1936 issue of Model Aircraft Builder, and had an even catchier title, "Contest Cabin Model!" As Art commented, "I don't know how it can be called a cabin model."

### WHAT HO, CHAPS!

Ray Forbes, vice president of Hobby Products, Kraft Systems, announces the appointment of Dage (Great Britain) Limited, Rabans Lane, Aylesbury, Bucks HP193RG, England (Phone 0296-32881) as Kraft's exclusive sales agent for Great Britain.

Dage is a long established international group of companies supplying goods and services to the electronics and computer industries. It's newly formed hobby division has just moved into a new 20,000 square foot facility in Aylesbury, and will be offering both retail and mail order sales, as well as

Continued on page 95



# 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 R/CMB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by R/CMB.*

• Just in time for those modelers starting to plan large model projects for fall and winter building, is the availability of 1/4-inch music wire in 36 inch lengths, now available from Sig or your local hobby emporium. Hundreds of other modeling items are listed in catalog #44, *The Model-Builders Wish Book* for only \$2.00, from Sig Manufacturing Co., Inc., Montezuma, IA 50171.

★ ★ ★

MRC's fiberglass Cessna, the newest addition to the company's ready-to-fly line, has the appearance that every flier wishes he could build and finish. While it has a number of features that make it stand out, one of the most obvious is its professionally painted finish. Like MRC's other RTF's, this one is practically assembled right out of the box. The Enya .35 TV engine is installed, as are servo trays, fuel tank, push rods, clevises, and tires. About an hour's time is required to complete assembly.

The fuselage is made from fiberglass, while the wing is fabricated from foam, with a wood spar for strength and durability. For complete information see your hobby dealer, or contact: Frank Ritota, Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.

★ ★ ★

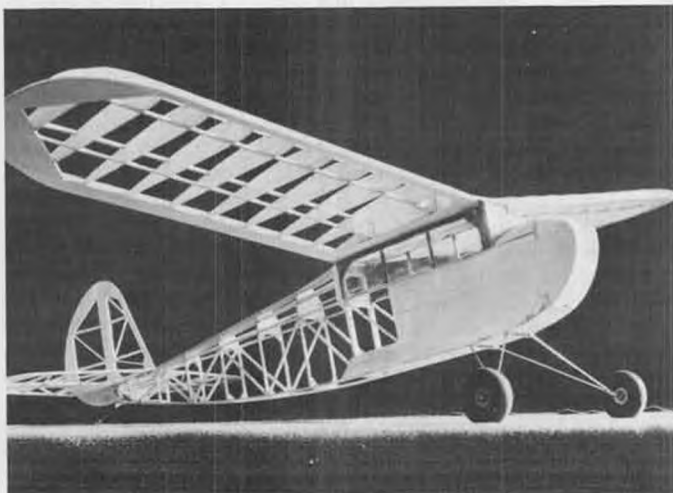


MRC's ready-to-fly Cessna with Enya .35.

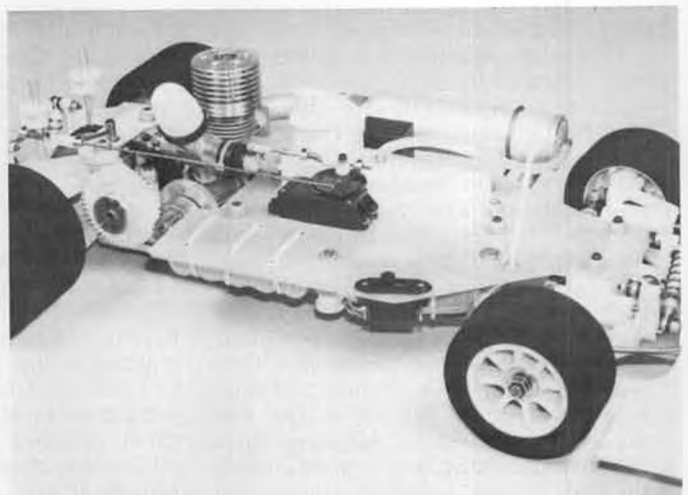
Associated Electrics' new RC500 has just been released! This 1/8-scale gas powered kit features full 4-wheel independent suspension with a chassis designed from full scale Formula racing cars. The RC500 is already a race proven winner, having placed 1st and 2nd at the 1981 USA ROAR Nationals. It also won the Formula 1 as well as GT classes at the 1981 English Nationals, and to prove its durability, it also won the 1982 Detroit 6-hour Enduro race. Two outstanding booklets are included in the kit, the first is a ten-page, step-by-step assembly and chassis tuning/set-up booklet that really spells out how to "tweak" things, and, to insure that everything is assembled correctly, one of the clearest and most concise aids to assembly ever put in a kit ... a twenty page booklet containing over one hundred clear, sharp photos to be used in conjunction with the assembly instructions. For more informa-



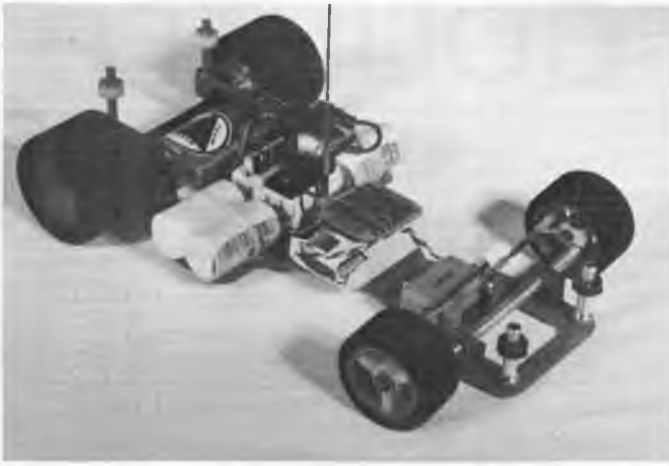
The 2.4 cu. in. Marine Kiortz, from Roush Mfg.



Pre-built "Klound King" O.T. from Beehive R/C Model Aircraft Co.



Associated Electric's 1/8-scale gas powered RC500.



Delta Mfg. Inc. 1/12 scale Phaser Chassis modification kit.



The Fox Bicycle Motor, it outruns the Mopeds.



Headlock Remote for enclosed engine installations by Model Products Corporation.

tion, write to: Associated Electrics, 1928 E. Edinger Ave., Santa Ana, CA 92705.

★ ★ ★

Fox Manufacturing Company, well known for its model aircraft engines, fuels, and accessory items, has now introduced its latest item, the Fox Bicycle Motor. Four years ago, Duke Fox surveyed the bike motor marketplace, and determined that something much better was needed. Existing bicycle motors were underpowered, drive spools chewed up tires quickly, mounting was flimsy, they were too expensive, and in general, were a sorry lot. Duke felt the goals were simple to state, but would be hard to achieve. Fox Manufacturing feels its design goals have been met.

The motor installs in 10 to 15 minutes, outperforms MOPEDS, all controls are handlebar mounted, and the large diameter, cleated roller and swing arm system solved the rapid tire wear problem. The power head, designed and built for this purpose, features Schnuerle port design, removable cast iron liner, needle bearings, and massive finning. The magneto is of Fox design, and the carburetor is a simple, model airplane type that has no valves, floats, pumps, or other built-in service problems. Being rear mounted, noise, fumes, and heat move away from the rider. The Fox Bicycle Motor will be marketed on a dealer direct basis, and is not available through jobbers. A special summer deal of only \$124.95 is being offered now! Dealers, write to Fox Manufacturing



Four new colors added to Coverite's epoxy spray paint line.

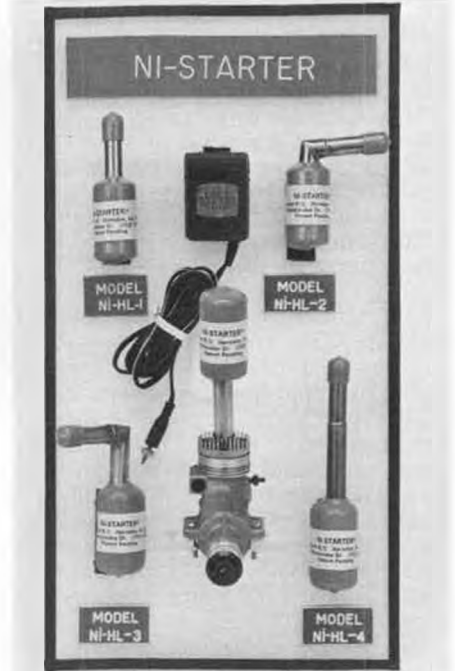
Company, 5305 Towson Ave., Fort Smith, AR 72901, or call (501) 646-1656.

★ ★ ★

The BLACK BARON from Coverite strikes again! Four more new, exciting epoxy paint colors have been announced for availability this fall. The new colors are: Fokker Red, Cub Yellow, Curtis Blue, and Aluminum. This rounds out the present line of Epoxy paint colors: White, Fire Red, Electric Blue, Lemon Yellow, International Orange, and Black. All colors are ideal for spraying over any of Coverite's coverings, also over bare wood, fabric, paper, acetate, fiberglass, and over various primers including Coverite's own primer, "Primex." Features include excellent "hiding" and fuel resistance, along with long term flexibility and a deep, glossy finish. Coverite, 420 Babylon Rd., Horsham, PA 19044.

★ ★ ★

R.C. (Bob) Sweitzer of R.C. Sweitzer Enterprises has released his first new set of scale drawings for radio control aircraft in the unique D.H. 89A Dragon Rapide, a well-known 'short haul' twin engined airliner of days gone by. Drawn to a scale of 2-inch to the foot, a 96 inch wingspan model is the result. Four sheets of plans, 3 feet by 9 feet, include all interior detail and complete wing layouts. Fiberglass cowls and canopy will be available soon. The special introductory price of \$39.50 p.p.d., includes



Complete line of Ni-Starter systems, from McDaniel R/C.

mailing tube, and for airmail, add \$3.00. Bob Sweitzer prepared most of the scale drawings offered by Sid Morgan Plans, so his work is well known. More scale R/C plans are in the offering by; R.C. Sweitzer Enterprises, 1925 S.E. Oak, Hillsboro, OR 97123.

★ ★ ★

Delta Mfg. Inc. has made available a 1/2 scale Phaser Chassis modification kit, #CMK-120. Delta has entered the 1/12 racing scene with its Phaser Mod kit, using Associated wheels, axles, and differential to complete the assembly. The completed car has extremely low CG, and gives greatly improved steering response and overall improved handling. It has an adjustable caster front suspension to control throttle steering, and a highly machined aluminum heat-sink power pod with a fiberglass chassis and low mounted radio plate. Available now for \$60.00, suggested list from your dealer, or contact Delta Mfg. Inc., 27

Continued on page 68



# Pattern Flying

By DICK HANSON

• Occasionally we pick up bits of information that bear passing on. One of these was the finding that the servo arms for the new imported Kraft servos fit the J.R. radio servos, and vice-versa. The Kraft arms are apparently made from nylon and tend to resist wear very well.

Another handy tidbit was the finding that the standard Futaba servo connector (not the "J" series) can be easily split with a sharp knife so that the wires and pins are exposed. It's then an easy matter to re-solder the pins to other manufacturer's servo leads, or simply use the process when making up long leads. The connector halves can be glued back together using a C.A. adhesive. It makes a very neat job of things.

I picked up the above information during my never-ending search for the "Holy Grail". In this case, the ultimate, perfect, no backlash, low power drain, never-needs-the-pot-repaired servo. Like the Holy Grail, it has not been found . . . but we are very close!

It may be of comfort to know that the present crop of super servos is really so good that there are a number of manufacturers offering models which operate more precisely than the airframe requires . . . as an example: a situation can easily be created where the pushrods drag slightly and cause the servos to constantly try to "center" and relieve the load, the net result is high battery drain.

Another situation which breeds disaster is a loose pushrod hooked to one of these super sight beauties . . . the vibrations delivered by the engine through the pushrod can act like a jackhammer and just plain ruin the precise qualities you paid extra for. If you want to realize the performance these servos can deliver, make sure that the entire control system is absolutely tight, but free of any binding or loading in any position you select when moving the TX control stick. If the system constantly buzzes like a hive of bees, fix it or you might as well switch to "Economy Specials" which are less critical and power hungry; at least you will reduce battery drain and maybe save a plane.

During our "Servo Search", we tried four different models of the servo line offered by J.R. Radio . . . the models are the: 4001, 2001, 801, and 501. The 4001 was the most expensive and the 501 the least expensive. The 501 was equal to anything I had seen a few years ago, smooth and strong. The 801 was simply tighter around center . . . the 2001 was tighter yet, and the 4001 was the tightest.

The really interesting thing about this test was that the difference in tightness could not be detected with several of the transmitters (different brands). The stick slop, although very minute, caused the servos to move by simply touching them or squeezing them. One transmitter which has a very solid gimbal and very good pots, clearly showed that differences existed. If you were to flip the transmitter stick and make it go "Boing", the 4001 would follow.

There are a number of other manufacturers who offer servos comparable to those described above, but I was fascinated by the observation that these servos are apparently able to detect movements that result from unintentional and unknown movements of the transmitter stick. If all this leads you to think these super servos are overkill . . . well . . . could be. But we all kept asking for the tightest and fastest . . . so the competition among manufacturers gave us just that . . . a selection of servos with virtually undetectable error.

The reason we brought up all this business about servos is to suggest that if you are in the market for servos, don't buy those which require more precise control than your transmitter sticks can provide. Conversely, if you want to build up a zero slop system, it can be done . . . just remember, it's no better than the sloppiest fitting in it.

Enough about servos, let's get on to some new stuff we are playing with. .60 geared engines . . . friend or enemy. I guess we have all seen a geared engine of some sort and a number of us have run them. We have learned a little about them and if the info helps you, pass it on.

1. The AMA pattern rules allow an engine no larger than .61 cubic inches and most of these engines weigh roughly 18-20 oz.

2. The lightest .60 geared engine set up we know of weighs 27 ozs.

3. A typical gear drive (belt type) unit weighs approximately 29-30 oz. plus the engine weight. This brings the combined weight to approximately 3 lbs!

4. Exhaust systems have been omitted from the above figures.

5. Gear ratios commercially available run between 1.4 to 1 and 3 to 1, depending on the manufacturer. Recommended props range from 14 to 18 inches.

Before we continue, consider that there are various drive systems, i.e. cog-belt, V-belt, spur gear, helical gear, etc.,

which are available. We are referring to all of them as gear drives because they all vary the engine-to-propellor speed in some manner. The difference in speed is commonly called the gear ratio.

1. They all absorb some horsepower through friction.

2. They all have some maintenance requirements.

3. They all reduce the amount of horsepower available at the propellor shaft.

4. They all increase the torque available at the propellor shaft in a ratio directly related to the gear reduction.

5. The propellor used is dependent on the gear ratio and the size of the model. No solid information on the best "pitch to diameter" is available but **apparently** the pitch must be increased as the diameters decrease. Also no hard information on best prop r.p.m. for maximum performance has been found. (Ed. Do you have any?) (Perhaps John "Prop Chart" Burns can help. wcn)

The old question "Which one is the best?" always pops up. Frankly, the applications are so varied, there is no "Best." But if we are to take pattern planes *specifically* and apply the criteria related to good pattern plane performance, the selection narrows fairly rapidly to the lightest and most compact units.

The new units by O.S. Max are advertised to be designed specifically for F.A.I. Aerobatic models and they look very good. The Webra gear unit also shows promise. Both of these units weigh less than 30 oz. less exhaust systems. As far as the airframes required for these units, time will tell. We do know that a 100 sq. inch model which weighs 10 lbs. is entirely possible and flies very well. No trick cutout construction was used and three gear retracts were used. We hope to have photos for next month.

A couple of notes of caution if you decide to experiment with the gear units.

1. The propellor deserves great respect.

2. The electric starter can quickly destroy the engine if you allow the starter to engage while the engine is flooded. This is because the gear unit tries to move the crankshaft much faster than on a direct drive set up.

In spite of all this, they are great fun to experiment with! Buy one and try it.

Until next time. . .



Level I USPJA judge Al Tuttle, Maui Island, Hawaii, with his Tartan single powered Stampe.



Al's 1/4-scale Stampe built from Svensen kit. Line has been discontinued in the U.S. This was to be a product review . . . Oh well . . .



# WORLD

JOHN ELLIOT

## TGIF

Are you one of the rank and file who still believes that TGIF stands for "Thank God It's Friday"? Well, according to the *Cleveland Aeromodel News*, TGIF is really the cry of all areomodelers everywhere, "Thank God It Flew!"

## PREDICTION DEPT.

In the September 1981 issue, we made mention of the First International Competition of Model Formation Flying, to be held in Harsewinkel, West Germany. My prediction was that this competition would be won by a three or four-plane element of the pattern type . . . and sure enough, three well-flown pattern birds made it into first spot. Enjoy the coverage of this historic event in a feature article found elsewhere in this issue.

## BIGGEST OR BUST?

What with many thoughts being

expressed regarding the present and future status of Giant Scale models, the *Gold Coast Flyer*, edited and published by Art and Charlotte Johnson, says it all for a lot of us . . . "Some of the guys who are into big models claim they do not like competition, but it looks to me as though they are in an all-out competition to see who can build the biggest and heaviest model without putting a guy in it to fly it. I like Giant Scale models, but I am not sure that biggest is bestest!"

Art's comments are basically referring to the B-29 seen at Toledo this year, the weights for this model (?) have been quoted as anywhere from 135 to 150 pounds. All this being hauled around on a 16-1/2 foot wing. Big is neat, for sure, but how and why did it grow to 135-150 pounds? Models (?) are supposed to be built to fly, not to retaliate against

mother earth should the gods decree that it come to rest. And consider that it has 9.6 cubic inches of engines hauling it around . . . Cogitate on that for a while . . .

★ ★ ★  
On 26 June, 1982, the peace and quiet of a tranquil Saturday morning was totally undisturbed by the efforts of Larry and Jim Jolly, Bob Boucher, Bob Sliff, and other supporting personnel. After, all how much noise can an electric powered model airplane make? Recently submitted to the AMA and the FAI were the first serious attempts for an electric powered, R/C model speed record.

Larry Jolly, of Larry Jolly Model Aircraft, flew a slightly touchy "Fast Eddy" 1/2A type racer, designed and built by Hobby Horn's Bob Sliff, and powered by an Astro 05 Samarium Cobalt motor administered to by Astro Flight's Bob Boucher. "Eddy" slipped through the 200 meter course at 104.5 mph on the downwind pass, and returned upwind at 81.2 mph, for a 92.85 mph average. In picking up Fast Eddy and noting the weight in the fuel (battery) tank, one would tend to be a bit pessimistic



Quarter Midget pylon is making comeback after four-year layoff in Southern California. At left, Bob Nickel rounds No. 3 on way to heat win. On right, clock is running as starter Ron Young waits to flag 'em off.



regarding its flight characteristics, let alone its record setting potential. But go fast, it did! When launched, Eddy simply picked up speed quickly even as Larry dialed in a 30 degree climb angle. With the batteries charged to the 'nth degree, the plan was to climb high upwind while easing into position for a split-S and a dive toward the course, leveling off and entering the traps at the prescribed altitude. Larry did a fantastic job of flying the model, as it tended to change trim while it moved through its speed envelope. Trying to follow its course through the sky with a 200mm telephoto lens was fun, too! Another design is in the works using the same motor (engines burn fuel, remember?) that should easily net another 25 plus mph.

The prop used on the fastest passes was a Rev-Up 5-3/4 x 9-1/2, and Larry's trusty Futaba handled the guidance chores. Considering the cramped installation; wiring, batteries, electric motor, and all, radio performance was superb. Even though electric powered flight has been around for quite a number of years and most modelers have shunned the concept, efforts of this nature will bring recognition and attention to the potential of electric powered flight. Now, how do you "Schnuerle port" an 05 Samarium Cobalt motor? Simple, add more cells!

★ ★ ★

On 27 June, 1982, a revival took place. Not the kind of tents, mind you, but a re-kindling of 1/4-midget pylon racing! Several years ago, QM, as practiced in Southern California, seemed to have died, period. Lack of suitable flying sites, (muffler rules in some cases), clubs to host races, bickering, whatever, the spark was gone even though some QM activity was evident, on a small scale, in other parts of the country. Those who tried to legislate price limits on engines may have caused the suggested retail price to be held down for a while, but as time has proven out, this was not the solution. Be that as it may, it took an outsider, Lyle Larson, recently transplanted to southern California from the wilds of South Dakota, to re-ignite old "go fast, turn left" urges again.



One of our most popular full-size plan projects, the FA-61 twin-rotor autogiro, designed by Skip Ruff. This version by Ed Jevyak, Lansing, Ill., uses OS 40. Everyone wants to fly it!

With Lyle as CD, assistance from K.K. Schrader, and the MARKS club hosting, Fontana, California saw a QM race with five rounds being flown with seven entries in expert and five in standard going to the line. Tom Christopher (former QM editor for MB) picked up all the marbles with a perfect score and fast time of the day . . . 1:30 flat. Bob Nickle was 2nd, only one point down, having been edged out in a heat by Bob Novak, who wound up in 3rd and had a fast time of 1:31. Kent Thomas brought out his trusty (dusty?) 'Cobra and eased into 4th spot while Bob (R/C Etc.) Root came out of retirement and garnered 5th, needle problems notwithstanding. Mac Moffet picked up 6th and Lyle Larson, busy CD'ing and racing, took off in a heat race with only the fuel remaining from a previous heat. Needless to say, he didn't make ten laps and wound up 7th (last!).

Standard class saw Bill Becker in first with newcomer Ted Burns in 2nd, Bob Gillespie, Jr. (look out, dad!) in third and fastest time in standard with a 1:48. Larry Stotts was 4th. Randy Bloom wound up 5th and with the only broken bird of the race. Ron "Conquest 15" Young was starter, and interesting to note was the fact that everyone was using the Conquest, most of them having been pre-

pared by Ron.

It was good to see Quarter Midgets in the air again, let's hope the bug-bite was strong enough and that we'll see a resurgence of this Super Sport again. At one time, QM contests in southern California drew 30 to 40 entries. . . Could it happen again? Let's hope so.

★ ★ ★

#### FOUR-STROKING IT

In the beginning the idea of a Four-stroke, R/C Scale contest sounded a bit far-fetched. How many scale models were there around the area, ready to fly, or under construction, with Four-stroke powerplants as the motivating force? Read on, George . . . John Lupperger,



"Fast Eddy"; Bob Sliff's 05 electric racer going through speed traps at 107 mph!



Jim and Larry Jolly, Bob Sliff, and Bob Boucher (l to r) after 92.85 mph average speed runs with 05 Cobalt powered model. See text.



Bob Sliff talks "electric" to Roger Roth and Charlotte Jolly. Bob is proprietor of Hobby Horn and Midway Hobby.



Closed cockpit Waco at four-cycle meet, built by Bob Richards. Pilot just a little under scale!



Beautiful Waco 10 with O.S. 40 four-cycle up front by Frank Comyns, who did that beautiful 3-inch scale G.L.T. in March '82 MB.

Advertising Director/Buyer with Hobby Shack, was kicking around the idea of a different kind of a contest, when during a discussion with his boss, Paul Bender, founder of Hobby Shack, Paul suggested making it a Four-stroke scale contest. John then approached the Riverside R/C Club, well known for its beautifully run R/C Scale Olympics, and initial reaction was, well, OK, we guess . . . With Don Lien and Mike Miller CD'ing and managing the contest, its smooth operation was assured.

Initial reaction was to expect maybe twelve to fifteen entries max . . . after all, this was a first! As time passed, the word spread and it looked like maybe twenty to twenty-five *might* show up. Sunday morning, the 27th of June (this was set up to be a one-day contest as entries were expected to be light!), *forty-three*, that's right, 43 valve clattering (or is it ticking?). Four-strokers were signed up, with 37 entries making official flights by contest's end. Next year, two days are scheduled, and an excellent turnout has already been assured. Prizes furnished by Hobby Shack ranged from a Saito 80 twin and trophy for first place, trophy and a 7-channel system for second, a trophy, engine, and kit for third, to electric starters for 9th and 10th spot! The plane with the highest static score,



Steve Pfister with his 2nd Place Aeronca C-3 OS40 powered. Built in three weeks. Owns full size "Airknocker" just like model.

Chuck Maitre's Fokker D-7, received a trophy and engine.

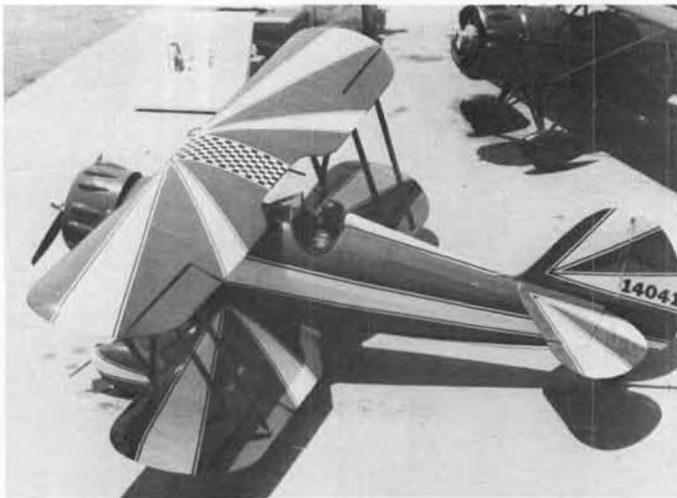
It was interesting to note the number of new contestants, including quite a few scale types who haven't been active on the scale circuit for a number of years. Evidently the idea, sounds, nostalgia, or charm of Four-stroke engines going 'ta-pocket-ta-pocket-ta' stirred the souls of the not-quite-over-the-hill

gang into action. The age level was a bit higher than usual for a scale contest, as was that of the very large group of responsive spectators. All of the models were pre-WW-II types, Golden Age and older, no fighter types at all, although Japan scale modelers are hanging Four-strokers into everything.

Cubic inch for cubic inch, the Two-strokers will crank out more horsepower,



Team of Bruce McAviney (shorts) and Charlie Strange with lovely old Taylor Cub, Saito 80 twin 4-cycle powered.



Nice red and white, .45 Saito powered Waco, by Gary Smith, placed 4th at Hobby Shack co-sponsored 4-cycle scale meet.





Dave Johnson, Kraft rep, with his Proctor Nieuport, OS twin powered . . . oh yes, and Kraft radio!



Pete Sepulveda's Farman Moustique putty-putts overhead. He edits Scale Squadron newsletter.

but the current generation of 'ticking Ted Tappets' (who can remember that name from what era?) specials do quite well swinging large props, with and without gear reduction units. Rumor mill has it that Forrest Edwards, Sr. has started on an 18-cylinder double-row, scale P&W for a yet-to-be-named scale project.

The Waco's of Steve Spears and Gary Smith with OS .60 'ohv's are excellent marriages, as was the Eindecker E-III of Bill Duncan with a Saito .45 doing the chores. Ron Karwacky's big Jenny with a Webra .90 Four-stroke flew quite well, too. One of the charmers of the contest was the Aeronca C-3 built and finished in three weeks by Steve Pfister. Steve mentioned that he hadn't heard about the contest until three and a half weeks before same . . . His "Airknocker" was finished with the same paint as his own C-3, which he restored himself (Steve is in the aircraft restoration business!). With an OS .40 Four-stroke in the nose, the model was beautiful on the ground and in the air.

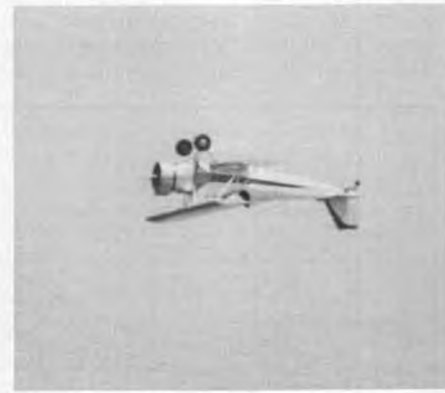
It looks like John Lupperger, Paul Bender, and the Riverside R/C Club have a winner on their hands, let's hope someone doesn't try to bolt a four-cylinder OHC Honda into a 'Giant' scale model next year. . .



The Riverside R/C Club four-cycle Scale Contest crew at least got together for one thing . . . this photo. Just kidding, they ran a great contest!



Larry Maynard with his Monoprep, powered by an OS 40 four-cycle. Kraft radio.



Forrest Edwards, Jr., makes inverted pass with smaller Concept Fleet. Pilot fell out!



Four-stroke contest winners with their Hobby Shack loot and trophies.



Pam Chew, hobby shop co-owner, wowed troops by side slipping her J-3 Cub, on purpose! Been flying one year.

# FUEL LINES



JOE KLAUSE

P.O. Box 2699  
Laguna Hills, CA 92653

• In this column last month, I presented a general review of the transfer and exhaust ports of two-cycle model engines. This time the subject is the intake port. Again, the discussion will be somewhat simplified. The goal is a broad understanding rather than complete technical details.

While these porting articles provide some of the basics, you may want a bit more information. In that event, I suggest you read my column in the February 1980 issue of *Model Builder*: "How Engines Operate." Together, the three articles should provide you with a decent knowledge of the fundamentals of two-cycle, single-cylinder model engines.

## THE FUNCTION OF THE INTAKE PORT

This port is an entrance to the crankcase. If crankcase pressure decreases, such as when the piston moves upward after bottom dead center (ABDC), then higher atmospheric pressure outside the engine will enter the crankcase if the intake port is open. On the way, the air passes through the carburetor and atomizes the fuel. Subsequently, during descent of the piston, sometime after

top dead center (ATDC), when the intake port is closed, the piston pumps the fuel/air mixture from the crankcase, through the transfer passages and ports, and into the cylinder.

Obviously, the timing of the opening and closing of the intake port is an important part of the scheme of things. Further, it will vary with the designed purpose of the engine. Without going into lengthy details, two examples will illustrate this point. Control line stunt engines will have an intake that opens about 40 degrees ABDC and closes around 40 degrees ATDC. On racing engines, the intake port usually opens at 35 degrees ABDC and closes as late as 70 degrees ATDC. In simple terms, the intake port controls the flow of the fuel/air mixture into the crankcase.

## INTAKE PORT DESIGN

As you might imagine, there have been many designs. However, there are only two basic ones in use in currently produced model engines. (Note: I do not include all possible two-cycle engines that may be adapted to models from their original designed use. One or more of these may have piston port

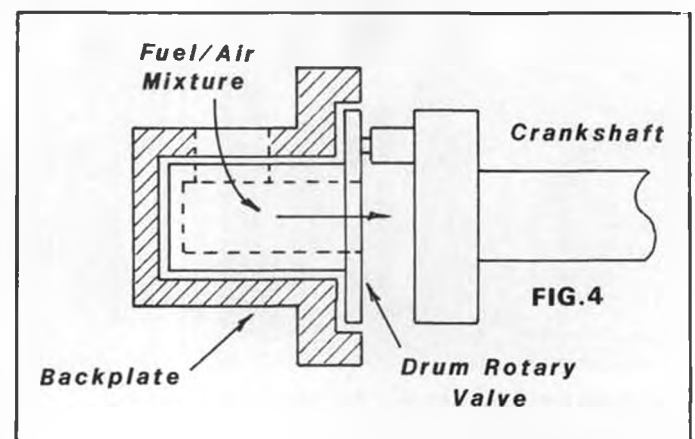
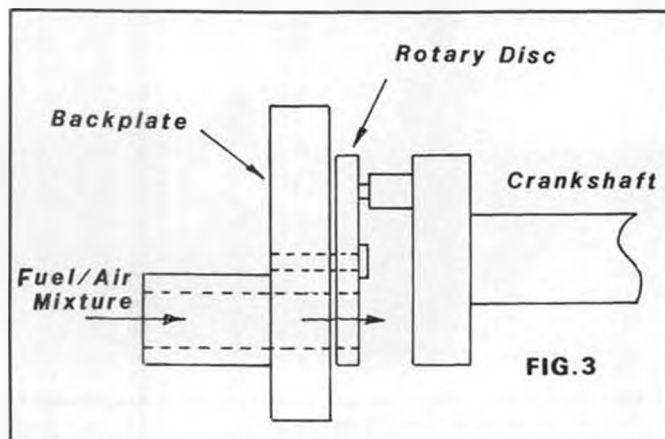
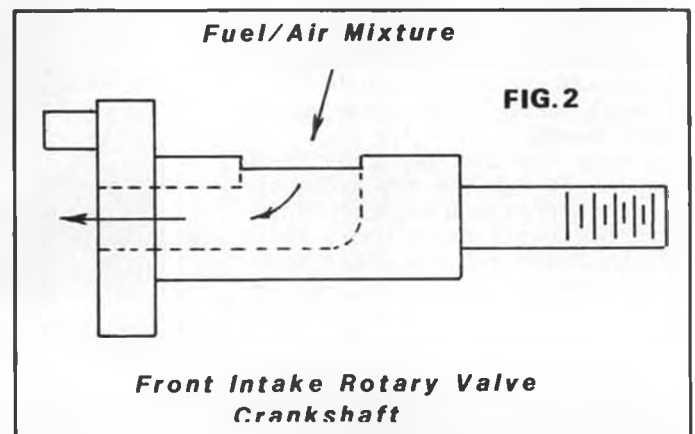
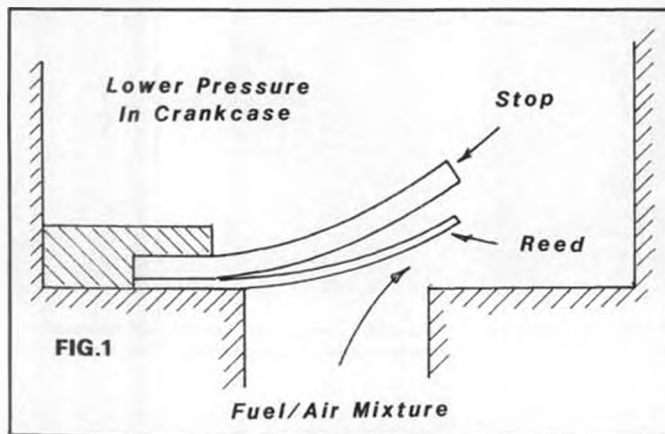
intakes.) There are a lot of variations of them, but they all are either reed or rotary valve intakes.

When we think of reed valve engines, the name Cox always comes to mind. Cox has literally produced millions of them. Their first production .049 engine was the Space Bug. It was a reed valve engine and it was marketed over thirty years ago, in 1951. As you can summarize, production increased over the years. As an example, in 1976, Cox produced 2.3 million reed valve engines. To date, their total production of reed engines amounts to an estimated 25 to 30 million! That may sound almost incredible, but it's a fact.

There are a few other isolated reed valve model engines, but their numbers are insignificant compared to Cox. The familiar Cox design is a quite simple and relatively efficient mylar reed that flexes in one direction in response to varying crankcase pressure. When the reed flexes inward toward the crankcase, it uncovers the hole through the stem in the tank which leads to the needle valve carburetor in the backplate. Higher exterior pressure then forces fuel/air mixture into the crankcase.

A variation of the reed, which is commonly used in other engines, is shown in the first drawing. Notice that the thin reed bends in response to the higher pressure of the incoming fuel air mixture, but is limited by a curved heavier metal strip that acts as a back-stop. This helps to prevent fracturing of the reed which is often made of stainless

*Continued on page 69*







# Krier GREAT LAKES Special

By LARRY SCOTT . . . Designer of last November's three-inch scale Waco Taperwing comes through with another classic aircraft in the same scale . . . and a biplane, of course. Not only that, it's *sensible* Giant Scale, with an overall weight of eighteen pounds. Cowl and wheelpants in 'glass available from Larry.

• If I was asked to pick my favorite airplane, I doubt if I could do it. One thing I am sure of, however, is that it would have two wings and a round engine. I also prefer a model with a lot of aerobatic potential, as this is the type of flying I like to do the best. After I read an article on Harold Krier's Great Lakes Special, I really got the urge to build a model of it. When I saw the three-views listed in Bob Holman's catalog, I ordered them immediately. I drew up some plans and built a quarter-scale model with a

wing span of 80 inches and a total weight of sixteen pounds. I used a Webra .91 for power. It flew very well at this weight, and I won Giant Scale at the Sig contest (IMAC) at Montezuma, Iowa. (I believe it was in 1978.) I have since built two more models with some slight change in the plans to make them more scale. Both of these models flew very well, the first on a Suevia (1.5 cubic inch) engine and the second with a Quadra engine for power, at eighteen pounds. The model is very easy to fly and also pretty simple

to build, so I won't go into too much detail on the construction of the plane.

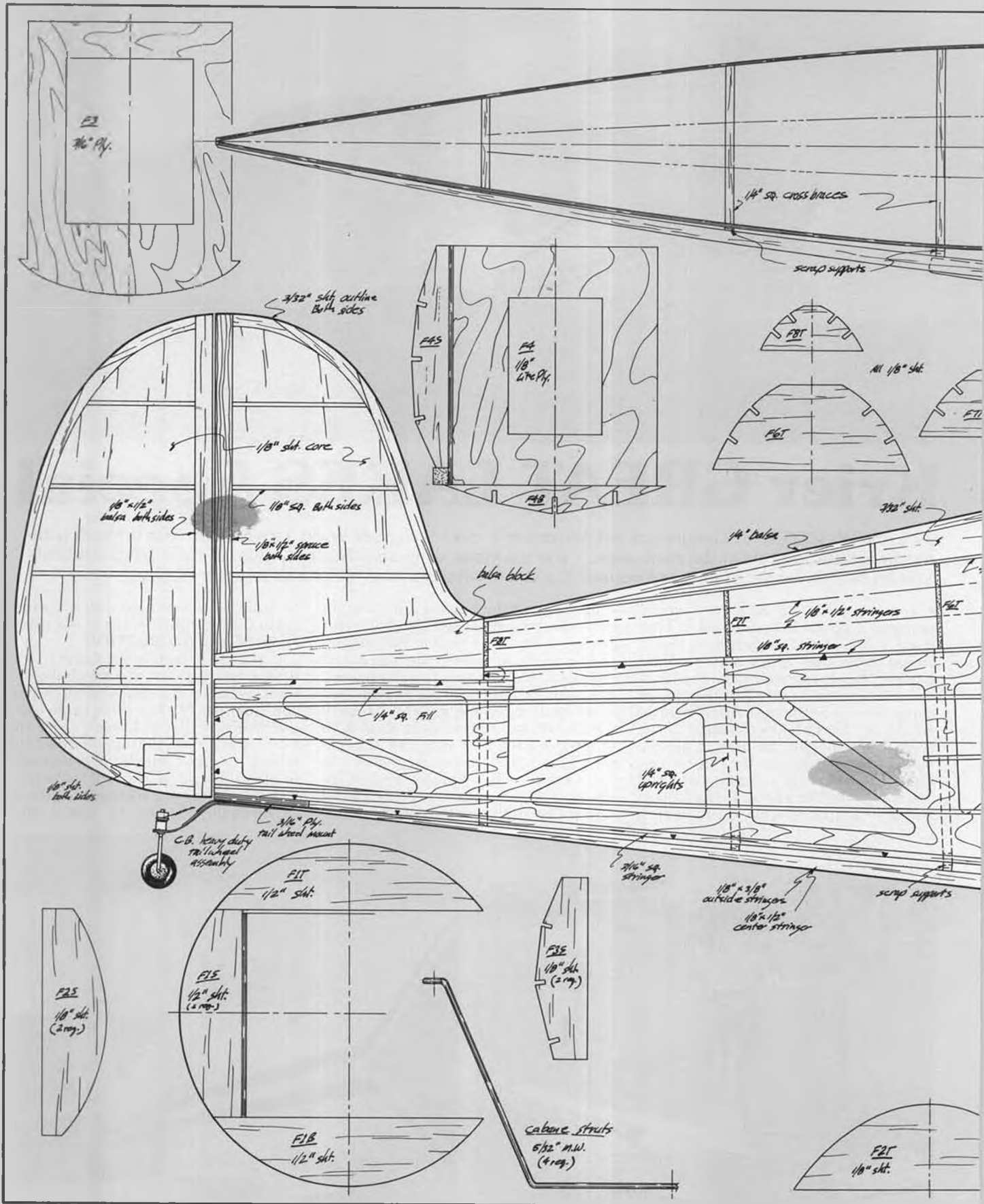
## FUSELAGE CONSTRUCTION

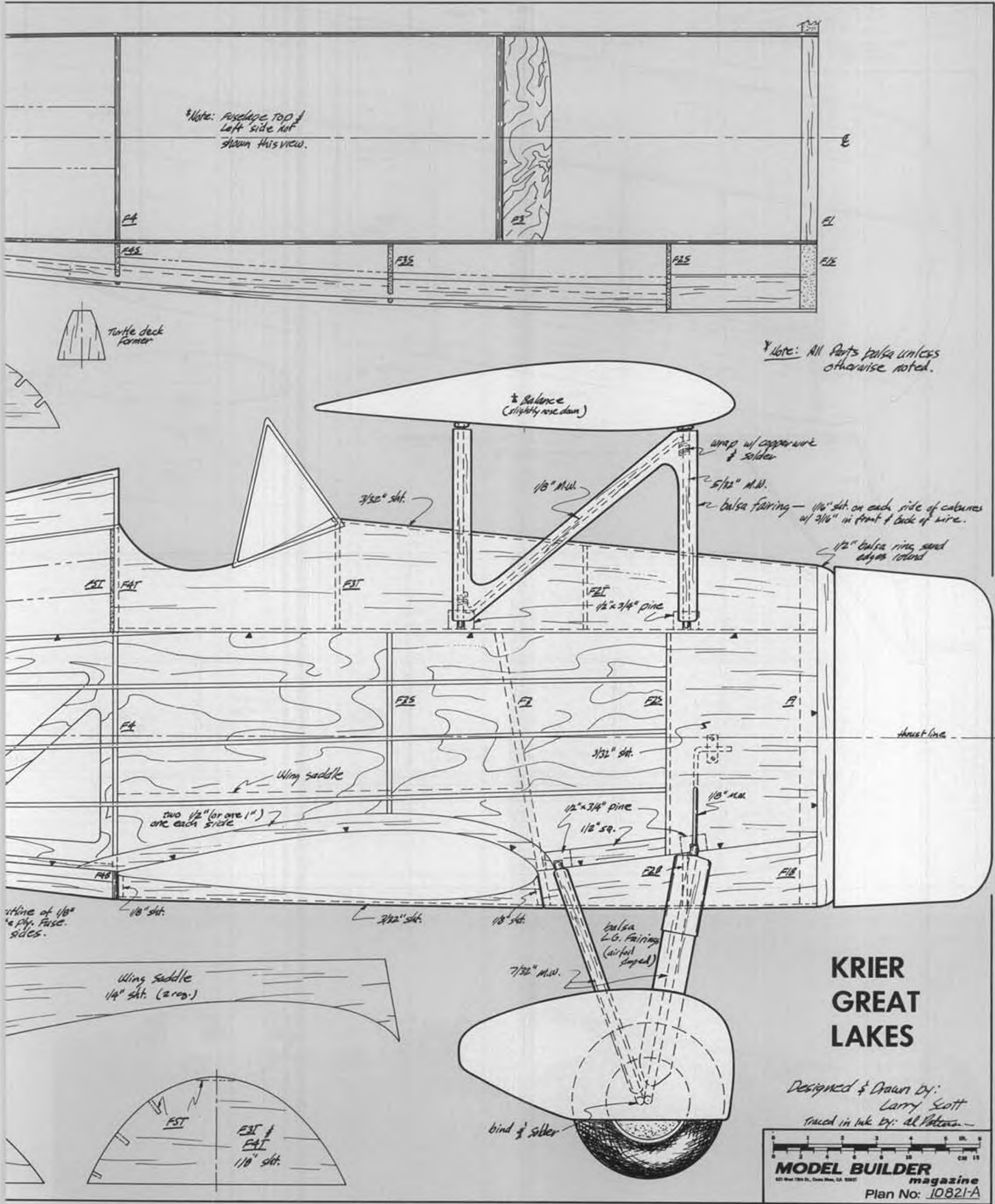
If you have built a Sig Kadet or any similar type trainer, you can build this fuselage, as it is of a very simple box-type construction. The first thing to do is cut out the sides from lite-ply, and the formers and firewall from plywood and lite-ply. Lay both sides flat over side view of plan and mark position of formers on fuse sides. Now you are ready to glue on F1 (firewall), F3, and F4. Use a small



Not, it's not Grizzly Adams, it's Larry Scott at Sig's 1980 IMAC contest, with his second GLT, Suevia powered. AMA's John Worth in background. Quadra and 18 lbs. total weight is just right.







\*Note: Fuselage 100 of left side not shown this view.

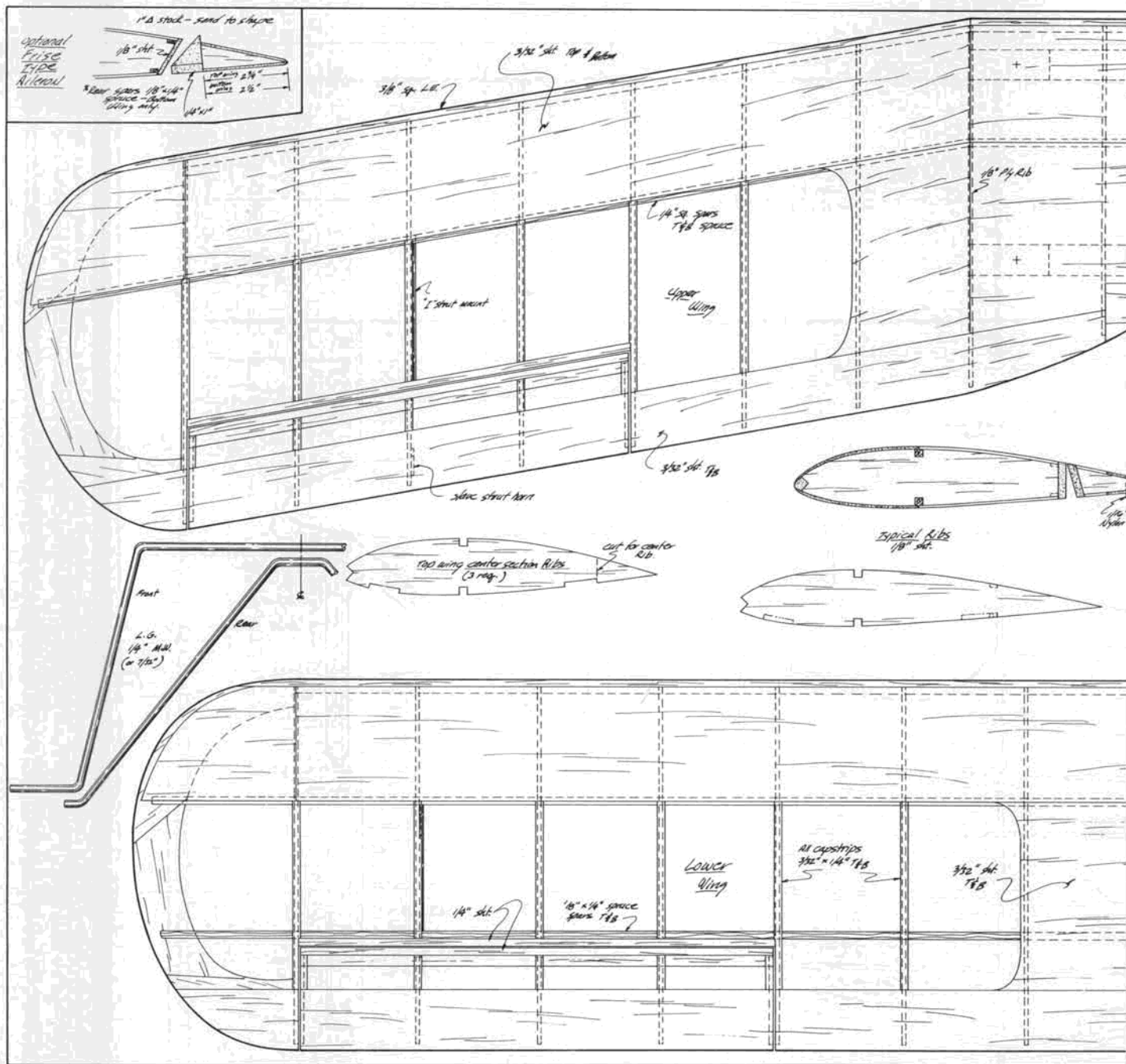
\*Note: All parts balsa unless otherwise noted.

# KRIER GREAT LAKES

Designed & Drawn by:  
Larry Scott  
Traced in ink by: Al Petersen

**MODEL BUILDER** magazine  
 Plan No: J0821-A

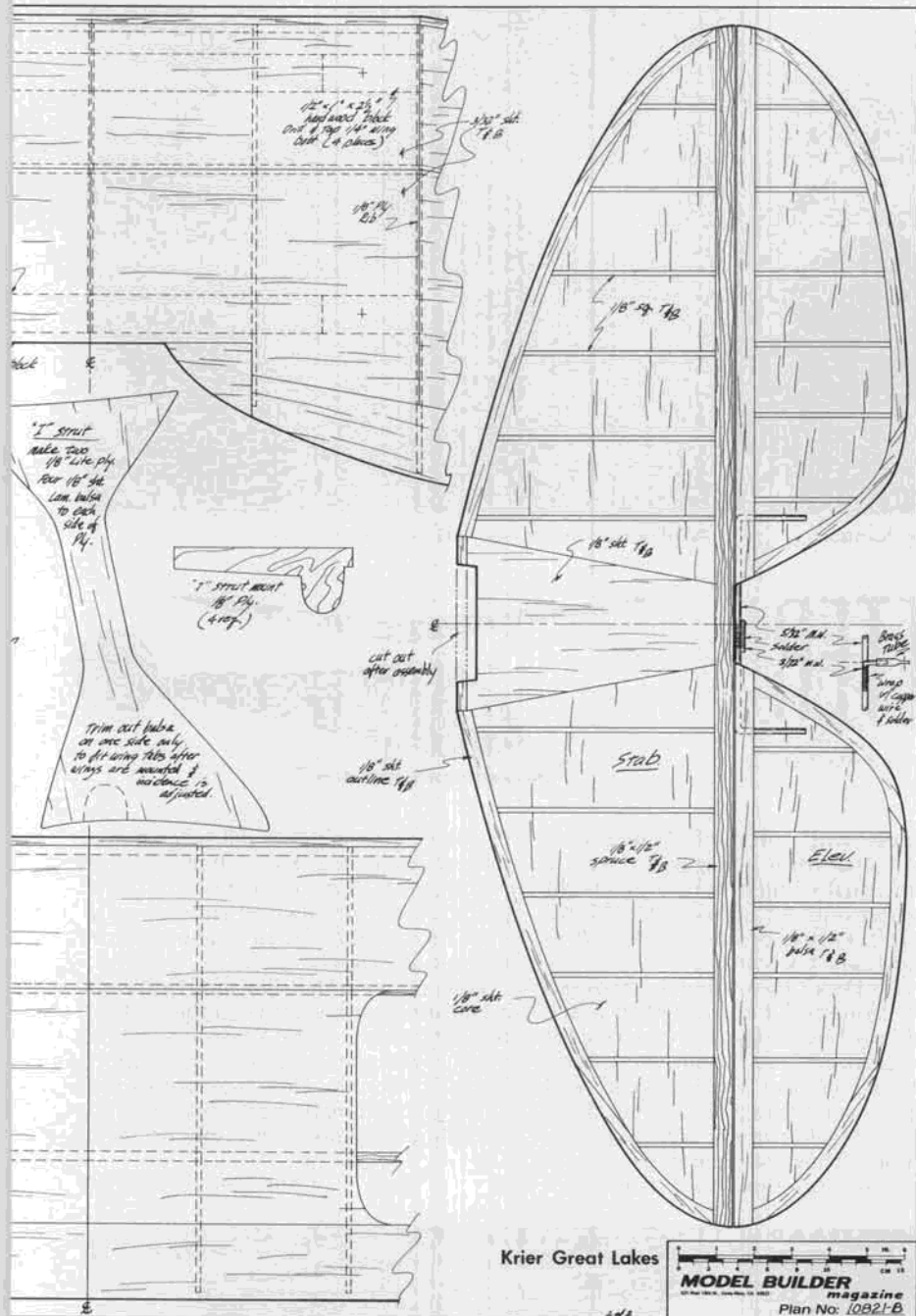




All wood construction, just bigger pieces! Jet and epoxy used throughout. K&B Super Poxxy over Coverite. Fiberglass cowl and wheel pants.



Completing a low pass at Sig contest. Suevia engine was adequate, but the vertical upward performance improved with the Quadra.



square or triangle to be sure these are vertical to the first fuse side. The next step is to lay the other side on top of the formers and glue it on. Square the formers to this side too, just to be sure everything comes out right.

Now pull the fuse sides together at the tail and epoxy together, being sure the tail end of the fuse is vertical with the fuse laying on the top side flat on the table. Cut out a sheet of lite-ply to fit top of fuse. This should reach from front of fuse to front of F4. Glue on with epoxy.

The next step is to make your landing gear and cabane struts from piano wire. You will need a vise, two pair of vise-grips, and lots of muscle, to bend the landing gear, as the 1/4-inch music wire is very hard to bend (it can be made from 7/32 wire, if a smaller, lighter engine than a Quadra is used). The cabane struts must both be exactly the same height, as this sets the wing incidence. Glue the cabane struts on with 3/4-inch x 1/2-inch pine blocks across the top of the fuse. These should be grooved with a Dremel router or a table saw. Fit the landing gear in the pine blocks on the bottom of fuse and solder back gear ends onto bottom of front gear, then glue and clamp it into pine blocks with small straps of brass and metal screws.

The basic structure is now complete. All that is left is to add the outer formers, sheeting, and stringers. Sand the stringers down and taper them to about 1/8 inch thick at the tail.

The tail surfaces are all built from 1/8-inch balsa with half-ribs on top and bottom sides of 1/8-inch square balsa, leading edge of 1/8 inch balsa sheet, and spars on top and bottom of 1/8 inch x 1/2 inch spruce. The elevators on both sides, and rudder, have a leading edge spar of 1/8-inch x 1/2 inch balsa. I used Jet glue to glue all of this together, it's fast, light, and very strong.

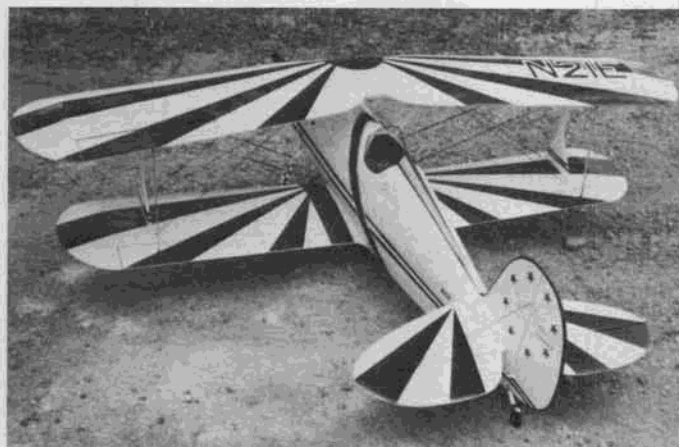
Before building the wings, I would suggest cutting out all the ribs and other parts, then once you start building things will seem to go a lot faster. Two wings aren't really that much extra work (or are they?). It's worth it though (isn't it?). All the ribs in both wings are the same (WR3) except three (WRT1) in the

*Continued on page 70*

**FULL SIZE PLANS AVAILABLE – SEE PAGE 96**



Checkers anyone? Red and white color scheme leaves no doubt as to the plane's attitude in flight. Tail brace is important with big engine.



Krier brothers added ailerons to top wing for a better roll rate during aerobatics. Wire rigging for looks only. Wings demount quickly.



Kavan Alouette converted to Bell 47G by Dick Hausfeld, Madison, Wisconsin. Fully described in text.



Heli-Boy modified to Bell 47G by Dick Hausfeld.

# CHOPPER CHATTER

By RAY HOSTETLER

PHOTOS BY THE AUTHOR



• As promised; the start of a series of articles for the beginner. But first I figure you're tired of seeing my helicopters and would like to see someone else's. Dick Hausfeld, from Madison, Wisconsin, sent me photos of his present stable of helicopters. Dick's ships are nice, as they are not the average looking helicopters. . . . Usually if you see one Heli-Boy you've seen them all.

The first photo shows my favorite, a Kavan Jet Ranger, with modified scale landing gear, antennas, and an operable baggage door that hides the fuel tank. A 14 oz. tank is used to prevent tail

heaviness with full fuel. Makes easy access to tail rotor linkages, but a little hard to visually check fuel during a flight . . . watch out! All up weight is 18 lbs. (Doesn't Kavan produce a low fuel warning light system? wcn)

Next is Dick's love, a highly modified Kavan Alouette kit converted to a Bell 47G. Many hours of work in this one for sure: Upswept tail boom, horizontal stabilizers, custom landing gear, and canopy from Morely, I believe. Scale saddle fuel tanks coming, will hold 14 oz. combined. They will probably feed into one smaller "reservoir" tank, from there

to the engine. Cricket tail rotor transmission, collective Kavan head for the Alouette, flybar not installed at this point. As yet unflown, it should really look nice in the air. How about some flight shots, Dick?

Last you see a Heli-Boy modified with a Heli-Boy canopy to resemble a 47G. Note stand-off for the anti-rotation link of the swashplate and the extra support for the tail boom. Dick reports that the landing gear is made from fiberglass and ABS plumbing pipe; it is rather bouncy,

*Continued on page 70*



Another Dick Hausfeld project, this Kavan Jet Ranger, with modified scale landing gear, antennas, and baggage door.





Winning teams in F4C (l to r): Germany 3rd, United Kingdom 1st, Canada 2nd.



Team winners in Stand Off (l to r): U.S. 3rd, Sweden 1st, and Italy 2nd. All Scale W/C photos by Cathy Underwood.

# 1 TO 1 SCALE

By BOB UNDERWOOD

## 1982 R/C SCALE World Championships

• To my right stood a ring of interested onlookers outlined against the distant mottled mountains of Nevada. Clicking cameras accompanied the playing of national anthems, answered by the fluttering flags to my left. Fourteen countries raised their colors as teams stood at attention by the poles. As the last brightly colored rectangle moved slowly upward to the strains of the Star Spangled Banner, a nostalgic feeling of longing flowed through me. I felt much like the ugly duckling in Hans Christian Andersen's tale as he followed the flight of swans. It was about a year ago that I surprised my family and others by stating that I would not be trying to qualify for the U.S. team, but would "work" the championships instead. Such a large number of events, some rather disappointing in nature, had filled that year, that as I stood with the KOLO TV crew I was shepherding for the ceremonies, I wondered longingly whether I had made the right decision. A thundering boom indicating the start of the 7th Scale

World Championships shook me back to the reality of the moment. Such musing was all academic. There was work to be done!

This is the fourth World Championships I've had an opportunity to report, and it is by far the most difficult. Though the Underwood clan arrived several days early and stayed beyond the closing day, we didn't "see" the event in the way

the others were viewed. Flights came in bits and pieces; hangar talk was interrupted by requests and tasks to perform; the subtle relationships which develop between competitors didn't exist.

One might assume from these comments that we did not enjoy the Championships. This is not true; rather, our perspective was altered in many ways. There were fourteen countries entered,



Ill-fated Ryan SCW by Bob Wischer, U.S. Beautiful and realistic aluminum finish on this F4C model. Crashed early in first flight.



Finland's F4C entry by B. Frilander, a K2-VII Lark.



Pfalz DXII for Stand Off by Michael Carlson, of Sweden. Finished in second place.



Charlie Chambers' Cougar, the first ducted fan model to fly successfully at a World Championships (Stand-Off Scale).



J. Ehlers, South Africa, used new long-stroke Webra to swing large prop. Flew nicely. Finished 8th in Stand-Off Scale.



Second highest in precision (F4C) scale static points, this DH 82 Tiger Moth by R. Nilsson, of Sweden. Really excellent job of weathering.

with some forty-three competitors divided between the two classes: F4 (Stand Off) and F4C (Precision). Some countries, of course, did not field complete teams in each category. There were 18 in F4C and 25 in F4. Several countries which had not competed previously were involved this year. In some cases, such as Italy, whose Carlo Mapelli finished third in Stand Off, did a fine job for their first exposure to the competition.

The competition week capped a year of very hard work for Patty and Monty Groves, the Contest Manager and Director. The average modeler cannot possibly realize the myriad details that have to be nailed down to handle a project of this type. The normal contest contains just a fraction of the items required to put on a world championship event. The feeding and housing of some 300 persons in itself is a monumental task. The correspondence and coordination with AMA Headquarters and the many elements and groups involved is staggering.

Patty and Monty put the package together and it worked. On numerous occasions during the event, contestants and local Reno business representatives related with amazement that the various parts of the team worked well together. As one stated, "You've done this together before, have you?" Of course, the fact of the matter was that for the most part, the only contact we ever had

occurred during the event.

The Reno Radio Control Club, with its ever present leader Phil Abbinanti, was fantastic. No job, however urgently requested at the last minute, was overlooked. They sensed the needs of both contestants and organizers, and reacted. When the Underwoods organized a Virginia City tour during the week, Sam Clarke volunteered his services as a driver/guide for the AMA van, and did an outstanding job. When beer and soda were needed for a Wednesday reception, bang, it appeared. When the Swedish team required the boiling of ten pounds of potatoes for a reception they gave, a Reno club member's wife, Bev Nelson, took care of it.

Members of the Hill Country Flyers were also on hand to fill very important roles in the organizing of the event. Transmitter processing, frequency monitoring, hangar security, flightline security, were but a few of their tasks. These were accomplished effortlessly and efficiently.

The Reno Air Race group, with its boss



Stand-Off Scale winner, DH Mosquito by Wim Reynders, Belgium. Tied for fifth in static, flew extremely well and earned 20% flight bonus.



U.S. Team Manager John Guenther holds as Cliff Tacie works on Spezio. Highest U.S. finisher in Stand-Off Scale.



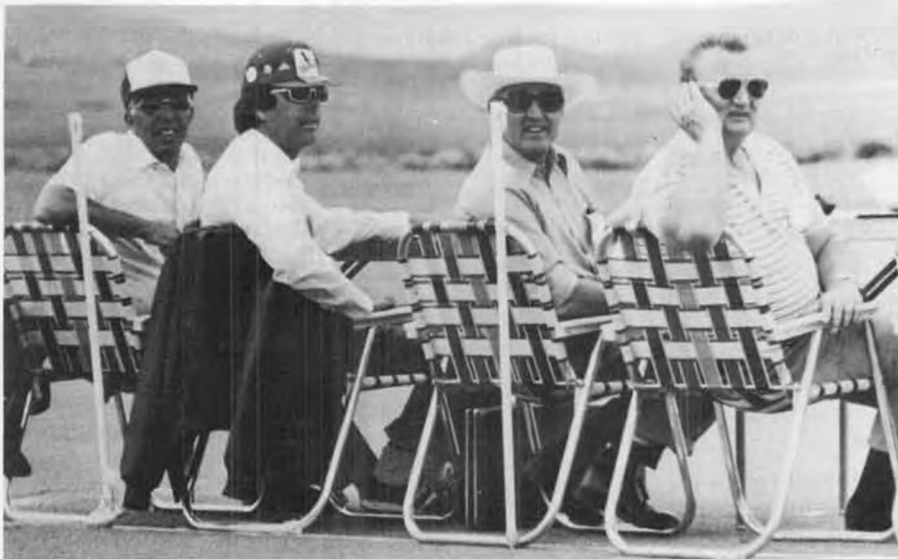
United Kingdom's F4C Blackburn Shark Mk I, by Terry Manley.



Third Place winner in Standoff, Baby Ace Model "D", by Italy's Carlo Mapelli. Flew very nicely.



Stearman 4EM by Canada's Marcel Jonckheere. Model was in Stand-Off in 1980, upgraded to F4C for 1982. Placed fourth.



F4C static and flight judges (l to r): Andy Sheber (U.S.), Paul Jones (Canada), Tony Aarts, Chief Judge (Netherlands), George Buso (U.S., sub for Ireland's John Carroll). Eric Coates (GB) absent.

Floyd Edsell, the Airport Authority under the leadership of Bob Esperance, and the Lear Fan Corporation through its contact, Joe Brownlee, melted into a team that worked so well together under the guidance of the Groves and the AMA Headquarters staff. At the risk of stepping out of line, I do want to add an editorial aside here. On occasions, fortunately rare, I have heard persons gripe about the fact that people working contests such as this championships, the Nats, etc., are getting a "free ride." I have never understood how they figure out such an idea. All told, there were perhaps a hundred persons who used vacation time and, at least in part, *paid* for the privilege of working the championships. Thank heaven for the people who are willing to perform such tasks, in many cases, time after time, or events such as this would never happen.

The models began rolling in even *before* we arrived on Thursday. As several of us were setting up the tables at the Air Race hangar, the models from Italy were sitting on the floor on charge after a day of test flying. As the boxes arrived and were opened, there were the repeated gasps and held breath as the models were checked for damage. Gradually, the tables were filled with assembled models awaiting their fate. Some evoked immediate attention, such as the exquisite Mosquito of Sepp Uiberlacher of Canada. Sepp, a watchmaker by trade, created a model that was pristine in its appearance and seemed to be a sure winner in Stand Off. Gentle ribbing of two other Canadian team members occurred when Marcel Johckheere and Gerry Dale took the better part of a millennium to assemble their biplanes.

The German models were of great interest due in part to their size. The weight of each turned out to be right at or slightly over the 6 kg. maximum. There seemed to be little way to argue with the super accurate digital readout scientific scale that measured to 1/1000 of a kilogram. Just dropping the one coin you had left from the night before in the casino on the scale would sent it into a frenzy of flashing digits. At any rate, by Sunday evening, the tables were filled, the judges present, and an event was about to occur. A last-minute judging change was necessary when Ireland's John Carroll could not be present to be chief judge in F4C due to medical reasons. Tony Aarts (Holland) performed that task after being requested to do so by the FAI jury composed of Helmut Ziegler, Dennis Thumpston, and John Grigg. The missing judge spot was filled in by George Buso, who joined the other team members, Paul Jones, Andy Sheber, and Eric Coates. The Stand Off judges were Pat Ray, Steve Gray, Karl Mueller, Whitey Pritchard, with the chief judge being Roy Yates.

I was called upon to fly a judges training flight. On the evening before, the Hiperbiplane was put in the air to determine whether the rather restrictive area we had to fly in was satisfactory. At that time, we "flat landers" discovered the absolutely stunning effects that occur when one flies at 5000 ft. (with a density altitude of 7000 + due to temperature). Mushy controls, breathless engines, and sink rates of a brick are common. For the following morning's judging flight, I borrowed some of Charlie Chamber's ducted fan juice (25% nitro), a 13x6 prop from Cliff Tacie, and put in a reasonably normal flight. (Normal, if one can consider sliding

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Another "Mossie", by Sepp Uiberlacker, Canada, placed fourth in Stand-Off Scale.



What would World Champs be without a CAP. This 21 model by A. Depaux, France (F4C).

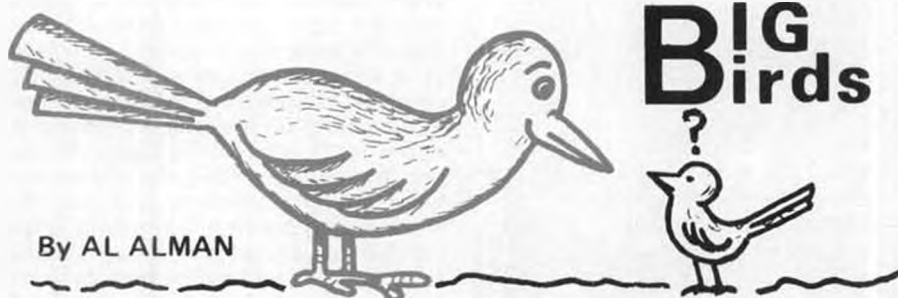




Waco YKS-6 under construction by Dick Igaz, Cupertino, CA. Uses a 3.15 Kawasaki and expected to weigh about 30 pounds.



Our BIG Birdman's high technology balancer. Can you cope? You're right . . . it's built with a dull ax! See text and drawing for details.



• By the time you read this I'll have completed my (ugh) move to Puyallup, Washington. When I informed some of the locals of my intent, one crusty Arlington resident and long-time R/C type offered his view on the matter: "I'd rather get hit in the face than have to move," he said . . . with nary a smile.

I've never known a modeler who looked forward to this sort of thing. The main problem, of course, is getting all those precious airplanes transported safely. I've got an old VW van, without seats, just for this purpose. My nine foot wings fit inside with ease, and all I have to do now is drive 2000 miles without this derelict breaking down.

Then there's the move itself, which usually turns out to be a hassle from start to finish. No matter how well it's planned, there are always extra expenses, lost items and uncoordinated timing.

And since I'm a writer, I've also got my files to worry about, in addition to my BIG Birds. What's that? You want to know what else I write about? Well, come to think of it you may have read my stuff, although I do *that* writing under a pen name; you see, most of those dirty stories and . . .

Anyhoooo . . . please do make a note of my new address at the tail end of the column. And if you want to pronounce Puyallup correctly, make the first syllable sound like you just smelled a skunk, and people'll think you were born and bred in the Evergreen State. Not being a native-born Texan, I sure won't miss those HOT summers and those damned June bugs. . .

#### BBB

Between the shock of reaching my 51st birthday, and the very sudden decision to move to Puyallup, I plumb

forgot about the balancer last month. However, as you can see from the accompanying sketches and photos, the BIG Bird Balancer was worth waiting for; it's the latest word in engineering technology and definitive proof that old world pride and craftsmanship have been diligently nurtured.

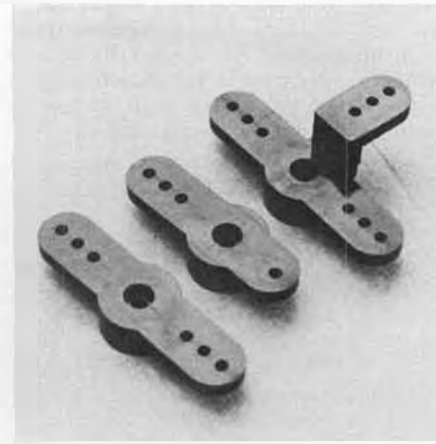
Of course everybody knows that beauty is in the eye of the beholder, so understandably not everyone beholds the BBB as I do . . . which pretty much boils down to sour grapes on their part, don't you think? I mean, after all, who wouldn't be just a little bit jealous of not being the first to come up with such an engineering marvel. Surely its flowing lines and graceful symmetry have already destined the BBB to become a timeless classic during its humble inventor's lifetime.

When first unveiled to select IMAA members, the balancer drew some rave comments: "Why didn't you use the sharp side of the axe," one ex-friend demanded to know, while another itinerant well-wisher had to make sure I was aware that, ". . . the ladder doesn't have enough rungs in it . . . yet." Now I know what Wilbur and Orville and all the other great men of vision have had to put up with.

I was going to tell about the many sleepless hours that went into its making, but the truth is that my subconscious must have worked out all the intricate details . . . 'cause once I got back to the



Two (his and hers) Concept Fleet Model 10's by Dick Igaz. Both Quadra powered and weighing 18 pounds. Hmmm, getting ready for formation flying?



Kraft's new thick (erer) servo arms are strong, fit 15 and 20 servos. See text.



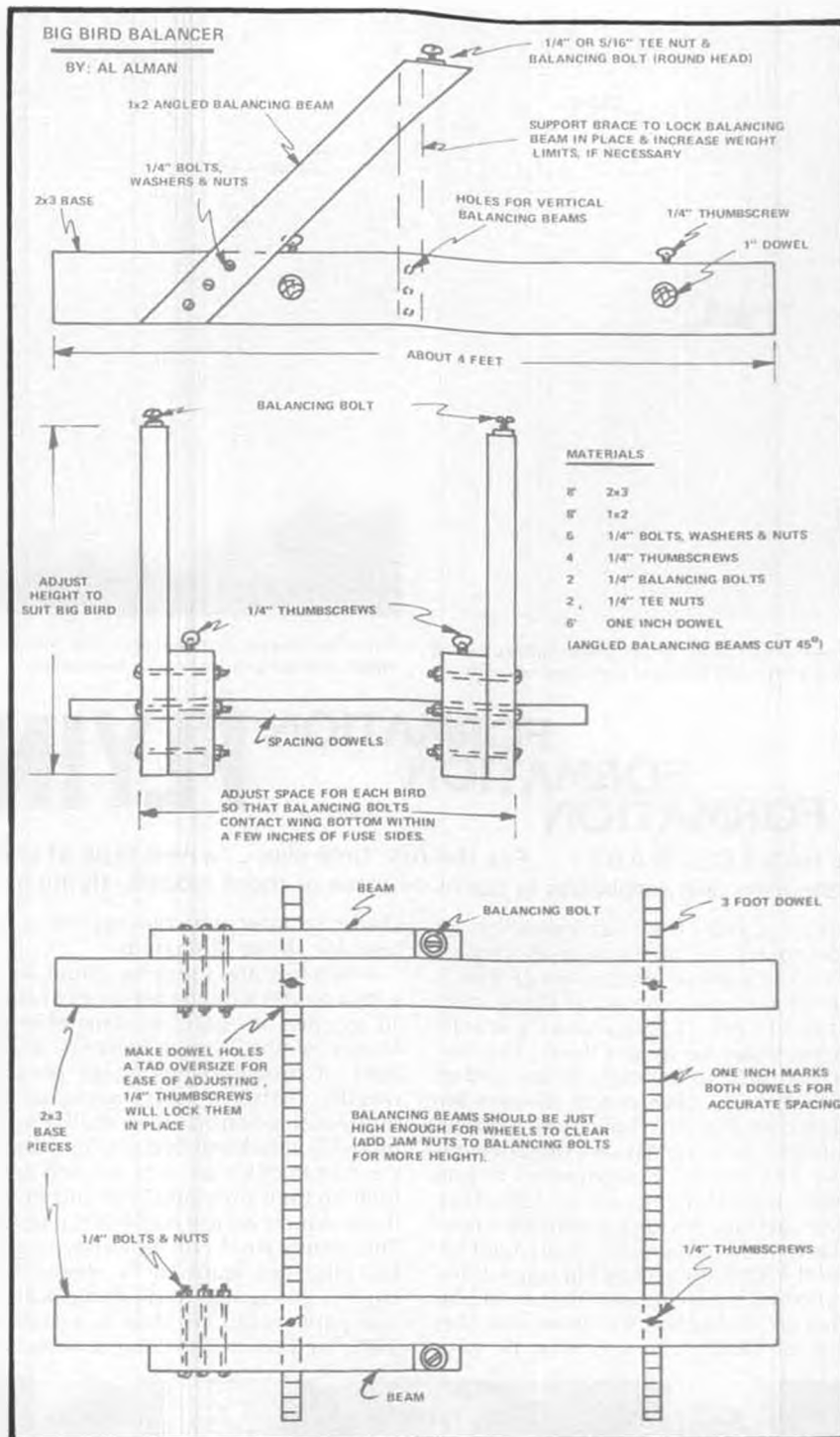
Close-up of Alman's high-zoot BIG Bird Balancer, made with hand tools.

shop with the six-foot 1x2 and the eight-foot 2x3 (I already had the three-foot one inch dowel and hardware), my handsaw, miter-box, and mickey-moused drill press did the rest. As a matter of fact, I wasn't too sure it would work because it sort of fell together so easily by itself. Guess my subconscious wasn't surprised when its brainchild did so well balancing three different types of BIG Birds its first time out.

All kidding aside, guys, there's been one helluva need for some kind of BBB for years. Since our aircraft are too heavy and awkward to handle as easily as we could a Super Kaos .40, for instance, most BIG Bird builders just make a WAG about where the balance point might be . . . and usually end up with a tiger by the tail as that new biggie becomes a tail-heavy accident looking for a place to happen on its first takeoff. If she's not properly balanced (this includes lateral balance, also), you'll never be able to get that new bird trimmed correctly, and she'll fly like a dog the rest (?) of her life.

The one basic problem with any kind of balancer is that airplanes come in different configurations . . . and that's where the BBB really shines; it's a basic platform, and all you gotta do is tailor it to suit the needs of your particular aircraft. For example: a low-wing bird like a CAP 20 would only require vertical balancing beams, as the balance point would be easily accessible from the bottom; bipes, however, are a different story, as their balance points are located on the bottom of the top wing, but usually aft of the lower wing's leading edge. This means that angled balancing beams, like the ones in the photo, are needed to be able to reach in there.

The 1x2 angled beams pictured have 45-degree cuts on both ends, and like the vertical beams, are secured to the 2x3 base pieces by three 1/4 inch bolts, washers, lock-washers, and nuts (the holes for mounting the vertical beams can be seen in the base pieces directly below the C-3's wheels). The one-inch



dowel pieces are used for spacing and stability, and sport one-inch markings in order to simplify spacing. Although the holes for these dowels are made a tad oversize to allow for free movement, 1/4-inch thumbscrews are used to lock the dowels in place (after drilling and tapping these thumbscrew holes, I Hot Stuffed the threads for durability).

Now obviously you don't just lay the wing on the broad, flat ends of the bird balanced. Look at the close-up photo and you'll see the 1/4-inch roundhead balancing bolt that the left wing-root section is balanced on. Both the left and right balancing bolts are screwed into

1/4-inch Tee Nuts (also known as blind mounting nuts) that are epoxied into the top of the balancing beams. If you need a little more height, one or two jam nuts can be used on each bolt.

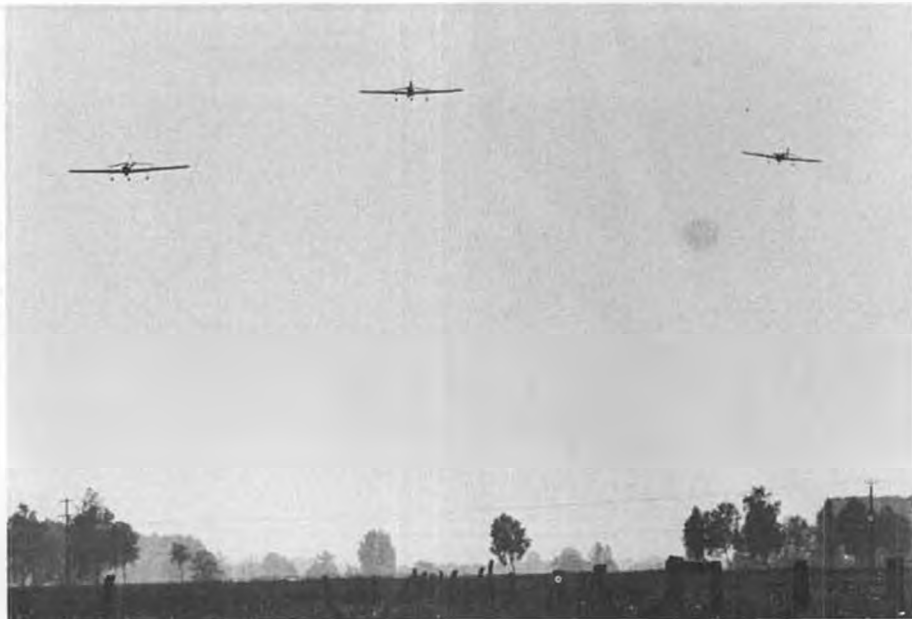
The BBB should be spaced so that these boltheads contact the underside of the wing as close to the fuselage sides as possible (if you move too far out from the fuse, you may run into structural limitations).

And there are three ways to accommodate these 1/4-inch balancing bolts: 1) at the desired balance point you could plan ahead and build in 1/4-inch Tee

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Three Hunter models from Swiss Simprop team looking for right position just after takeoff.



Peter Stuyvesant team begins a low pass with their Curare's. Note gear is down to slow flying speed, allowing more precise formation.

# FORMATION FLYING CHAMPIONSHIPS

By HANS DE ZWART . . . For the first time ever . . . a new type of competition for R/C aircraft; precision maneuvers and aerobatics in teams of three or more models, flying in formation. Chose your partners!!

• Once a year, the "Las Vegas" show takes place in an European city in Germany named Harsewinkel. Every year at Whitsun, the local flying club named IKARUS, organizes a world famous show for model flyers. The first one was held in the early sixties, and in 1965 already they made history by organizing the first helicopter contest ever held. In those days we did not even have any model helicopters! It was earlier world champion of F3A, Fritz Bosch, getting this idea. Looking for new ideas in model flying, he challenged his model friends by setting big rewards for the first model helicopter that would be airborne. Nowadays we know that this prize of \$2000 U.S. was won by eng.

Dieter Schluter, who flew his heli at that time for about 10 seconds.

When we are speaking about flying with a model airplane for times of about 10 seconds, it's good to remember the history of the Wright Brothers. In the field of model-flying, things progress rapidly if the industry gives us the technical possibilities. Well known model builders and flyers in Germany by the names of Kavan, Schluter and Bosch built up their own industries and gave us the products we use to enjoy our hobby. The results are there. Nowadays a good RC pilot can learn to fly model helicopters and is able to do things with it a real pilot would not dare to imitate. In 1981, I saw for the first time a model heli

fly upside down at a height of about one foot over the grass. A novelty in presentation at that time, but already now starting to be a usual maneuver. This familiarity to our sport is a good reason for looking and finding new ideas to renew our interest. Such an idea I think, has been found by the organizers of the air-circus in Harsewinkel. Preceding this big show on May 30, they held a contest in formation flying on May 28 and 29.

## RULES FOR FORMATION FLYING

In the early morning of May 28 there were 11 complete teams for the contest at the flying field of IKARUS. There were several German and Swiss teams, as well as a Luxembourg/France, and a German/English team.



Former World R/C Aerobatics Champion Fritz Bosch keeps public informed during team flying competition. Jochen Meyer is stand-by.



Willi Gloor, Switzerland with his Bellanca Super Decathlon from Pilot kit. Willi coached seven teams in formation contest!





Victorious Peter Stuyvesant Team, won both classes, plus first overall (1999 points) (l to r): Helmut Wolf (Co-Captain), Franz Stenzel, and Rudi Kramer (Team Captain).



The Bucker Jungmann Team from Switzerland placed Third (1242 points). Sharp looking aircraft, built from pilot kits.



The Peter Stuyvesant team begins an inverted circle left in formation. Also note formation of antennas!

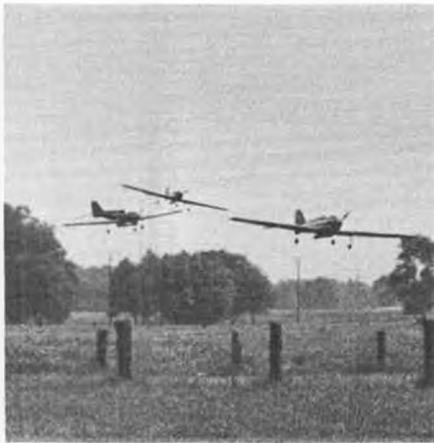
The contest itself was held in two parts. The teams had to fly a program that was put together out of the F.A.I. figures by the organizers. These figures also got the same K-factors as in the F.A.I. rules. Every team had to fly this program three times. Each team had to have at least three R.C. pilots; when they flew with four, they got a factor of 1.2 times the score and with a five-man team, 1.4 times the score.

The second day the teams had to give a free presentation of 10 figures out of the F3A program with the corresponding K-rules. The five international judges had to watch the individual maneuvers, but also, of course, the ability of the teams to stay in formation and to synchronize their movements. The highest and lowest scores were not counted in the total valuation.

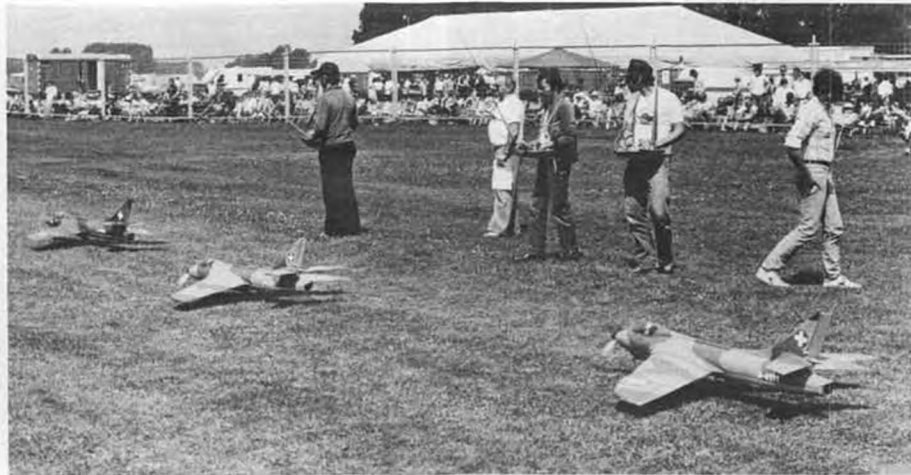
The first day, on which the teams would all fly the same program, gave a good possibility for comparison. After the first round, it was rather clear that formation flying is something more than just flying together! The one and only team that would earn the factor 1.4 by operating with five pilots had big



Swiss Akrostar team placed second with 1296 points. Note the very positive crowd control barrier in background.



A once-in-a-lifetime photo. Note that in addition to the Curares being in formation, the props are all in the same position, stopped by the camera!



The Swiss Simprop Hunter models start out by taxiing in formation. Note again the crowd control barrier. They placed fifth in the competition.



Another Swiss Simprop team entered these beautiful Tartan 44 glow powered Pitts Specials.

troubles in finding each other. Very low points were the result, staying low even by a factor of 1.4

The planes the teams were flying could have won prizes in a beauty contest. Pitts Specials, Hunters, Bellanca's, Akrostars, Bucker Jungmeisters, Magics, and not to forget Curares,

presented on unforgettable show of today possibilities in R.C. flying. At the end of the first day, the Peter Stuyvesant team had scored 331 points, but only beat the Swiss Simprop team (with 330 points) by one point.

The second day, this difference in points became bigger as the more

experienced Peter Stuyvesant Team scored 806 points in the first round by presenting their free-program with very difficult figures. It was just as though the three Curares were held together by an invisible rope! A very high standard of R.C. formation flying of which I do hope that you guys in America will see and enjoy very soon. I heard there might be a possibility for the Peter Stuyvesant Team to come to the Las Vegas T.O.C. next time. For this reason and maybe for all interested readers of **Model Builder**, I did interview this team that won the first contest.

#### THE PETER STUYVESANT TEAM

The Peter Stuyvesant Team consists of three club members of MFG Bensheim who have known each other for several years and who have flown together for more than six years. Flying captain is Rudi Kramer (32 years old) and co-captain is Helmut Wolf (30), and the youngest member, Franz Stenzel (25), completes the team. In 1979, after three years of tryouts, the team became semi-professional because they got sponsored by the cigarette company of Peter

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Models belonging to the first three place teams make an impressive sight when gathered together. Should scale and aerobatic ships compete in separate categories?



Mike Bame helps Dick Odle launch his RO-15 off "Gorilla" winch. Getting glider up to speed before letting go is a must . . . winch tends to jerk ship out of your hand otherwise.

# R/C SOARING

By BILL FORREY . . . Our new *SOARING* columnist introduces himself, and gets right down to business. Photos by the author.

• Hello, my name is Bill Forrey, and I'm going to be the new **Model Builder** soaring columnist. Dr. Fogel is unable to continue for various reasons, and I'm sure that he will be missed by all of his readers, myself included.

I shall strive to continue the good coverage that Larry has given us in the field of R/C soaring, mixed with a few ideas of my own. In keeping with this promise, I need your support. I need to hear from you! My address will be found at the end of this column, and all future columns. I want this column to represent what is going on out there where you are, but in order to do that, I need to hear from you. Please feel free to write me about whatever concerns you in R/C soaring. I am particularly interested in helpful building hints, technical developments, new sailplane designs, and things of this nature, but you don't need to feel limited to these areas.

Allow me to tell you a little bit about myself. I am 28 years old, I live in the Los Angeles area (Pacific Palisades), I am married (6 months by the time you read this), and am active in a club that many of you may have heard of, the San Fernando Valley Silent Flyers. I was the newsletter editor of the SFVSF journal, the *Silent Flyer!* for two and a half years.

My favorite R/C soaring pastimes are FAI/F3B, multi-task 2-meter (a la 2MWC), slope soaring (combat, aerobatics, racing), and hand launch. I often enjoy thermal soaring on Sunday morn-

ings, just to relax and have fun.

I love to experiment with new building techniques. I have always been interested in time-saving devices. Early on in my building skills development, I learned from a friend (LSF Level V, Chris Adams), how to build a fuselage mold, and I have built three molds since then. When foam core wings started becoming popular, I went out and bought the materials to build a foam cutting "bow" so that I could save a few hours over the

"built-up" method of wing making.

The first flying model that I built was a Sinbad 40. It was a free flight, tow line glider. I enjoyed the challenge of building that paper and stick glider so much that I went out and bought a Super Sinbad.

After these two gliders, I stopped building for a while. I don't even know why, really, except that as a teenager in high school, I had a few extracurricular activities that weren't too compatible with building models.

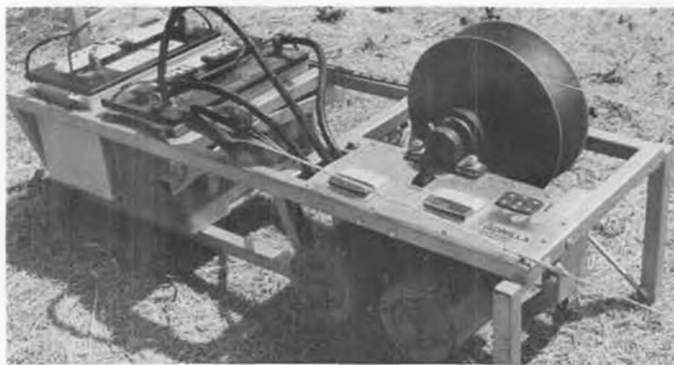
Six years after the Super Sinbad, I was ready to get modeling again. This time, I thought I'd try R/C.

The first R/C glider I bought was a Monterey. It looked almost scale-like with its long, tapered wings and fuselage. To control it, I purchased my first radio, a Kraft 3-channel "brick."



Dick Odle poses with RO-15 and "The Gorilla" (pronounced go-rilla!). Together they are serious FAI threat. Guaranteed 800 foot launches almost every time!

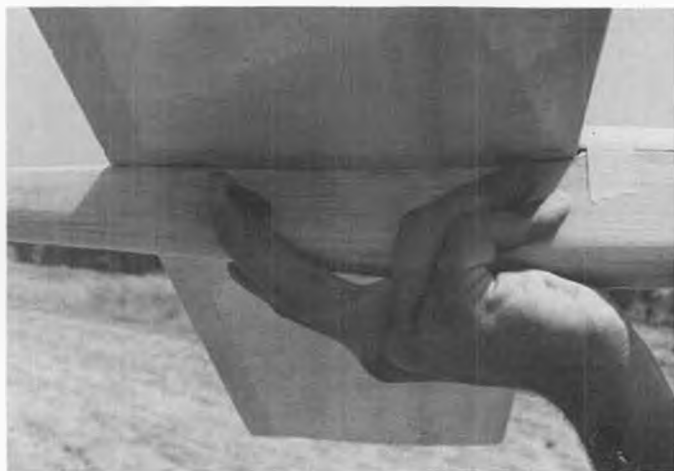




Close-up of Odle's "Gorilla" . . . two batteries, two motors, two voltmeters, two belts and pulleys, and two bike wheels for transport (see previous page).



Control management department in Odle's RO-15. Rear servos for rudder and elevator. Big wheel servo for ailerons. Front servo with cable joiner for flaps. Rubicks cube easy after this!



Finger grips on Mike Bame's "Meadowlark" improve hand-launch performance. See text for more.



U-U-umph! Mike Bame pegs his Meadowlark into a thermal. Gets consistent 30 to 40-foot launches. Imagine . . . glider elbow!

I was hooked from the beginning. It was easier to build than the Sinbads, and flying the Monterey was much more fun and interesting.

Seven years later, I still have that Monterey. It's in one piece, but no longer gets flown. I guess you could say that it has been placed in my sailplane archive along with a Paragon, a Mirage (from Blaine Rawdon's pre-release kits), a Gryphon flying wing and several original designs that I've built over the years. Occasionally they see some action. The Paragon, actually, is still very competitive for thermal duration con-

tests, and I bring it out of mothballs for contests once in a while.

What I fly currently reflects my interest in sailplanes with higher performance. My most frequently used glider is my Gemini M.T.S. (Multiple Task Sailplane). Not many months ago, in another magazine, Ed Slobod, the Gemini designer, introduced this glider to the world. It compares favorably in performance to the well known Airtronics Sagitta, yet the Gemini is worlds apart otherwise.

I enjoy it mainly because it is one tough airplane. On its second flight, I

accidentally adjusted my elevator in the wrong direction to cure a trim problem. Shortly after it left my helper's hands, it popped off the tow line, and pointed straight up. Well, gliders tend to stop flying when flown this way, and mine was no exception. It did a nice tail slide into a nearby sycamore tree and became precariously lodged.

Seconds later it was no longer so precariously lodged. It fell a good 10 to 12 feet out of the tree to the ground below and landed directly, perpendicularly on the left wing tip. Beside a slightly crushed tip block, it was undamaged. Try that one with your ship!

In my opinion, the Gemini is a fantastic airplane for the guy who wants to build a good handling thermal soarer capable of covering ground between thermals in a hurry. It climbs almost as well as a "gas bag" floater, yet will handle a 12-volt winch, fully ballasted (4 pounds of lead), and zoom launch into a headwind with no problems. The Gemini was not intended to be a serious FAI threat, but for a club contest, or for fun flying, I'm sold!

I am also sold on designing and building my own sailplanes. Over the years I have designed at least a dozen ships. Not all of them were completed, but most were, and they proved to be the most gratifying of all to fly. I really enjoy the feeling of pride and accomplishment that designing, building, and flying



Like a well trained Falcon, Mike's Meadowlark returns to its master for another heave-ho into the brown (this is an LA suburb).

brings. If there are any of you who fall into this general description, I would REALLY like to hear from you so that we can share your ideas with others through this column.

Well, enough about me. Let's move on.

★ ★ ★

As you read this, the United States FAI/F3B team has been selected. If you were fortunate enough to be at the competition, you undoubtedly witnessed the most exciting F3B team selection the U.S. has ever held.

So much has happened in the world of F3B since the last team selection.

Two years ago the hot ticket was the just released Sagitta designed by the talented wizard of Airtronics, Lee Renaud. In combination with a good Hi-Flight winch, this was enough to get you a spot on the team. True, Carl "The Kid" Blake flew a rather advanced speedster, the FMF, but he was almost alone in that league.

If I don't miss my bet, this year's competition will be strongly influenced by the models flown at the world champs last year in Sacramento. Dwight Holley's Gobbler will probably be represented by duplicates and look-alikes. Molded wing gliders of either European manufacture or home-brew will likewise be represented, as well as a new breed of



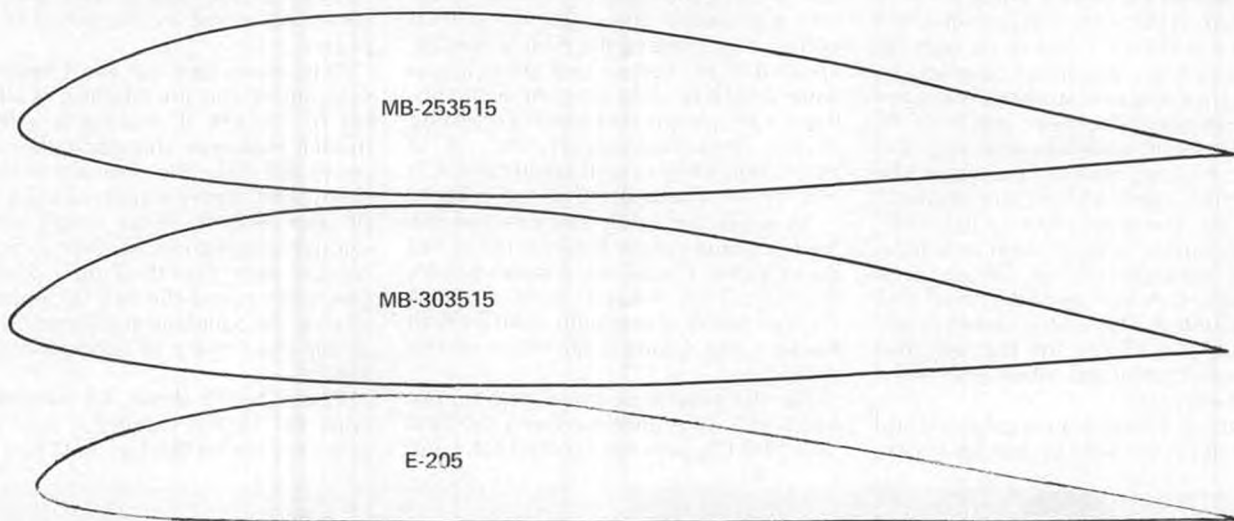
Dick Harty returns to pit area looking pleased with first flight of his aileron "Gemini M.T.S." Uses Mike Bame molded 'glass fuselage.

gliders, which for lack of a better name, I will call glider-missiles.

Glider-missiles (GMs) are the wave of the future in F3B. Gms are the logical solution to a simple problem . . . win. To win you must max all possible duration and distance tasks, and go consistently fast in speed. How, you ask? Easy. To win

duration, you need to stay in the air (really?). Now, there are two ways to stay in the air once you have a model that is flyable. One way is to fly around after launch in search of lift, find it, and stay in it, hoping that the lift doesn't die,

*Continued on page 79*



MB 253515			MB 303515			E-205		
STA	UPPER	LOWER	STA	UPPER	LOWER	STA	UPPER	LOWER
0	0	0	0	0	0	0	0	0
2.5	2.56	-1.76	2.5	2.75	-1.68	1.25	1.8	-0.9
5.0	4.06	-2.44	5.0	4.26	-2.25	2.5	2.6	-1.25
7.5	5.35	-3.00	7.5	5.56	-2.69	5	4.0	-1.6
10	6.34	-3.51	10	6.63	-3.06	7.5	4.9	-1.95
15	7.88	-4.14	15	8.24	-3.63	10	5.65	-2.05
20	8.93	-4.63	20	9.29	-4.06	15	6.8	-2.2
25	9.50	-4.94	25	9.98	-4.25	20	7.6	-2.25
30	9.81	-5.00	30	10.28	-4.38	25	8.1	-2.26
35	10.00	-5.03	35	10.46	-4.50	30	8.3	-2.15
40	9.90	-5.00	40	10.28	-4.41	40	8.1	-2.0
50	9.14	-4.69	50	9.46	-4.06	50	7.2	-1.6
60	7.78	-4.03	60	8.14	-3.53	60	6.0	-1.4
70	6.06	-3.13	70	6.44	-2.71	70	4.6	-1.15
80	4.13	-2.25	80	4.38	-1.88	80	3.0	-0.95
90	2.16	-1.22	90	2.36	-1.00	90	1.45	-0.65
100	0.19	-0.19	100	0.19	-0.19	95	0.75	-0.3
						100	0	0



No. 3 SAM 49 Prexy, Dr. Chuck Patteson, poses with his Forster 99 powered Lanzo Record Breaker. Tom Kulp holds on.



No. 1 Salinas Aero Modeler Don Schaper with Comet Clipper Mk II, originally built by Walt Parker.



# PLUG SPARKS

By JOHN POND

• This month's report is going to be a little short, as the writer has just returned from the SAM O/T Nationals only 10 days late of the deadline! Needless to say, we are going to feature many photos and writeups wherever possible to acquaint these modelers with you, the reader. After all, doesn't everyone like to see their name and picture in print?

First off, we would like to acknowledge receipt of photos from Jack Jella, contest manager of the Salinas Area Modelers, (S.A.M.) second annual Old Timer Contest. This writer cannot praise this club too highly for the way this meet was conducted albeit only their second attempt.

This time, this columnist got smart and appeared on the field in time for break-

fast. Wotta good deal! For a dollar or so, you got bacon and eggs along with coffee. If you missed the early breakfast, around 9:30, coffee and doughnuts were available. Not content with this, the S.A.M. people had lunch, consisting of hot dogs, hamburgers, etc., at 12 noon. You were so well taken care of, it was hard to concentrate on the contest.

To show the other competition the Salinas group means business in this old timer game, Photo No. 1 shows S.A.M. member, Don Schaper with a Comet Clipper MK II as originally built by Walt Parker, the Contest Director of the meet.

For the benefit of those who do not know the difference between the 1938 and 1939 Clippers (designated MK I and

MK II by this writer), the former is the only one eligible for the Antique Event (cutoff date, Dec. 1938).

Taking the old slab sided design, Goldberg reduced the height of the fuselage, added fairing stringers to it and in general, cleaned up the fuselage design. In addition, Carl made the wing polyhedral, replacing the single dihedral 1938 version.

Most surprising to this writer was the performance of the MK II version, as it did not approach the good flight characteristics of the MK I. This was most confusing as we are supposed to "improve".

One more item on the Clipper development, was the addition of a lifting tail to the MK II, making it a MK III model. However, this particular model never did make the production line, as the Comet Zipper was breaking all sorts of sales records. There simply weren't enough production facilities to accommodate more than the Zipper, Mercury, Interceptor, and the MK II Clipper. Of course, the Sailplane and Zipper A came in for their share of production time, too.

Photo No. 2 shows Ed Solenberger with his highly successful McCoy 60 powered scaled Playboy Jr. When using



No. 4. SAM member Jerry Graham with his neat Bay Ridge Mike, built from Tyro kit.



No. 2. Ed Solenberger, SAM 27, with his McCoy 60 powered Playboy Jr, scaled up to 900 sq. in. wing area.





No. 7. Buck Zehr, one time free flighter, with his cabin version of Playboy Senior.

power like the McCoy 60, the scaled Playboy Junior lends itself very well with its long tail moment arm. In addition, its large tail helps keep the nose down during that long fantastic climb under the 55 second motor run rule (an overkill if I ever saw one).

This meet gained such favorable notice last year, that quite a few of the Southern California boys came up for some of the loot. Among those was Dr. Chuck Patterson, as seen in Photo No. 3 with his Forster 99 powered Lanzo Record Breaker.

Patterson, somewhat of a newcomer to the O/T game, has proven to be an enthusiastic competitor, placing in about every meet he has entered. He has been responsible for organizing a group to come north for more than one contest.

Photo No. 4 is of another Salinas Area modeler, newcomer, Jerry Graham, shown with a well built Bay Ridge Mike as kitted by Tyro Products. Although Jerry didn't win, the extreme simplicity of the 1/2A Texaco R/C event has attracted not only Jerry, but dozens of new modelers. This is something this writer has been supporting for a long time, i.e., an event where the would-be contestant doesn't have to look all over for a

specialty engine, but can simply buy over the hobby store counter, along with the kit. This simple fact has contributed tremendously to this particular O/T R/C event.

Continuing with our photographic



No. 6. Harry Samuel Murphy, "Dirty Harry", with Nostalgia Lou Mahieu Zeek.



No. 5. Bill Berleson, working hard at flying Texaco model, helped by Jim Kyncy (left) and SAM 30 Prexy, Nick Nicholau.

account of the Salinas meet, Photo No. 5 shows the backbone members of SAM 30. On the left is perennial winner Jim Kyncy from Oroville, sitting is Bill Berleson, Editor and Publisher of the Gridley Herald, and right is Nick Nicholau, organizer and sparkplug of SAM 30. If no one else wants the job, Nick ends up doing it, from President to newsletter editor. Read dedication!

Also worth noting is the prolific output of models by Nicholau. Over half of the models flown by SAM 30 members have been built by Nick. This tickles Nicholau no end, as the physical condition of his eyes prevents him from being a real serious competitor in the big Texaco Event.

We had intended to run a full color photo of the contestants as we did last year, but again, the negatives disappeared. One of these days we're going to catch up with that guy, "Nobody Didit". Well we have given you an insight on the meet and its contestants, let's look at the winners:

#### CLASS A

1. Jack Albrecht
2. Loren Schmidt
3. John Pond

#### CLASS B



No. 8. Father/son team of John Boddi and John Jr., with Embryo rubber ship.



No. 9. Hans Oschner seen at Michigan Antique Modeler's (MAM) "Mini-Champs" with a Kloud King.



Joe Ott, 82 years young, with his latest design, the "Golden Falcon", to be produced this fall. Will use famed Joe Ott jig-built construction. Also will produce radio gear.

1. Jack Albrecht
  2. Jim Kyncy
  3. Ed Solenberger
- CLASS C

1. Chuck Patterson
  2. Don Bekins
  3. Ed Solenberger
- ANTIQUÉ

1. Jack Alton
  2. Jack Albrecht
  3. Don Bekins
- TEXACO

1. Jim Kyncy
  2. Tom Kulp
  3. Jack Albrecht
- 1/2A TEXACO
1. Karl Chulich
  2. Ed Solenberger
  3. Ed De La Rue
- ELECTRIC .05

1. Jack Albrecht
  2. Roland Boucher
- ELECTRIC UNLIMITED
1. Loren Schmidt
  2. Jack Alton
  3. Jim Pond

Sweepstakes Winner: Jack Albrecht  
 . . . Winner of the Airtronics Radio!!  
**MINI-SAM CHAMPS**

This is getting to be a great meet as staged by the M.A.M. (Michigan Antique Modelers), Club headed up by Carl Spielmaker. Originally started for the benefit of those SAM members in the local area who could not attend the National SAM Champs, the idea of a "Mini-SAM" Champs has really caught on. Held at Three Rivers, Michigan, on May 22 and 23 at the local airport, the weather started off cloudy but calm. By 1 p.m., the rain started coming down in buckets, necessitating the closing of the flight line.

As is done at the SAM Champs, a "Bean Feed" was staged at the local Holiday Inn, followed by a well attended MECA Collectogether. Great evening for the swapping of antiques as well as stories.

At the recent SAM Champs at Chicopee, the writer was fortunate to receive several photos from Karl Spielmaker, organizer of the Mini-Sam Champs. Photo No. 6 shows Harry Murphy with his Nostalgia Event Model, a Zeek, as originally designed and kitted by Lou Mahieu.

Harry is the newsletter editor of the Central Indiana Aeromodellers (CIA) *Inform*, a very newsy club publication that features photos, contest results, commentaries, articles, and editorials. Can't say Murf's stuff is not thought provoking!

While on the Mini-Sam kick, Photo No. 7 depicts Buck Zehr with a Playboy Cabin. This alternate version of the pylon was first advertised in the June 1940 issue of *Model Airplane News*. Actually, the model was never kitted as a cabin model, but the original drawings did show dotted lines for the cabin version plus a nice artist's sketch of the cabin arrangement. Turns out it's a nice



No. 10. Prolific builder, Dennis Parker, Australia, with his latest, a Modelcraft Pacific Ace.

flying model for the cabin event.

Getting back to the contest, Sunday was overcast with little drift. Surprisingly, this followed the weather forecast rather closely. Lift wasn't that great, hence times were rather erratic, in line with the sporadic lift. It took a good "sand-bagger" to spot the thermals.

In that line, Photo No. 8 shows John Boddie with his son (both from Jacksonville, Michigan) readying up his son's rubber job for the Embryo Event. As can be seen, the back of the car is being used as an umbrella to shield against the unpredictable Saturday weather.

While we are at it, Photo No. 9 is presented to show Hans Oschner with a Cloud King. Note the background. Actually, for the Michigan area, this is a

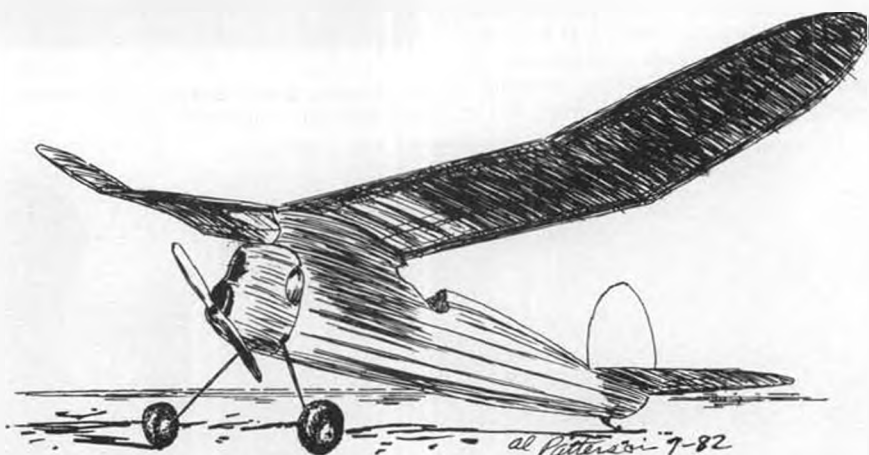
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# NEW RULER

**OLD TIMER Model of the Month**

Designed by: Henry Struck  
 Drawn by: Al Patterson  
 Text by: Bill Northrop

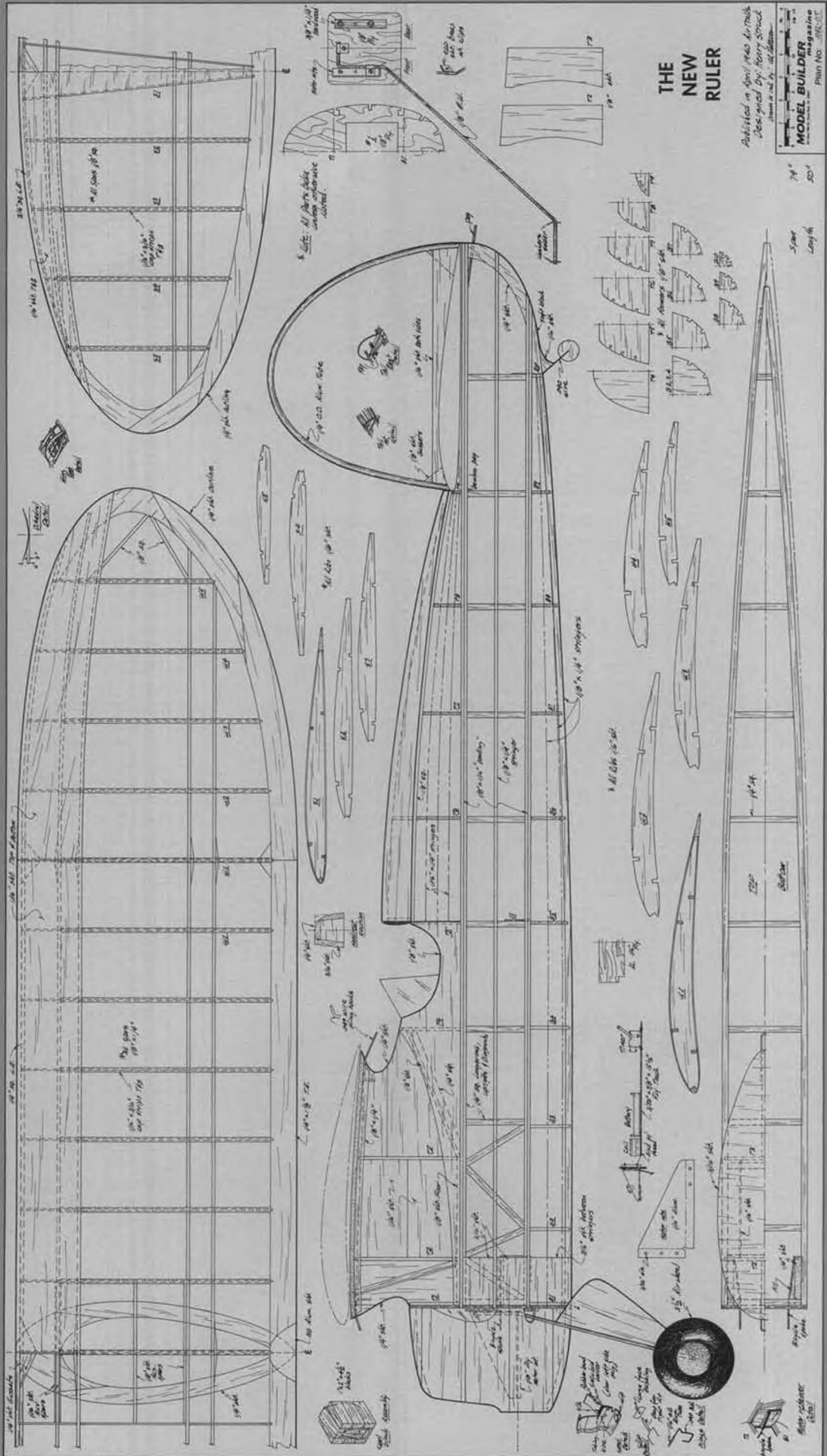
• Probably no one in history has designed more significantly popular and trend setting model aircraft, during a long modeling career, than Henry Struck. There have been so many, in fact, that it's difficult to pick out the best of the lot. One way to make it less difficult, would be to sub-divide his designs into various categories; gas, rubber, duration, scale, sport . . . Did he ever really get into control line?



If there was ever a fault to find with some of Hank's designs, it might have come from his refusal to compromise the functional and esthetic features of a model in order to simplify the construction. In other words, it would seem that he first conceived the aerodynamic requirements of a model, then surrounded it with esthetic lines, and lastly,

figured out how to build the thing to come out as he planned it! It wasn't always easy, and the KGS might be considered a prime example of this theory . . . not too many copies of this classic design have appeared since it was first published.

*Continued on page 97*



**THE NEW RULER**

Published in April 1982 in *Model Builder*  
 Designed by Henry Struck

**MODEL BUILDER**  
 Magazine  
 PHOTO NO. 38-211

Span 74"  
 Length 50"





Mike Charles flying Larry Jolly's Olympian from cul-de-sac in front of Larry's house.



Olympian F3E, probably highest performance electric sailplane in U.S. Geist 40-14, 12 cells, 45° climb. Definitely state-of-the-art.

## You'll Get A 'CHARGE' Out Of FLYING ELECTRIC

By LARRY JOLLY . . . First of a series on building, flying, and operating electric powered aircraft, with the emphasis on obtaining maximum performance from this newest and still underrated power source.

• The following is the first of several planned articles dealing with electric powered radio control model flying. The object of these articles is to educate, answer questions, explore new technology, and bend your arm until you try electric. This article will touch on the "CURRENT" (ouch!) state of the art and hopefully give you a general view of what you can expect from your electric system.

First off, by now everybody knows somebody who has proved that electric doesn't work. Believe me, I know people who do it continually, and they're not all modelers. Time after time I've seen manufacturers market electric powered ready-to-fly aimed at the so called mass market (synonymous with beginner; he who knows no better) that were, should we say, marginal at best. A lot of serious power flyers shy away from electric

because they've witnessed the following too many times. . .

"Clyde Der Tauben" thinks he'd like to try electric flying. After all, it has all the attributes; it's quiet, it's clean, no glow plugs to burn out, and fuel, mercy look at all the money he'll save on fuel, but most important he simply flips a switch, and like magic, the prop spins. No longer will Clyde have to arm wrestle with his Black Widow in his present Q-Tee trainer. Clyde's mind is made up. Off he goes to his local model emporium to look at electrics.

The owner of the model shop where Clyde shops stocks equipment from both American manufacturers of electric paraphernalia. The owner doesn't fly radio control (sounds like a guy I used to know . . . he pushed it but didn't use it himself), but had heard of some guy up North who flew electric, and had even

read enough to suggest that Clyde buy an 05 size motor, because of the convenience of being able to charge the batteries off his 12-volt car battery. Clyde intently looked over the electric motors and batteries, and chargers, and gear drives and got thoroughly confused. Clyde, now exasperated, says to the shop keeper, "What's wrong with these guys? This instruction manual is written for a rocket scientist and this one doesn't have an instruction sheet. I don't care about amps, volts, watts, or what they do in private, I just want to fly my plane without the fuss and muss of a gas engine!"

Not wanting to lose a sale, the shop owner suggested one of the ready-to-fly foam planes that has the motor and battery and charger included. This is just what Clyde had in mind. All the science is done for him, all he has to do is install his radio. While driving home, Clyde's mind is filled with images of his silent powered scale foamy dashing across the sky and shooting touch-and-goes at the club field. At home, Clyde installs the radio, charges the motor battery and even takes the extra five minutes to stick the mylar stickies in their appropriate locations. All done, Clyde steps back and admires his handiwork; she's a bloody marvel of modern science! Look at that sleek racy scale appearance, Ol' Steve Sauger and Bob Underwood have nothing on this boy.

Finally arriving at the club field, Clyde assembles his model and walks out to the pits, tranny in one hand and weapon in the other. One of the assembled locals spots Clyde and exclaims, "Here comes some more foam trash." All heads turn as Clyde approaches. "Where's your field box Clyde," says one. Clyde confidently returns, "Don't need that anymore, this baby's electric



SEAM booth at Macs Show. Frank Heacok and Ross Thomas answering questions. Playboy and Olympian overhead, electric powered ukies on table.



Larry Jolly's 1-1/2 times up Goldberg Interceptor, with L.J.'s 3 to 1 gear box and Leisure 05 motor.



Gene Wallock's gorgeous 2-channel 035 powered Corben Ace. Neat, simple scale project.

powered." Even if Clyde had heard the muffled chuckles it wouldn't have made any difference, destiny was about to play her hand.

Clyde puts his model on the strip, flips the motor switch on and starts the takeoff run. Clyde doesn't think she is accelerating very well, but he can't turn back now, after all, this is just a rudder and elevator model with no motor control. Nearing the end of the runway, Clyde pulls back on the stick, and she's off. Anxious to climb out Clyde pulls back just a little too much, and faster than you can read this, the model snapped once right, twice left, and then over the top . . . the death sequence had started.

Clyde's hopes and dreams lay in a smoldering heap at the end of the runway. As Queen plays, "Another one bites the dust," all the experts argue as to why it crashed. One says those darn electrics are just too heavy to fly, one observes that Clyde's Greeb Ground Greeter simply ran out of altitude and airspeed as Clyde ran out of ideas. The fact is, Clyde got one micro-second



Full view of Jolly's 1-1/2 times Goldberg Interceptor. Span 74 inches, weight 38 ounces, 15-minute flights a snap.

behind a product that already had a power-to-weight-to-wing-loading imbalance.

Even though Clyde is a fictitious novice pilot, an expert might have had a similar experience. Most of the ready-to-fly electrics are inefficient power wasters that at best will only stay airborne 2-1/2 to 3 minutes. If the manufacturer's engineers had done a little more work changing battery capacity and prop, they would have had a super product that would have flown well and given 10-13 minute flights. Instead, we have one broken airplane, a group of modelers who won't try a serious electric because of this experience, and a company that no longer sells electric ready-to-flies in the U.S. But cheer up, some other company will try again this year, history repeats itself.

Now that you are all sure electrics are a waste of time, let's tackle some electric old wives tales.

**ELECTRIC MODELS ARE TOO HEAVY TO FLY PROPERLY.** It is true that the electric propulsion unit is heavier than a comparable gas engine. It is, however, very easy to compensate for this weight by building a better engineered lighter airframe. Build your models to fly, not to

crash. It is also a fact of nature that the larger size electric models are not so adversely affected by extra weight. Most people will fly 05 size electric models. Unfortunately, on this size aircraft, an additional 3 ounces can make a real difference in performance. Strive for an airframe-radio weight equal to or less

*Continued on page 82*



"Fast Eddy", by Bob Sliff. Jolly flew it through speed trap at over 107 mph, one way. Averaged 93. Samarium Cobalt 05.



Gene Wallock and his Corben. Couple of years ago, Gene wouldn't even say "RC". Now he are one!



Power unit for Airtronics "Kitty". Geared Mabuchi, 7-1/4-inch prop, five NiCd cells.



Airtronics "Kitty". Prop in safe location. Skid very helpful, allowing "no elevator" landings. Nice looking in the air.

# ELECTRIC POWER

By MITCH POLING

• What is a trainer? I have seen a lot of planes billed as trainers, and, with an instructor, they do teach you how to fly. What about someone who has to try to learn on his own? I did, and my experience convinced me that the practical definition of a trainer is a plane that will fly just as well without a radio as with one, and that will fly slowly, so a beginner can figure out his mistakes before it's too late. This doesn't fit the description of most trainers on the market, which are, basically, designed for an instructor/student situation.

There are some aircraft that do fit my definition; these are gliders, powered gliders, old timers, and rudder-only planes, all of which can "free flight" if you leave them alone. Most ready-to-fly planes do not fit this, but there is one exception, the Kitty, marketed by Airtronics. I have been putting a lot of flight time on the Kitty in the last few months,

and I have been very impressed by its gentle characteristics and slow flight, ideal for a beginner. Airtronics is already known for its quality approach in its kits, and the same care has been applied to this plane. Its statistics are a span of 50 inches, area 233 sq. in., powered by a Mabuchi 280S motor (about the same as an Astro 020) geared to a 7-1/4 inch prop, and a five-cell Sanyo .425AH pack. I tached the prop at 6500 rpm, at a draw of 7 A, which is a light load compared to most units on the market. This pays off in flight. The flights are surprisingly long. On a still day, I get between six and seven minutes of flight on a warm battery pack charged from a digital charger. Even on a cold battery, I get 5-1/2 minutes. Maximum altitude varies with conditions . . . between 200 and 500 feet. The weight of the plane, with a Cannon receiver, two Bantam Midget servos, and a .250Ah receiver pack, was

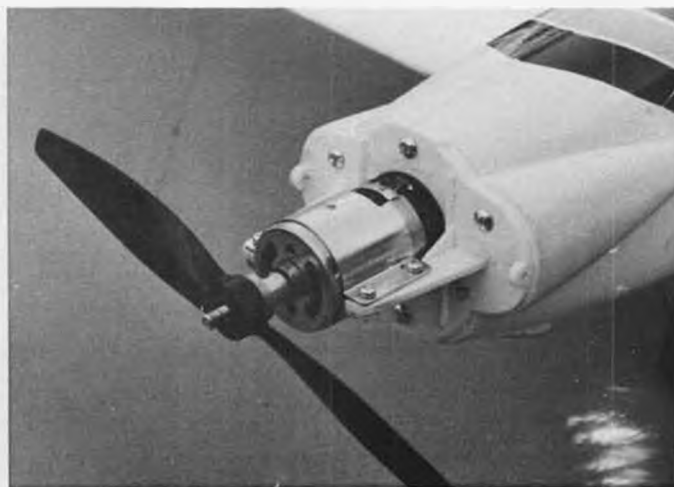
22 ounces.

The only time to take care with the plane is in the initial two circles of the field, trees are a no-no! I recommend a clear field about the size of two football gridirons for the flights, as the initial climb is slow. The first circuit of the field will get you up to 20 to 30 feet, the second circuit up to 40 to 60 feet. After that, it's all fun!

There is almost an irresistible urge to put in more up trim, but don't. I did, and got a snap stall on the first turn I made, which ended the flying for the day. Just let it amble up into the sky, and don't go near obstacles. I use left turns for the initial two circuits; the plane has a natural tendency to be stable in a left turn, or even to recover back to level flight, so mistakes are forgiven. The right turns are also close to stable, but there isn't quite so much tendency to recover, and if the turn is more than a mild one,



Cox Sportavia. Suggested modifications in text include reinforcing wing and streamlining nose.



Close-up of cheek cowls on Sportavia which Jet Raskin advises removing. Cover openings with ply.





Astro 035 will give 12,500 on a 6x3, 14,500 on a 5-1/4x3. With six .550 cells, weighs 26 oz.

the turn can steepen.

These turns are all done without touching the elevator; "rudder-only" turns. In fact, the plane can be flown entirely rudder-only if you wish, and if you are a beginner, I recommend it. Usually elevator causes more problems for a beginner than it solves. The trick in rudder-only flight is to use only a little rudder, so turns are shallow; steep turns will cause the plane to dive. That's all there is to it; a beginner with no one to help him should plan on using gentle left turns for the entire flight, if possible; just doing simple circuits of the field until the power runs down. Landings are a delight, you don't need to use elevator, just let it land on the skid, into the wind. There should be little or no wind, no more than 3 mph. That is a good description of my first successful R/C flight years ago, using Ace rudder only in a Schoolboy with a Pee Wee 020 for power; and a beginner can duplicate it with the Kitty. Remember, though, that this Kitty likes to climb trees (I know, I did it!), so no trees, please.

The Kitty is not quite ready to fly when you get it; most of the work involves the radio installation. This turned out to be surprisingly slow for me; the plane is small, placement is critical, and the servo rails have to fit just right. This took time; it would be nice to have a pattern to use

for the servo rails. The receiver is mounted on a platform below the wing, this was also a slow job, all cut-and-try. I gave up on the balsa supplied for the job, and used cardboard, which was much easier to fit and more adaptable. I also found that the rudder pushrod bound in the exit slot; the cure for this was to enlarge the slot and put a 12° bend in the rod 5-3/4 inches from the rudder end. This made the push rod movement quite free. Be sure to route the receiver antenna down through the bottom of the fuselage as shown. If you route it up out of the cabin top, the prop will tangle in the antenna (the plane is a pusher).

One last item: when the battery is connected, the connectors can be pushed down inside the fuselage, this does put them near the push rods, but it hasn't caused any problems. The instruction book is well written, with photographs to show you the steps, so the assembly is straightforward. It does take some time to do it right, about three evenings for me, but it is well worth it. I recommend the Kitty for beginners to learn on, and to the experts as a fun plane for evening flights at the local park. Airtronics has done a good job on this one!

Speaking of ready-to-fly planes, Jef Raskin (Cupertino, California) sent in some tips on how to get better performance out of some of the RTF's on the market. He says that two modifications to the Cox Sportavia make a lot of difference. First, use lots of strapping tape! Use 3/4 inch wide tape, and put two strips along the spar, one on top of the wing, and other on the bottom. Then wrap a strip of tape around the leading edge, the full length of the wing, and ditto for the trailing edge. This protects the leading edge from dings and the trailing edge from cracking (which it tends to do on collisions with branches, etc.). The wing is now stiff enough for even inverted flight, according to Jef. I tried it, and I agree, it makes a world of difference. I no longer feel like I'm



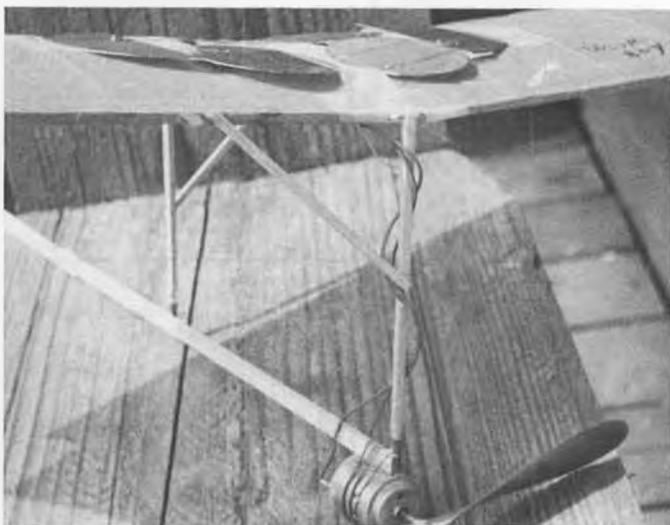
Will Bosco's "Solar Boy". Trim for level flight, or it's "Goodbye!"

flying a springboard!

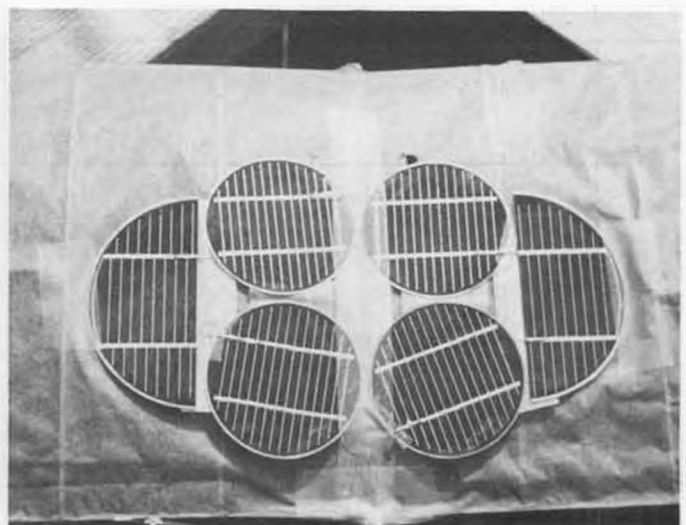
The second modification is to streamline the plane by cutting off the cowls and covering the holes with plywood. The benefits are less drag (something the Sportavia can do without), it strengthens a critical area that often cracks on hard landings, it gives the stabilizer less area up front to fight and so improves stability, and it adds a bit of weight up front to improve balance. The plane flies best when balanced 1.5 inches back from the leading edge of the wing, and this is hard to do without some extra weight. I haven't tried this mod yet, but Jef says he's had lots of good flights after the change, and poor ones before.

Jef also commented on the Kraft Chipmunk. He says a 7x4 prop is much better than the stock prop (8x4) for climb and longer flights. The plane is not for beginners, as it should not be allowed to slow down, but once you learn to fly it, you can make scale-like take-offs and greased-on landings that are just beautiful. With the 7x4 prop, Jef can make two, sometimes three brief flights on one charge, with enough charge left to taxi back to the pits. Jef reduces his charging time by using two Kraft chargers at once on the pack, to get

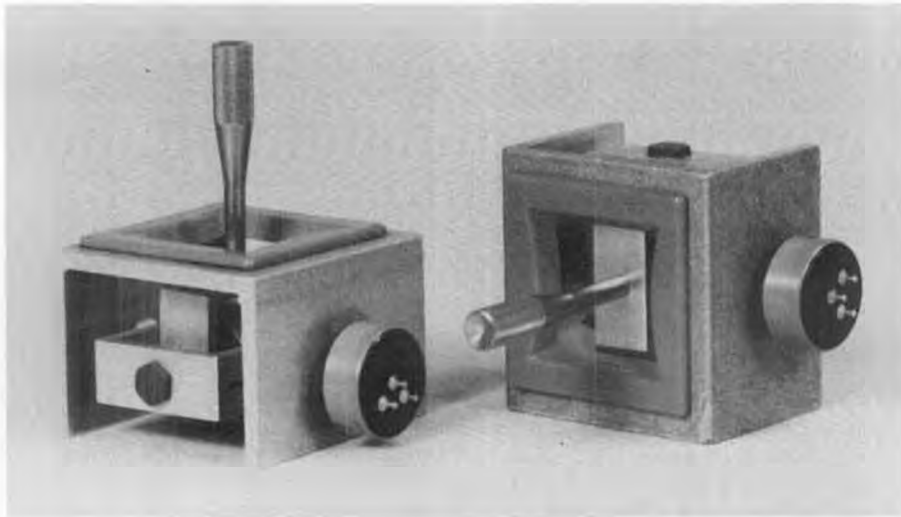
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Simple power setup. Leave prop off while transporting. Permanent wiring, no switch, just let 'er spin!



More cells than in shot above. Cells a buck a piece. Total of 1-1/2 watts enough to fly 2-1/4 oz. plane.



New ball-bearing gimbals being manufactured by DaCa Model Products for Ace R/C. Primarily for the Silver Seven series, they're available separately if your transmitter needs improving.

# Electronics Corner

By ELOY MAREZ

## DUAL TRANSMITTER METER

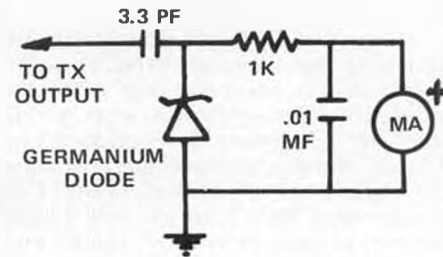
I heard once again from my Silverton, Oregon pen pal, Jordan Flakser, who wrote to inquire about the dual, switchable RF/ESV meter as used in my home brew Silver Seven transmitter, as described in the July '82 issue. Well Jordan, the meter itself is one I picked up in my wanderings through one of the local parts houses, but except for the face, one just like it is available from Ace R/C, as are all of the rest of the parts required. Actually, everything is standard, readily available electronic components, though I will include Ace R/C numbers and prices for those of you who have to depend on mail orders for your electronic goodies.

First, let us take a look at the various possibilities, and options. If your transmitter has no meter at all, we'll simply install the whole works, using all new components. If a meter is already in-

stalled, we'll have to determine what it is wired up to read, and then add the switch, and the remaining circuitry. If the meter used is one of the small half-inchers, it'll have to be replaced with the larger model, and some changes to the associated circuitry will probably be required.

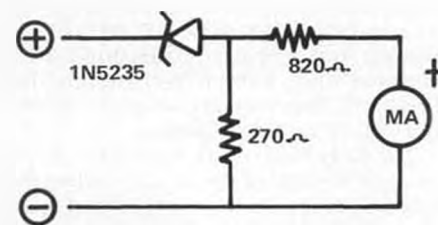
The new meter, and all other similarly sized meters I've run into used in R/C transmitters are "one mil" meters, meaning that they require one milliamp of current for full scale deflection. This feature is referred to as the meter's "sensitivity" and generally, the smaller ones in use range as low as 50 microamps. That is, they require only 1/20 of the current for full scale needle movement as do the larger ones. Therefore, any circuitry used with one of the more sensitive meters will not give much of an indication on the larger, less sensitive meter.

Generally, the meters used in R/C transmitters are wired in one of two ways, and we have to find out which. This is done simply by turning on the transmitter, and touching the extended antenna. If there is no meter fluctuation, it is wired up to read battery voltage. If there is a movement of the needle, generally in a downward direction, the meter is wired up to read R.F. Actually, this is something of a misnomer, meaning Radio Frequency, while in actuality, we are dealing with Radio Energy. Anyway, the reason for the change in meter reading is that your finger has changed the load as seen by the final amplifier, causing some detuning, and reducing the amount of energy being produced.



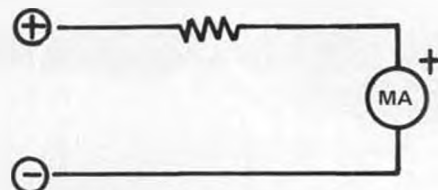
Basic transmitter RF meter circuit.

If you have an R.F. meter, we'll add the switch, and F.S.V. circuitry. If you have a voltmeter, we'll add the switch, and R.F. circuitry, unless what you have is a simple voltmeter, and you wish to change it to read on an Expanded Scale. The manufacturer's literature will usually indicate if you have an E.S.V.

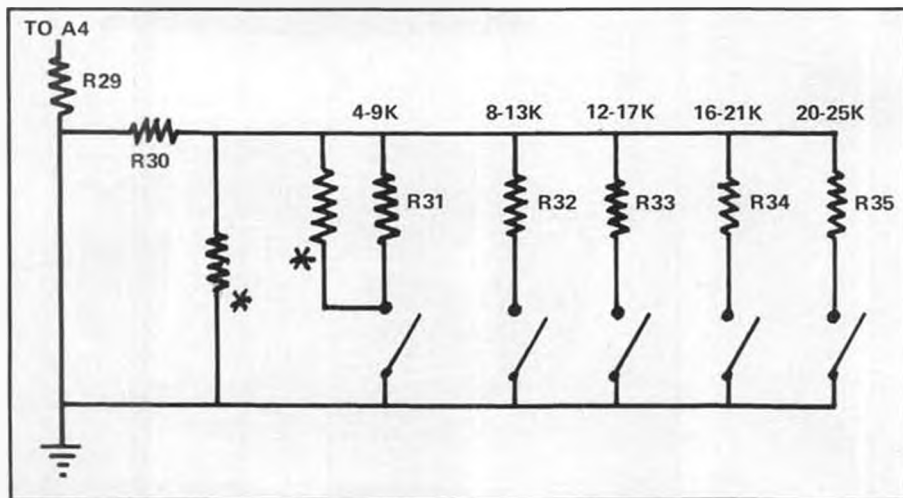


Basic 7-10.5V expanded scale voltmeter circuit, using a one-mil meter.

In the event that you are unable to determine from the maker's information whether yours is an Expanded Scale system or not, I've included a schematic of a basic voltmeter, as normally used.



Basic 10V voltmeter (non-expanded scale) circuit using a one-mil meter.



Simplified circuit of Protach Expanded Scale switching. Each progressive switch step adds 150K in parallel, reducing effective resistance. \*Possible additions as described in text.

All it is our old friend the milliammeter, with a series resistor to allow only one milliamp of current to flow, at which time a full scale reading results. Less voltage results in less current, therefore a lower meter reading. Though I have shown the resistor, in this case always referred to as a multiplier resistor, in the positive lead, it can just as well be placed

in the negative one; the only critical point being meter-to-battery polarity. In replacing this type of a circuit with the one for the E.S.V., simply remove the resistor, and use that point to connect the E.S.V. input.

Since we should now have an idea as to what the requirements are, let's go shopping. As basic items, we'll need the following from Ace R/C:

- 1 MT-001 Meter \$7.28
- 1 50L501 DPDT Switch .79
- 1 50L502 Switch Guard .30

The above assumes of course that your transmitter either had no meter at all, or you are replacing one of the smaller ones. If there is a large meter already in place, and it is in good condition, by all means, use it. The switch guard is not an absolute requirement, but it does wonders for dressing up that hand-cut slot that has to be made for the slide switch.

For the E.S.V. circuitry, you'll need the following:

- 1 R4-271 270 Ohm 1/4 Watt Resistor .20
- 1 R4-281 820 Ohm 1/4 Watt Resistor .20
- 1 SS-130 1N5235B Zener Diode .75

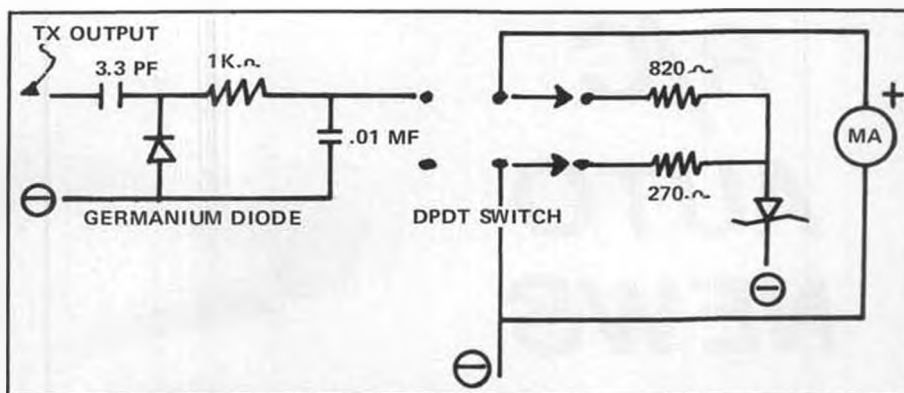
And finally, for the R.F. circuitry, you'll need:

- 1 SS-124 1N87 Germanium Diode .24
- 1 R4-102 1000 Ohm 1/4 Watt Resistor .20
- 1 CD-103 .01 Ceramic Capacitor .25

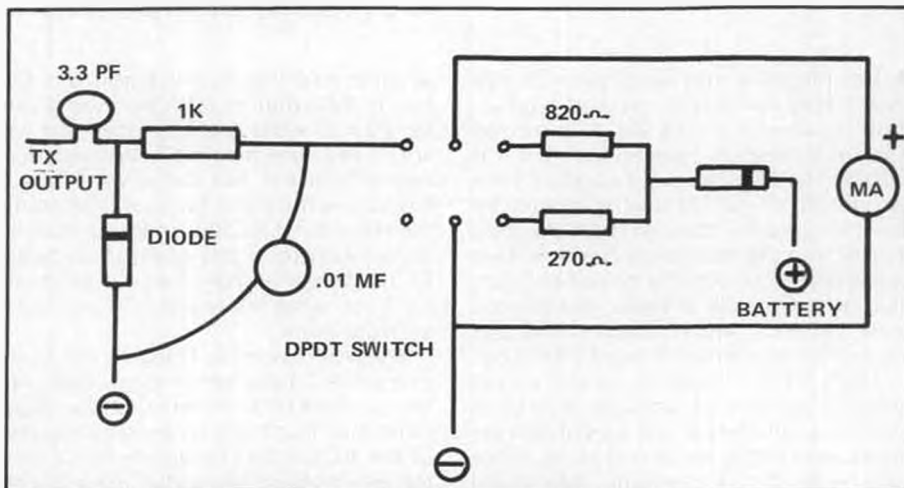
Unless a large meter is already in place, determine the location of the meter and the switch, and cut the necessary openings, making sure your tools don't tear into anything else inside, and be sure that no aluminum shavings or filings fall into the existing electronics. If you are installing the meter in the usual upper centered location, be sure that there is enough internal clearance before you cut any holes. The antenna base extends down a fraction of an inch, and must be cleared. Generally, there is enough room under it, and you can mount the switch on top of the case, between the antenna base and the front, as I did mine.

I have included schematics, both electronic and pictorial, and as you can see, there is nothing complicated involved. Simply pick out what applies to your case, and go at it. There are only two somewhat critical things to remember, one being the polarity of the diodes, and the other is in soldering to the meter terminals. Too much heat will travel up the lug and melt the plastic into which it is imbedded; use an alligator clip as a heat sink between the tip of the lug and the base, and solder fast.

In review, let us discuss the relative merits of these two metering circuits. First, in the case of the E.S.V., it is important to know that your battery is putting out it's designed voltage. It is a cold hard fact that with everything else in your transmitter being electronically perfect, without the proper voltage, it simply won't function as it is designed to. The E.S.V., being sensitive to small



Combine switchable RF and ESV circuit.



Pictorial diagram of dual meter circuit shown in schematic above.

voltage variations, will indicate voltage drops which are too small to be noticed on a non-expanded scale, and will let us know when we are getting close to the critical battery voltage, or if the battery is no longer reaching full voltage, as in the case of its having a defective cell, or cells.

The R.F. meter tells us the relative amount of radio energy being produced, which, while not a definite actual value readable in units, such as in the case of the volt meter, is still a useful reading in that it tells us of a normal condition, and indicates an abnormality by a lesser or lower reading. Unfortunately, these devices are not too sensitive, many will read very close to normal even with one cell out, which is why I decided to back it up with the voltmeter. There are a few transmitters on the market, such as certain models from Kraft and Futaba, which feature similar meter circuits, either with switchable meters, or with separate instruments being used. Either method gives us the best of both circuits.

Unfortunately, neither of these circuits can give us the full status of the workings of our transmitter, so for the best possible insurance, after checking meter readings, take another couple of seconds for a full control check before every takeoff. And to test the other very important part of the link, the receiver, you should make that all-important antenna-less or antenna-down range check before the start of a day's flying.

Although this is a worthwhile addition to any transmitter, especially to those without any metering at all, it is not especially complicated, in spite of all those scary diagrams. Just look everything over carefully and have a definite plan in mind before you cut any holes. Remember the old sage advice: Don't start any vast projects with half-vast ideas!

#### AND ANOTHER TRANSMITTER IMPROVEMENT

As smooth as a drink of sangria on a hot day...

That is how best I can describe the action of the new ball bearing gimbals being manufactured by DaCa Model Products for Ace R/C, presumably for its Silver Seven series, but also available separately for those of you who wish to improve your transmitters and subsequently, your flying, with a better set of gimbals.

Actually, this is the second generation of the gimbal some of you may already be familiar with, the open gimbal that has been available with the Silver Seven for some time. Most of the features have been retained, such as the solid .125 machined aluminum frame and bales, which will provide the utmost rigidity with no distortion possible during assembly in the transmitter case, or later due to extremes in temperatures. The noteworthy improvements consist of

Continued on page 83



# R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR



For Corvette lovers (Like me! wcn), this 1/12 body from JoMac.

• Just the other day word came in that Associated had finally released production versions of the RC500, its entry into the independent suspension 1/8 car battle. The Dirty Racing Team has been promised an RC500 and it should be here in just a few days, so there may be a test of it in the next issue, but only if we get a chance to actually go out and race it at least a couple of times, as a test of a new car isn't worth much if the guy doing the article hasn't thrashed the car.

From what I have to go on so far, which is just box art, a couple of pictures of the completed car and a set of instructions, everything looks real good. Actually, with the instructions, Associated has blown everybody else into the weeds, the basic written manual is 10 pages long and is supplemented by a 20-page booklet of nothing but photos of an RC500 being built bit by bit and there are about 100 of these photos. For the racers of Associated cars, their RC500 instructions make the instructions for the RC300 appear very ho-hum, and I think they are even better than those furnished with the Associated 1/12 cars. 'Course there is a lot more involved in building the suspension car, but still, they did right by racers in showing them exactly how everything goes together.

## THRASHING TEST CARS . . .

I am still very much up in the air about

whether or not to do much testing of RC cars in this column, both because it can be a lot of extra work for me, and we aren't too sure how well received that type of article is. But just so you know, I have done the Delta Eagle, will be doing the Associated RC500, and have started on the text for a test of the Associated RC12i. When all have been published, we'll see what the reaction is and then go from there.

The real reason for bringing this up is that while I have yet to even finish my text on the RC12i, I have in hand an issue of M.A.N. that has a semi-complete test of the RC12i! So I obviously don't care too much about being the first out with the news, but I do care a lot about the test being accurate and really wonder how anybody can get a new car, assemble it for photos and then go directly to the typer without using the car for its intended purpose, that of racing in head-to-head competition. I know about what M.A.N.'s lead time is, also know that all of us writer types got our RC12i production cars about the same time, in fact I probably got mine a day or two earlier than they hit the east coast, so I guarantee there wasn't much, if any, racing time to back up that "test".

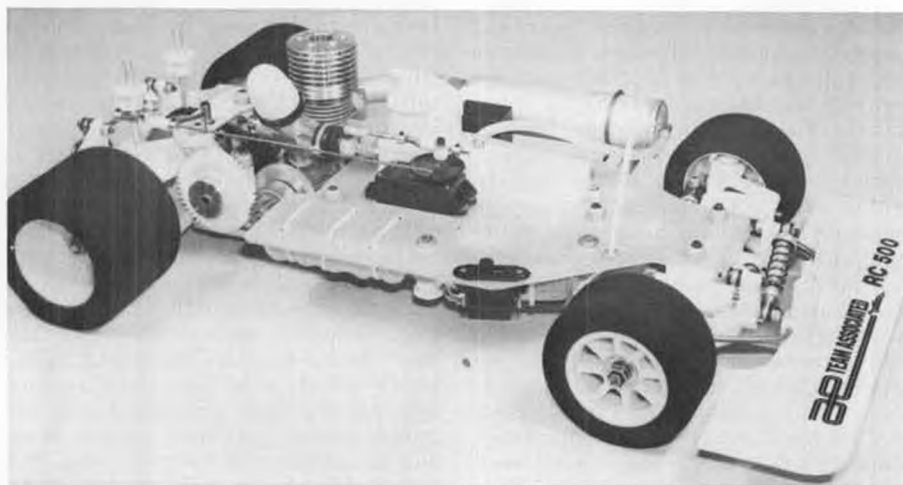
With the Eagle, I had raced the car twice, as well as going out practicing with it four times. Here at home in the

cul-de-sac (which isn't counted as being a practice session) nothing broke or went wrong. Practicing was the same story; everything was just super. But in the real world of racing I bent a wheel carrier, which dropped a half-shaft from its socket, as well as putting a semi-permanent tweak in the carrier and the motor blew a rod. Without actually racing the car, none of these things would have happened, but as you are expecting to read a decent test of a piece of racing machinery, you deserve to hear it straight.

So don't expect MB to have the latest word on race cars. Do expect the words we do have to come from racing experiences. And the RC12i will get its coverage, things are on hold right now as we are in the middle of a heavy series of 1/8 races each weekend and I just haven't had a chance to race the car yet.

## MORE ON THE DELTA EAGLE . . .

The Eagle continues to be an excellent race car for the DRT, a couple of weekends ago I used it to win the first race in the Seattle/Portland Challenge Series. It was one of those great races where the action is tight and close. I finished only a few feet in front of Jerry Brower, who was driving an MRP pan car, and Zale Thompson, racing his Eagle for only the second time, was right on Jerry's tail at the end of the 100 lap main event, with the other three cars being within a lap or so and all having their own battles for



Associated photo of just-released RC 500 independent suspension 1/8 car. Full ball bearings, coil-over shocks, anti-roll bars, geometry inspired by full-size Formula cars.

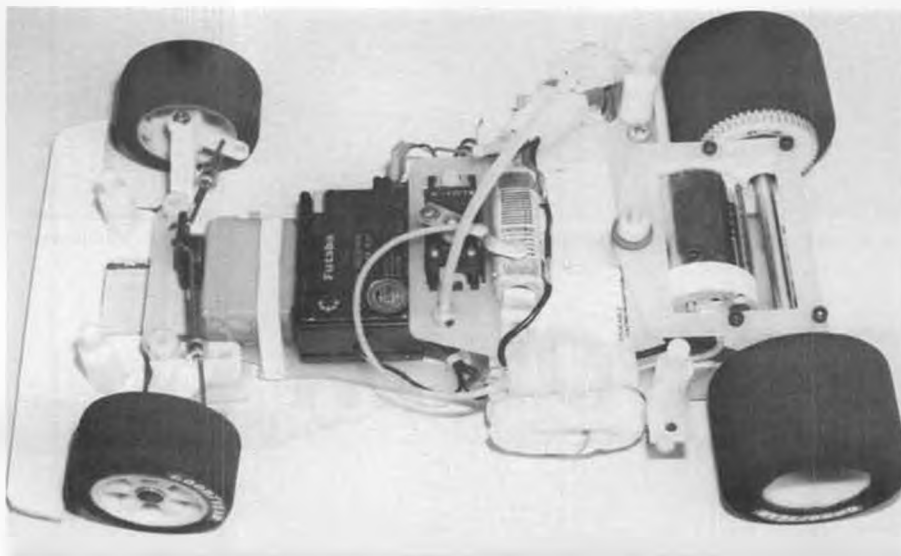


Ace R/C kit for slow-charging transmitters.

position. Just one of those races where there should have been three first place trophies and none past second place. It was also one of those situations where it was almost embarrassing to post-race. Whenever I can, I like to let other racers drive my cars, as they are usually set up pretty close to optimum and if they can get the chance to drive a stable, good turning car then they can go back to their car and try different setups, in order to achieve the same thing, regardless of the brand of car they may be racing. So after I whipped off a couple of show-biz victory laps, we filled the tank and several racers took their turn at driving the Eagle. The embarrassing part was that as each handed the transmitter over to the next in line, the second thing they said was that they couldn't believe the finish was so close and why didn't I just run away with the race! The first thing remarked on was how easy the Eagle is to drive, by the way.

Yes, it is very easy to drive, you just point it where you want it to go and it goes. No fuss, no muss, no hanging the back end out, it just stays tucked in and cooking. But I have also decided that as far as all-out blinding speed, the Eagle isn't that much, if any, faster than a properly set up pan car. This depends a lot upon the track surface, of course. If the track is real bumpy, any decent suspension car is going to stay hooked up and accelerating, where the pan cars will be bouncing from high spot to high spot. But on a smooth, or fairly smooth, surface, a pan car can still get around in real good shape. Where the big difference lies is that, in my experience with the Eagle, you have lots of time to set up for each corner, there are two or three good lines through each corner, instead of just one, and it simply isn't as much work to get the car around each lap. In a long race, or even just a 15 lap qualifier, the result is faster lap times, not from an outrageously fast car, but because the driver is having so much of an easier time in getting around.

Zale Thompson's experience with his Eagle has been similar, although more pronounced. He has gone from a pan car that was, on occasion, plenty fast, but had reliability problems and could be



Factory version of RC12i by Associated. Futaba receiver, Futaba S-20 throttle servo, Bantam Midget steering servo.

just a bit squirrely. He would have to concentrate so hard on just driving the thing that he would once in awhile drive right into a car that had spun in a corner, several times in the past year actually punched cars that had gone dead on the back straight. Now he is driving the car, instead of the other way around, to the point where in Portland he had time to check to see if the pits were empty before pulling in for more fuel, a couple of times going for another lap just to avoid the crowds.

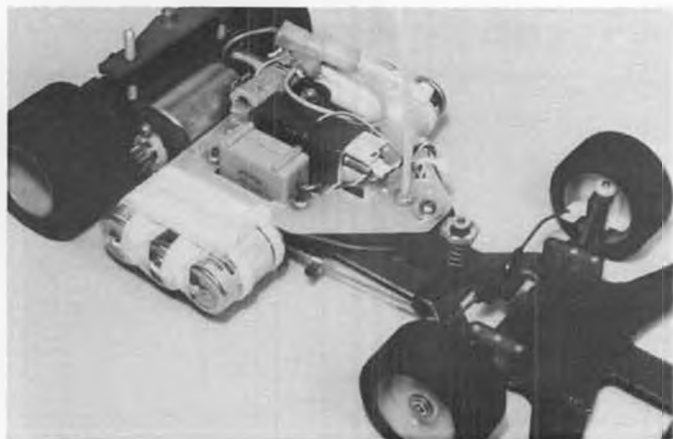
For tires on the Eagle, we are just using the Delta "A" compound in the rear, which is a middle-of-the-road tire and generally a little too soft for a Super J. I have one set of "AA" mounted, but have never felt the need for that much traction and also have two sets of "B", as well as one set of the sorta rare "C" compound mounted on wheels. The only reason for going to these harder tires would be to get better turning, which I haven't needed yet. Up front is where the real swapping of tires has taken place; as mentioned in the test the good ol' 318 combination fronts worked well, especially on a medium-bite track. When the traction comes up we use 316s, which is what comes in the kit, and

at Portland where the traction was really good, Zale and I both used 314s, which is 316-type rubber for the outer ring and rear tire rubber for the inside ring. There isn't a pan car around that could stand the amount of front bite these tires give, yet the Eagle loves it. Both of our cars could turn inside all others, almost at will, yet you would have to do something really strange to spin either car out, and in fact neither of us spun once all day!

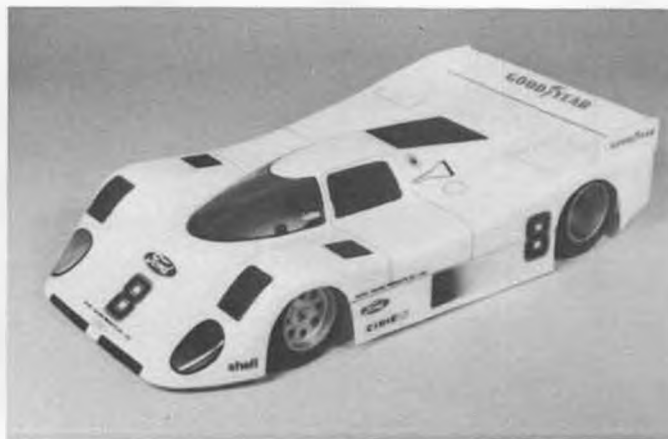
The latest tip from Delta is to remove the rear anti-roll bar completely, go to the lighter anti-roll bar in front, which is the 3/32 piece (a 1/8 bar is stock front and rear). On the shocks, the lighter springs are used in the rear, with the heavier ones up front, which is just opposite to stock configuration. My car has been converted over, but we haven't tried it out yet, with the plan being to leave Zale's stock, using it as a mule for comparison to my car.

The only other change has been installation of a Picco pipe, which seems to give quite a lot more low-end torque. Race this weekend, we'll see how much more low-end it gives and whether the top-end suffers too much. . .

*Continued on page 86*



JoMac Lightning 2000. Underrated in past, but now has big following at most 1/12 tracks.



MRP's very clean and fast Ford C-100, available in 1/8 or 1/12 scale.



Bill Hornell's Prather 29 Tunnel running on a smooth surface.



Ed Fisher's record holding Prather 35 Tunnel making a run for the camera.

# R/C POWER BOATS

By JERRY DUNLAP

## STRANDED AT THE WORKBENCH

I would imagine many folks would contend that one of the reasons they enjoy a hobby pursuit is because it allows them to forget some of the frustrations of job, relationships with others, leaky faucets, and assorted everyday incidents demanding our time and attention. My wife claims I can forget all kinds of things when I'm out in the garage messing around with my model boats. However, have you ever noticed that a pursuit that is supposed to provide some degree of repose and relief can be pretty darn frustrating at times?

In other columns, I've discussed the frustrations that bother some who participate in competitive model boating. You expect that competition can be frustrating at times. However, that time spent at the workbench isn't supposed to cause the anxiety that racing generates.

Occasionally, a situation arises that produces something that might be labeled "hobby haggardness." I managed to expose myself to this condition the other evening. A project that I'd been avoiding, it involved redoing the sponsons on a fiberglass tunnel, finally had to get done. Knowing I could no longer procrastinate on this task, I shoved the clutter on my worktable into a corner and commenced modeling.

Most of you have probably never cut the sponson bottoms off a fiberglass

boat. The first snag I managed to run into involved a very dull circular saw for my Dremel grinder. It was early evening, so a quick trip to the hardware store remedied that problem. With a sharp saw, the fiberglass dust really began to fly. It took some doing, but finally the sponson bottoms were cut away and removed from the hull. Since plywood would be used to rebuild the new sponsons, it was necessary to attach wooden strips inside the fiberglass hull to serve as gluing surfaces.

I began busily cutting, fitting, and gluing the wooden pieces in position to accept the plywood sponson bottoms, and started to experience that sense of relief one feels when they finally get around to completing a project they've been avoiding. A feeling of accomplishment began surfacing as the modifications neared completion. And then it happened. After making one sponson bottom from 1/16 plywood, I returned to my stack of plywood for another section of 1/16. How can this be? I knew I'd seen a sheet of 1/16 in the stack just the other day. I had 1/32, 3/32, 1/8, and even 1/4, but no 1/16.

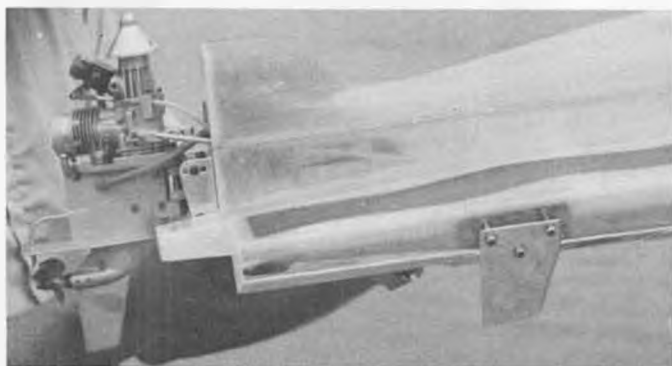
Too late in the evening to make a supply run to the hobby shop. One of my boating buddies is bound to have a piece laying around his shop. A couple of phone calls later shot down that idea. By now the warm feeling of pride and accomplishment was ebbing swiftly. The unfinished project rested on my dusty

workbench. The open spaces where the sponson bottoms were to be fitted were as vacant as my attempts to complete the project that evening. It was then that "hobby haggardness" invaded my being. I thought watching the late evening news might make me feel better. Unfortunately, seeing coverage of a Middle East war with people being blown away didn't do much to cheer me up. Oh, to hell with it. I took two aspirin, went to bed, and things felt much better the next morning. So, if you're ever struck down with "hobby haggardness", take this advice from a fellow sufferer. Just close the workshop door and forget the whole mess for awhile. It works for me.

## TUNNEL HIGHLIGHTS AND HINTS

Two North American Model Boat Association outboard tunnel records were recently set at events I attended. Using a Prather 29 Tunnel, Bill Hornell set a new record for the .21 class and Ed Fisher used a Prather 35 Tunnel to establish a record in the .45 class. Since there is considerable interest in outboard tunnels, a little more information on these two boats will be presented.

Of the two records, the .21 tunnel record set by Bill Hornell was the most impressive. This is not meant to slight the .45 tunnel record established by Ed Fisher. That, too, is a notable accomplishment. However, what made Bill's record so remarkable was the amount of time he cut from the existing record. The previous record for the .21 tunnel class

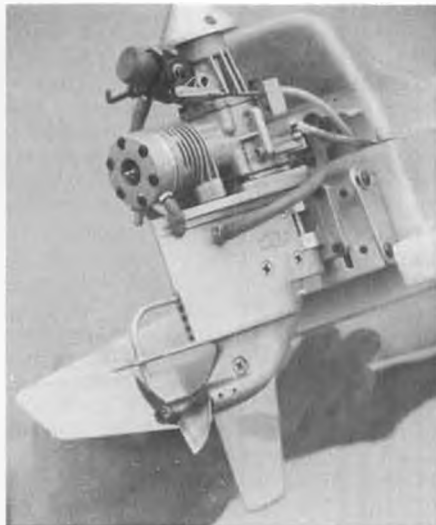


External turn fin on Bill Hornell's record holding tunnel. Note mounting block inside. Note sponson steps.



External turn fin on Ed Fisher's tunnel. Both boats finished in natural shades of epoxy glass.





New K&B long skeg lower unit, with Octura X-445 prop. Hub cut for outboard stub shaft.

was 1:51.2 for the five lap, .9 mile distance. Bill's new record is 1:40.9, or more than 10 seconds faster. The record speed was verified by two other model boaters who used their digital watch/timer to clock the run. I witnessed the record, and Bill turned in an almost flawless performance of driving while racing three other boats in that heat.

To shatter a record like Bill did, you have to do some things right. I've already mentioned his exceptional driving performance. Bill also had a couple of other things going for him. His Prather 29 Tunnel featured reworked sponson runners. What Bill did was to completely remove the stock sponson bottoms and add new "shoes." The new bottoms feature different spacing for the steps and 1/8 x 1/8 spray rails along



Bill Hornell and his record holding Prather 29 Tunnel. Uses Kraft radio for guidance.



Bill Hornell shows the reworked sponson bottoms, with four steps along sponson runners.

the sponson inside edge and outside bottom edge. One of the photos sent along for inclusion in this article shows the bottom of Bill's boat.

The prop that Bill used to set the record was an Octura X-445. This is a real big prop for the K&B .21 Outboard to pull. In order to turn this prop, Bill has elevated his engine to where the centerline of the propshaft is slightly above the sponson bottoms. He employs a Prather 3.5 Outboard Motor Mount to adjust the engine height on the transom. The X-445 prop hub must be cut back to allow the prop to fit on the stubshaft. He managed to remove the unwanted hub material by using a coarse flat file that had teeth on the file edges. It's a bit of work using a file, but it can be done. I should mention that this prop may not work on all tunnels. Since Bill set the record, a lot of the "locals" have tried the prop and it really hasn't done that much for most of their boats.

The final item that will be of interest to many tunnel boat owners is the use of an external turn fin mounted on the right side of the boat. Ed Fisher came up with this idea and tried it on his Prather 35 Tunnel with good success. Bill then took the idea and made a similar external turn fin for his Prather 29 Tunnel. The use of this outside mounted turn fin allows both of these boats to be cornered without having to back off the throttle to set the boat up for the turn. Both boats can be cornered at full throttle and hang right on the turn buoys. This turn fin configuration has proven effective in holding the right side sponson down while making full power turns. The fins are located slightly behind the boats' center of gravity with an empty fuel tank. Some of the "locals" have tried this arrangement on various tunnels and it has proven rather effective. It looks somewhat strange on the side of the boat, but it sure seems to work.

Some people question how tunnels can be made to go that fast with a stock engine. There were a few who attended the event when Bill set the record that felt, "No way can that engine be stock." One thing that N.A.M.B.A. requires of records submitted for the outboard tunnel classes is a motor inspection to

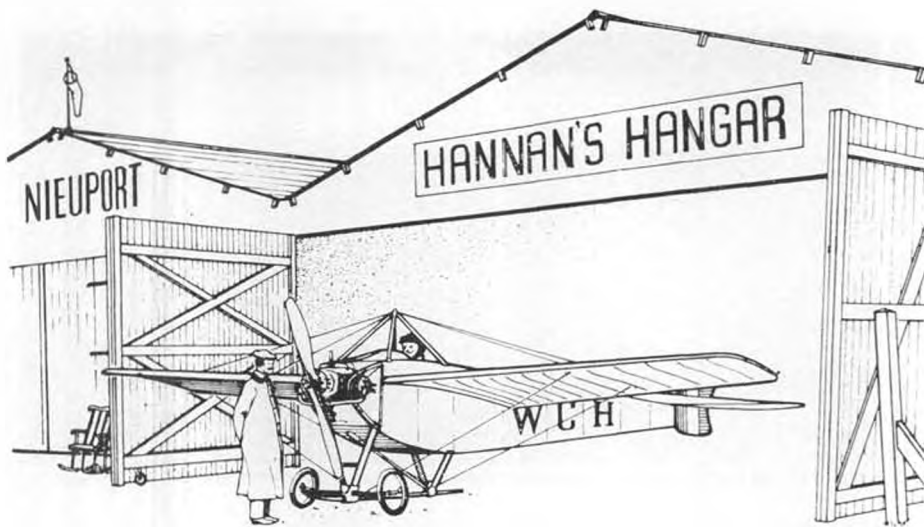
insure the little hummer is stock. Having known Bill for a number of years, I had no doubt the engine would be in stock configuration, as I volunteered to do the inspection. After completely disassembling the engine, my belief was confirmed. The engine was "stone stock." I handed Bill his engine in a plastic bag and again congratulated him for his record performance.

To establish his .45 tunnel record, Ed Fisher used a stock Prather 35 Tunnel with no hull modifications. His boat did have the externally mounted turn fin. He was using an Octura X-450 prop to supply the push. Both Bill and Ed use Sheldon's 60% nitro fuel and K&B glow plugs. There's a bit of "good news, bad news" when telling about Ed's record. The good news is that Ed is a valued friend and deserving of the record. The bad news is that I held the record with my Dumas Hotshot 45 until Ed clipped about eight seconds from my record when he turned in a 1:38.9 heat. Well,

*Continued on page 88*



Ed Fisher with Prather Deep Vee 40 and revised deck, used to establish NAMBA Off-shore record. K&B 7.5 with Octura X-450, Kraft radio.



"The money spent on preliminary drawings pays off a hundred to one."

• Our lead-in line this month, via Richard Miller, would seem appropriate to our favorite hobby, but in fact dates back much further, to that great artist, architect, and sculptor, Michelangelo.

#### AVIATION IS WHERE YOU FIND IT

Interesting aero-related items continue to crop up in unlikely places: *The Daily Midway Driller*, of Taft, California, featured a story and two large photographs relating to Skip Ruff and his Byron P-51 scale model which was featured on the January '82 cover of *MB*.

And Joe Wagner was kind enough to send us the February 1982 *American Wheelmen* (what, not *Wheel-person*?) a cycling magazine, which contained a feature entitled "Wilbur and Orville, Dayton's Most Famous Bicyclists". Were you aware that there were *four* Wright brothers? Well, there were: Reuchlin, Lorin, Wilbur and Orv... and, of course, sister Katherine.

Wagner says it is thought that the Wrights invented the turned-down handlebars and bent-over racing position for bikers.

Another publication, *Autoweek*, carried a brief report that aircraft manufacturer Bill Piper is preparing to market automobiles. Wonder if they will be available in Cub Yellow?

And finally, the prestigious magazine, *Smithsonian*, June, 1982 issue, featured well-known model builder and Gossamer Albatross crew-member Bill Watson on its front cover! Bill currently involved in a modeling spin-off activity testing the feasibility of kite/blimps for sea rescue purposes.

#### SCALE AIRCRAFT

Returning to aviation publications, we received a copy of *Radio Control Scale Aircraft*, a special release from Model &

Allied Publications Ltd., P.O. Box 35, Bridge Street, Hemel Hempstead, Herts. HP1 1EE, England. Although aimed at R/C enthusiasts, this unusually comprehensive offering should interest the scale model builder of any discipline. For instance Ray Rimell's article devoted to colors (well ok, colours) would be applicable to all types of aircraft, as would the clever construction and scale detailing techniques presented by Graham Smith. Eric Coates, with long experience in various forms of scale models, provides useful insights pertaining to the structural methods he has employed so successfully over the years. Terry Manley's "Among the Archives" provides an intriguing glimpse into his research efforts, while Gordon Whitehead counters the giant scale movement with his "The Fascination of Small Scale Models".

Even a contest report can be particularly engrossing when it concerns such diversified entries as an R/C Zeppelin and a Dornier Do-X! All this and much more has been carefully blended by David Boddington, and priced at \$3 U.S., plus postage, direct from the publishers. **SOME THINGS NEVER CHANGE**

"This interest is not confined to the younger generation... but many grown men also find the construction of flying models a keen delight as well as a fruitful

*Continued on page 89*



Semi-scale Bell Convertiplane R/C model by Georges Chaulet, of France. Powered by OS 90. Eight foot span model flown as autogyro (unpowered rotors).



Simon Blake's Mooney "Boston Found", with its hand-crafted first-place trophy. See text for more.



Vladamire Kostecka's CO<sub>2</sub> engine Antoinette weighs 78 grams, flies 80 seconds. Took 2nd in Czechoslovakian contest.

## 2-IN-1

# SAIMAN 200

By WALT MOONEY . . . Two-in-one means that you have a choice of power; rubber or CO<sub>2</sub>, for this slick little biplane. By the way, it sure would make a nice R/C scale project, and there's enough info to enlarge the plans . . .



• This is a Peanut Scale model of one of the prettiest biplane trainers of the World War II era. It was designed and built in Italy in some numbers, with the first flight of the prototype occurring in 1938. The design is excellent for a Peanut Scale and this model was built without any intentional departures from exact scale except for the flying propellers. In fact, it was built and flown with both a CO-2 and a rubber band powerplant. It is designed to be almost instantly convertible from one power system to the other, and has proven to be a very good flyer with either propulsion system. It was flown in both the rubber and power scale events at the May 16, 1982 Scale contest and while it did not win, it did take 3rd place in the power event. Its

best flight under CO-2 power was for 73 seconds from a completely unassisted R.O.G.

Flown in the rubber event, its best time was only 35 seconds, which was not competitive with several of the Jumbo scale competitors. Interestingly, it flew in wide smooth left turning circles when powered by the CO-2 engine, and in right circles when operated with rubber power.

A slight amount of right rudder was required to open up a rather tight left circle with the CO-2 engine, as the only required flight adjustment other than the engine power adjustment. When converted to rubber power, a loop of 5/32nd rubber twice as long as the motor base was used, and some clay

ballast (actually a piece of clay the size of the spinner) was required to put the center of gravity where it was with the CO-2 engine installation.

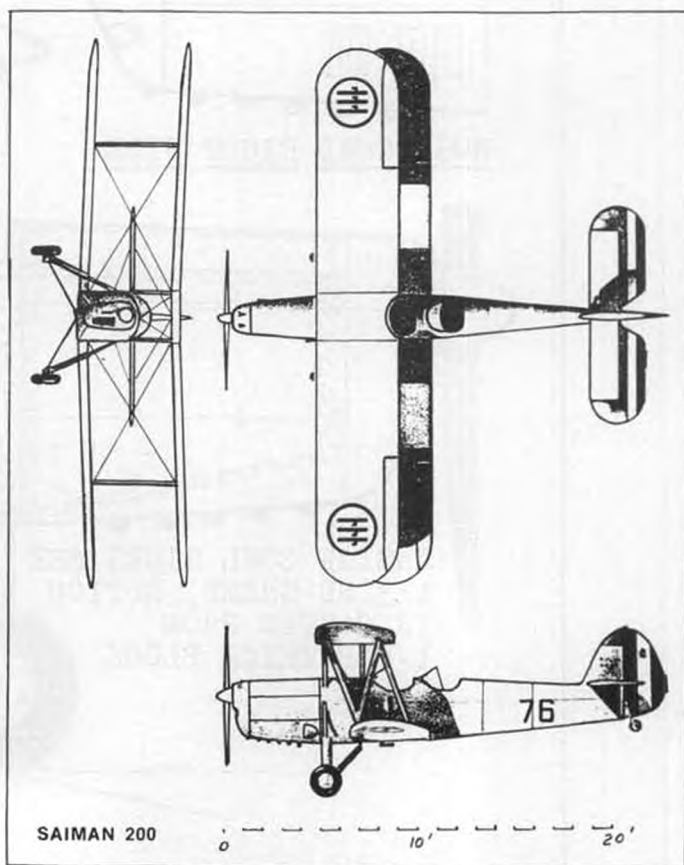
The CO-2 powered version weighs 22 grams, of which exactly half is the QC (quick change, to use airline jargon) engine package. At an outside temperature of 68 degrees and a power setting that gives realistic takeoffs and climbs, the Campus A-23 installed will run for more than a minute on each of the first three fillings from a standard CO-2 cartridge. During a session of about a dozen flights, all were at least 40 seconds, and the best three exceeded a minute.

The model has generally followed

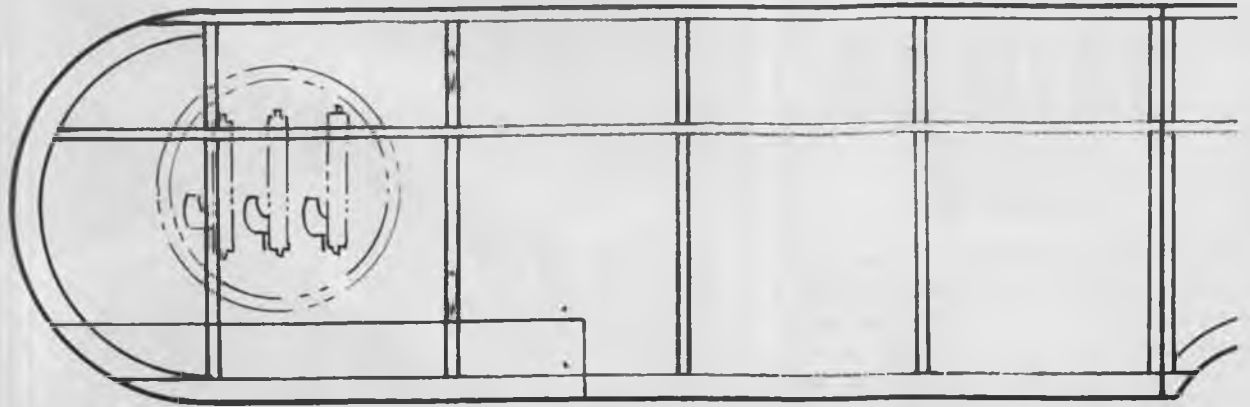
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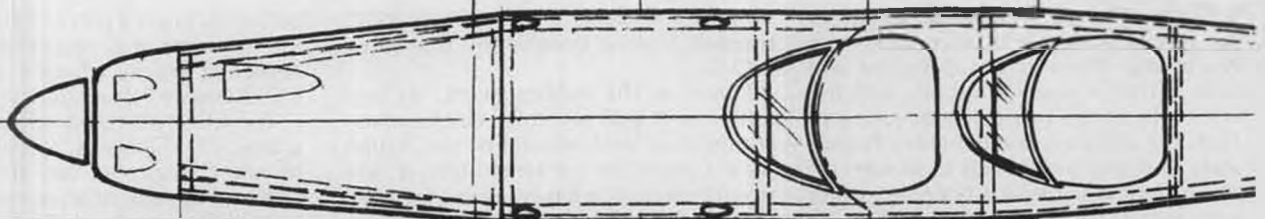
Nice lines on this aircraft. Should make a real sharp R/C scale project. Note prop and block for rubber powered version.





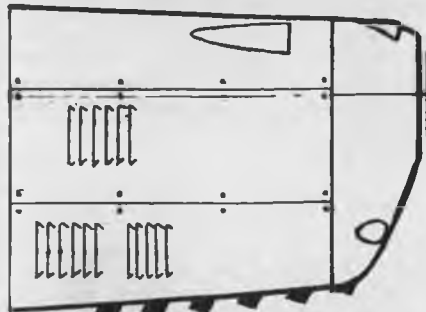


TOP WING PLAN VIEW



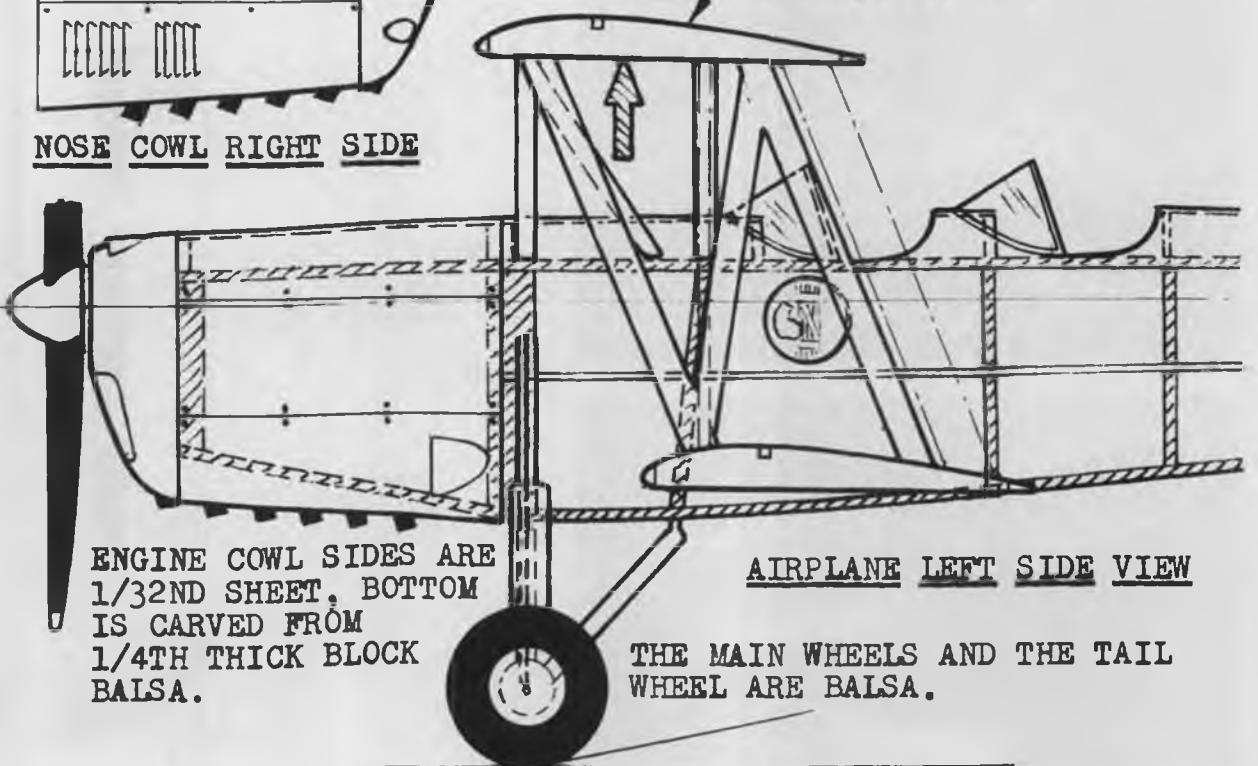
FUSELAGE PLAN VIEW

NOTE THAT THE  
BOTTOM LONGERONS ARE  
CLOSER TOGETHER AT THE NOSE.



NOSE COWL RIGHT SIDE

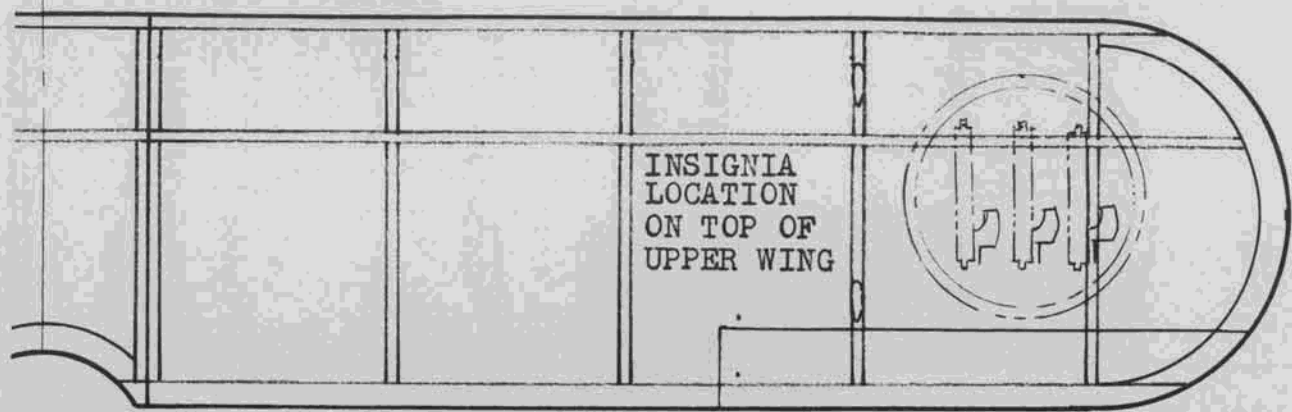
ALL WING RIBS ARE  
IDENTICAL AS SHOWN  
BELOW



AIRPLANE LEFT SIDE VIEW

ENGINE COWL SIDES ARE  
1/32ND SHEET. BOTTOM  
IS CARVED FROM  
1/4TH THICK BLOCK  
BALSA.

THE MAIN WHEELS AND THE TAIL  
WHEEL ARE BALSA.



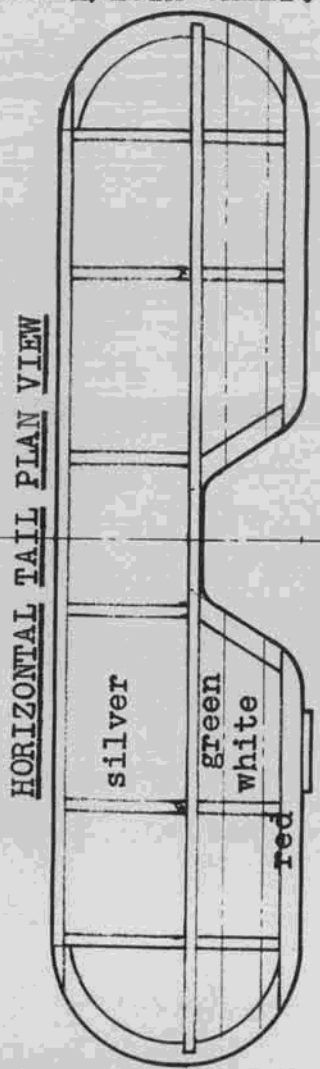
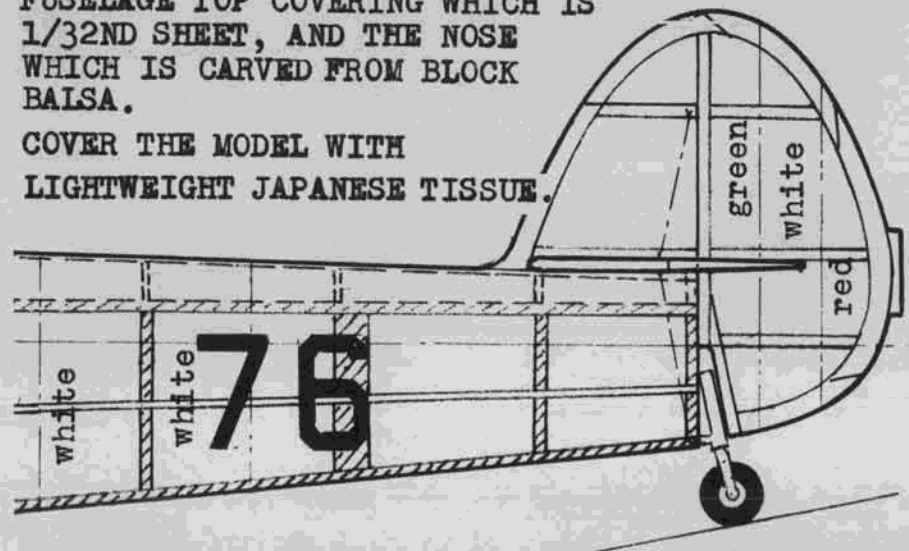
WING TIPS AND CENTER CUT OUT ARE MADE FROM 1/16TH SHEET.



ALL STRUCTURAL MEMBERS ARE Balsa EXCEPT THE CABANE STRUTS, THE WING STRUTS, AND THE LANDING GEAR STRUTS WHICH ARE MADE FROM MODEL RAILROAD BASSWOOD STICKS.

ALL Balsa IS 1/16TH THICK BY THE WIDTH SHOWN ON THE PLAN, OR IS CUT FROM 1/16TH SHEET Balsa, EXCEPT THE FUSELAGE TOP COVERING WHICH IS 1/32ND SHEET, AND THE NOSE WHICH IS CARVED FROM BLOCK Balsa.

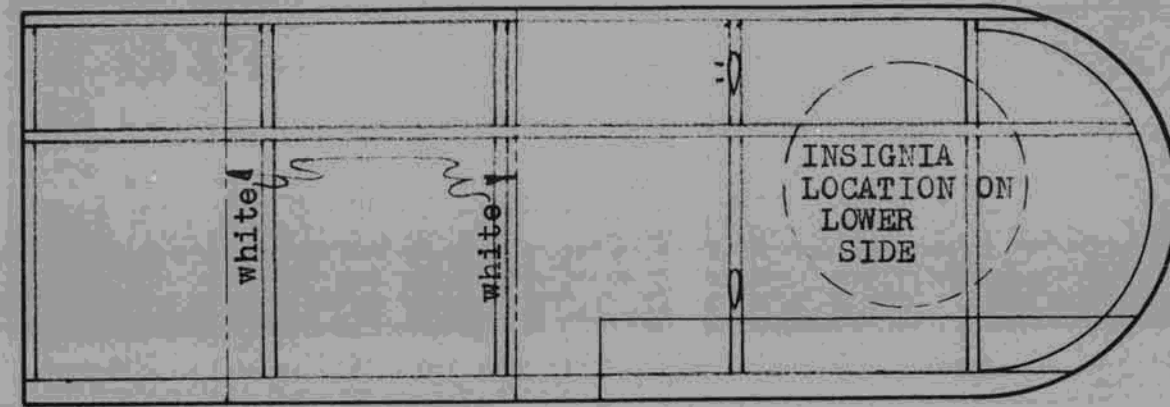
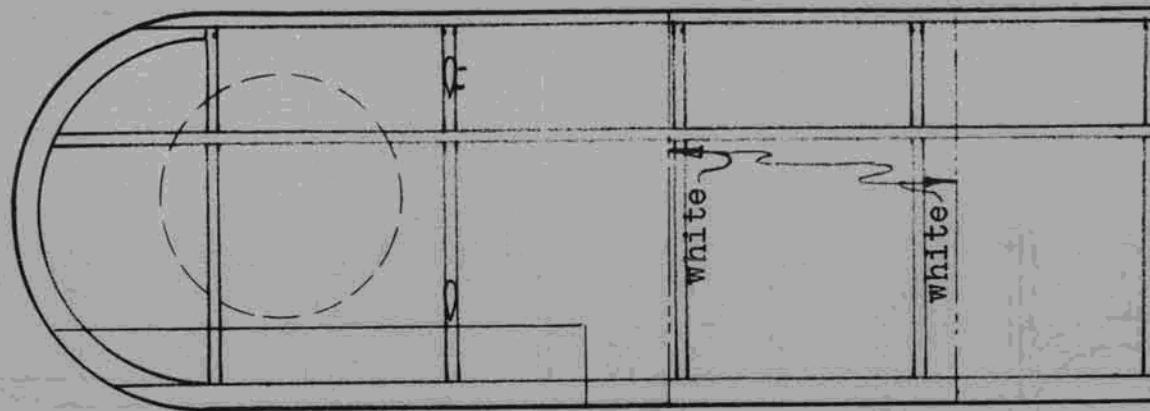
COVER THE MODEL WITH LIGHTWEIGHT JAPANESE TISSUE.



THERE ARE NO INTENTIONAL DEVIATIONS FROM EXACT SCALE ON THIS MODEL EXCEPT THE RUBBER POWERED FLYING PROPELLER AND THE CO-2 ENGINE PROPELLER.

# SAIMAN 200

AN ITALIAN PEANUT BY *Walt Mooney* 12-23-81



BOTTOM WINGS PLAN VIEW

WING LEADING EDGES ARE 1/16 BY 1/8 SET ON EDGE. TRAILING EDGES ARE THE SAME SET FLAT. SPARS ARE 1/16TH SQUARE.

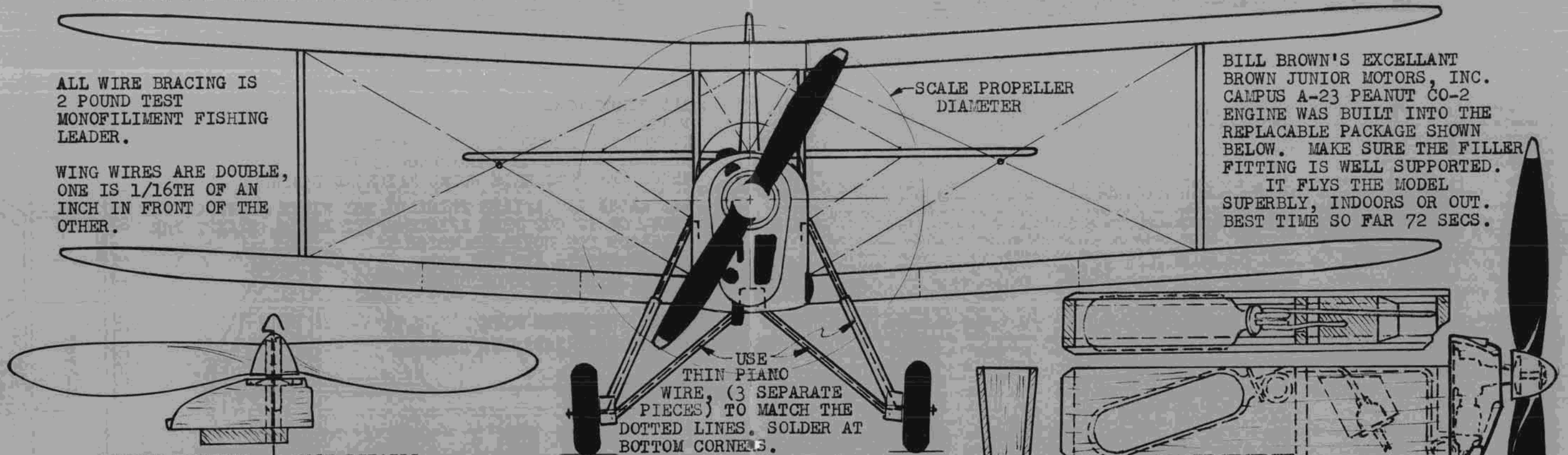
ALL WIRE BRACING IS 2 POUND TEST MONOFILAMENT FISHING LEADER.

WING WIRES ARE DOUBLE, ONE IS 1/16TH OF AN INCH IN FRONT OF THE OTHER.

SCALE PROPELLER DIAMETER

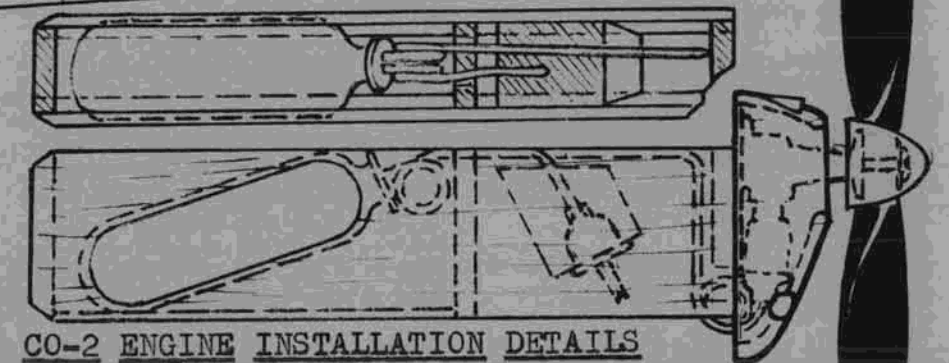
BILL BROWN'S EXCELLANT BROWN JUNIOR MOTORS, INC. CAMPUS A-23 PEANUT CO-2 ENGINE WAS BUILT INTO THE REPLACABLE PACKAGE SHOWN BELOW. MAKE SURE THE FILLER FITTING IS WELL SUPPORTED.

IT FLYS THE MODEL SUPERBLY, INDOORS OR OUT. BEST TIME SO FAR 72 SECS.



USE THIN PIANO WIRE, (3 SEPARATE PIECES) TO MATCH THE DOTTED LINES. SOLDER AT BOTTOM CORNERS.

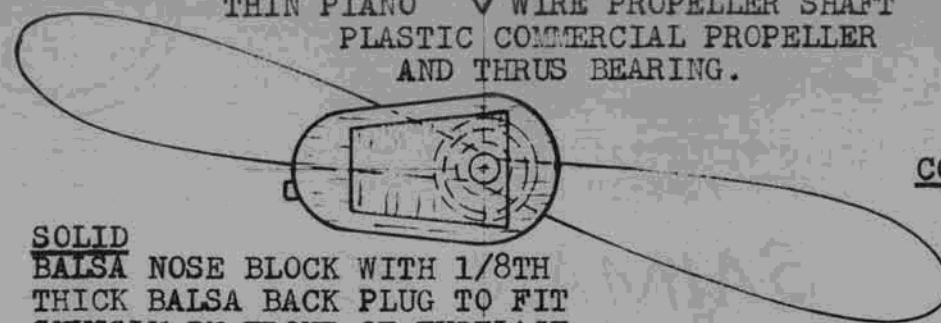
AIRPLANE FRONT VIEW



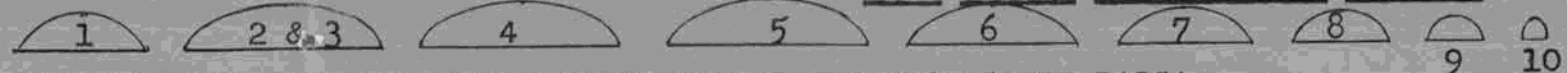
CO-2 ENGINE INSTALLATION DETAILS

RUBBER POWERED NOSE DETAILS

THIN PIANO WIRE PROPELLER SHAFT PLASTIC COMMERCIAL PROPELLER AND THRUS BEARING.



SOLID Balsa NOSE BLOCK WITH 1/8TH THICK Balsa BACK PLUG TO FIT SNUGLY IN FRONT OF FUSELAGE.



NOSE TO TAIL TOP FUSELAGE FORMER SHAPES CUT FROM SHEET Balsa 1/16TH SHEET FOR 1 THRU 5 OTHERS ARE 1/32ND SHEET

COLOR SCHEME (lower case letters) Airplane is overall silver with white bands on bottom wings and around aft fuselage. Tail surfaces have red, white, and green stripes. Insignia has black details on a white circle. Tires, numbers, and propeller blades are black.

**SAIMAN 200**

SHEET TWO BY *Halt Mooney* 12-23-81



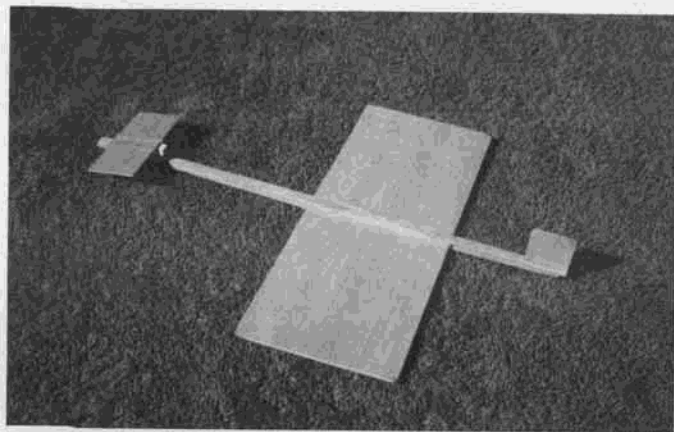


Fig. 1. This model glides stably . . . just . . . in spite of the negative incidence of its canard surface.

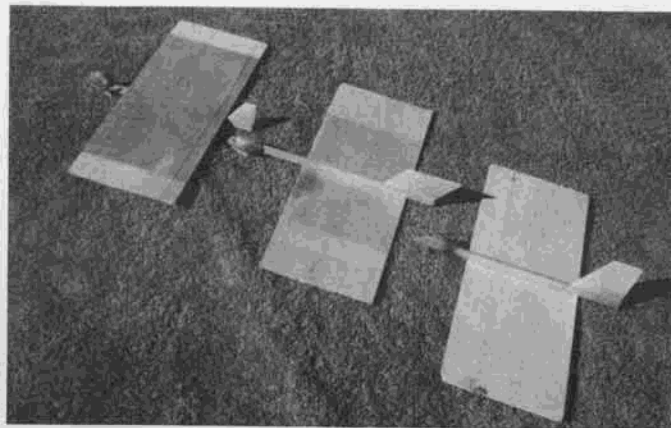


Fig. 2. These ballasted planes glide stably either way up. With balance aft of 23.75% of chord, they may go straight or loop.

# SUPERSTABILITY

By CHARLES McCUTCHEM . . . Why will a hand launch glider with 0-0 wing and stab go up like a rocket and (hopefully) down like a soaring bird? The author bravely tries to explain it with one word . . .

• Many hand-launched gliders will glide stably when their longitudinal dihedral is zero or even negative. This is because the center of pressure of a wing with a sharp leading edge and zero to moderate camber moves aft with increasing angle of attack once the angle exceeds a fairly low threshold value. Apparently flow separation causes the effective camber of the airfoil to change in the positive direction as the angle of attack rises. Above the threshold angle of attack, the wing is statically stable by itself. Below it, the wing is unstable.

At low speed, small, sharp-winged models fly in the high angle of attack, "superstable" regime. At high speed, unswept wings can fly in either the stable or the normal regime, whereas swept flying wings, and airplanes with tail or canard surfaces, are held in the low angle of attack, normal regime by their much larger pitch damping.

## ZERO-ZERO TRIM

When I was very young, I made a *Scientific* hand-launched glider. It was a large model for a little boy, with a lot of simple dihedral and sweepback, and a long, pointed nose. On its first flight it went up in a straight line, stalled, and came down in another straight line, spearing itself into the ground like a javelin. Subsequent flights were similar, until I gave it some up elevator with a tab of Scotch tape to make it pull out of its dives.

This was my introduction to zero-zero trim. The stabilizer of the *Scientific* glider was parallel to the intersection of the flat bottoms of the wings. For years I wondered why the *Scientific* Company sold a glider that would not fly. With no longitudinal dihedral why should it ever pull out? Books on aeronautical engineering agreed that longitudinal dihedral was required for longitudinal

stability.

Eventually I learned that zero-zero airplanes would fly; indeed that no other trim allows a chuck glider to be thrown high into the air, and, once up there, make a transition (sometimes) into a slow glide. At high speed the model behaves as its longitudinal dihedral and camber would suggest. A typical zero-zero airplane pulls up, but very slowly. A cambered wing lifts a bit when its bottom is at zero angle of attack, and in most models this has more effect than the nose-down pitching moment caused by the camber. Had I been bigger, and able to throw the *Scientific* glider harder, I might have found it had a little nose up trim.

Zero-zero models glide surprisingly stably. After small disturbances they recover much quicker than their longitudinal dihedral can account for. But if the model ever gets pointed sharply downward it will speed up, and whether it then pulls up depends on its longitudinal dihedral. Thus the models have one regime where their stability is normal, i.e., what aerodynamic texts predict, and another where it is much greater than normal. I call the latter regime superstable. A good flight re-

quires that the model change from the normal to the superstable regime at the top of its launch trajectory. To do this it must pass through a horizontal attitude travelling at fairly low speed.

Some chuck gliders are almost longitudinally stable in an inverted glide, some completely so, though most roll out too soon for this to be obvious. Any airplane that has longitudinal stability either way up cannot depend for this stability on longitudinal dihedral, which, if not zero, must be negative in one or other orientation.

So superstability cannot depend on positive longitudinal dihedral. Indeed, chuck gliders can be flown with negative longitudinal dihedral. At the launch, they are thrown vertically into the last quarter of an *outside* loop.

As an extreme example of stability in spite of negative longitudinal dihedral, consider the model in Fig. 1, which has a 2-3/8 x 1 x 1/16 inch canard surface 5-3/8 inches ahead, center to center, of an 8 x 3 x 1/16 inch flat plate wing with somewhat sharpened leading and trailing edges. It glides stably, but only just, with the canard at 9 degrees negative incidence relative to the wing. The balance is 25.8% of the wing chord back from the leading edge. Flight is slow, and at a high angle of attack.

## BALLASTED PLANES

Superstable behavior is exhibited by simple, flat-plate flying wings. These were written about in 1909 and 1910 by F.W. Lanchester, the first man to explain why wings make lift. He called them ballasted (aero)planes, and made them of thin mica sheets. Ballasted on one edge with the right amount of weight, they would glide stably either side up. I find that the essential property for stability is not thinness, but a sharp leading edge. An 8 x 2 inch flying plank with a

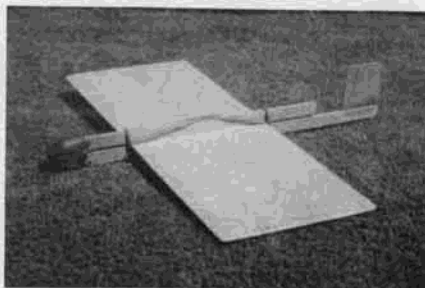


Fig. 3. Ballasted plane with variable balance point and constant weight.

symmetrical airfoil 5/16 inch thick would fly stably either way up, but only when flown backward, with the sharp trailing edge foremost.

According to ordinary airfoil theory, a flat sheet or symmetric airfoil should be neutrally stable, a cambered sheet stable if concave up, unstable if concave down. In fact, bending a sharpened 8 x 3 x 1/16 inch wing to a positive camber 2.7% of the chord length in height does not quite abolish stability if the balance is at 34%, but it does make it precarious. A minor disturbance may upset the model so it tucks under, does half an outside loop, and proceeds upside down. The mechanism of superstability may still operate with wings of greater camber. The experiment shows only that above 2.7% camber, superstability is unable to overcome the instability caused by the camber.

A model with an 8 x 2-1/8 x 3/32 inch balsa wing sanded to a flat-bottomed airfoil shape had slightly less precarious stability. Its balance could be anywhere between 31.6% and 34.4%. A flat-bottomed 8 x 2 inch wing 3/16 inch thick could, at best, yield a stalled, mushing descent with its balance at 38% of the chord. The greater the positive camber, or the greater the negative longitudinal dihedral of the canard model previously described, the farther aft the balance had to be for stability, the more precarious was the stability, and the slower was the flight.

A model with an 8 x 2-1/8 x 3/32 inch balsa wing sanded to a flat-bottomed airfoil shape had slightly less precarious stability. Its balance could be anywhere between 31.6% and 34.4%. A flat-bottomed 8 x 2 inch wing 3/16 inch thick could, at best, yield a stalled, mushing descent with its balance at 38% of the chord. The greater the positive camber, or the greater the negative longitudinal dihedral of the canard model previously described, the farther aft the balance had to be for stability, the more precarious was the stability, and the slower was the flight.

Does the ballasted plane have a normal regime where it behaves as its camber would predict? Will it ever go straight at high speed, as would a zero-zero chuck glider with symmetric airfoils on wing and tail? To find out, I made catapult-launched 8 x 3 x 1/16 inch balsa ballasted planes with leading and trailing edges thinned to varying degrees. Each weighed 7 gm, and had a stick fuselage just long enough to support a catapult hook in front of the wing, and a small fin to the rear to improve the lateral stability (Fig. 2).

The models would glide either way up with the balance anywhere between 22% and 37%. With the balance much forward of 22%, the models would pitch down into an ever-steepening dive. Moving the balance aft from 22% slowed the glide. The aft balance limit was not sharp. With the balance aft of 30% the flight path was undulatory, and the farther aft it was, the slower and larger the pitching oscillations became. At

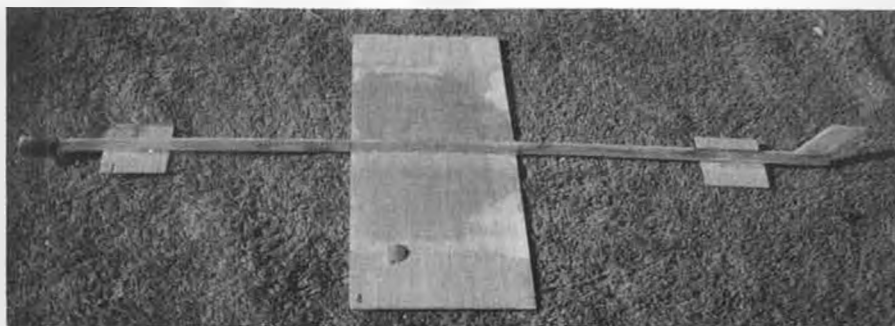


Fig. 5. Without the pitch damping added by the tailplane and canard, this model is unstable because of its large pitching inertia.

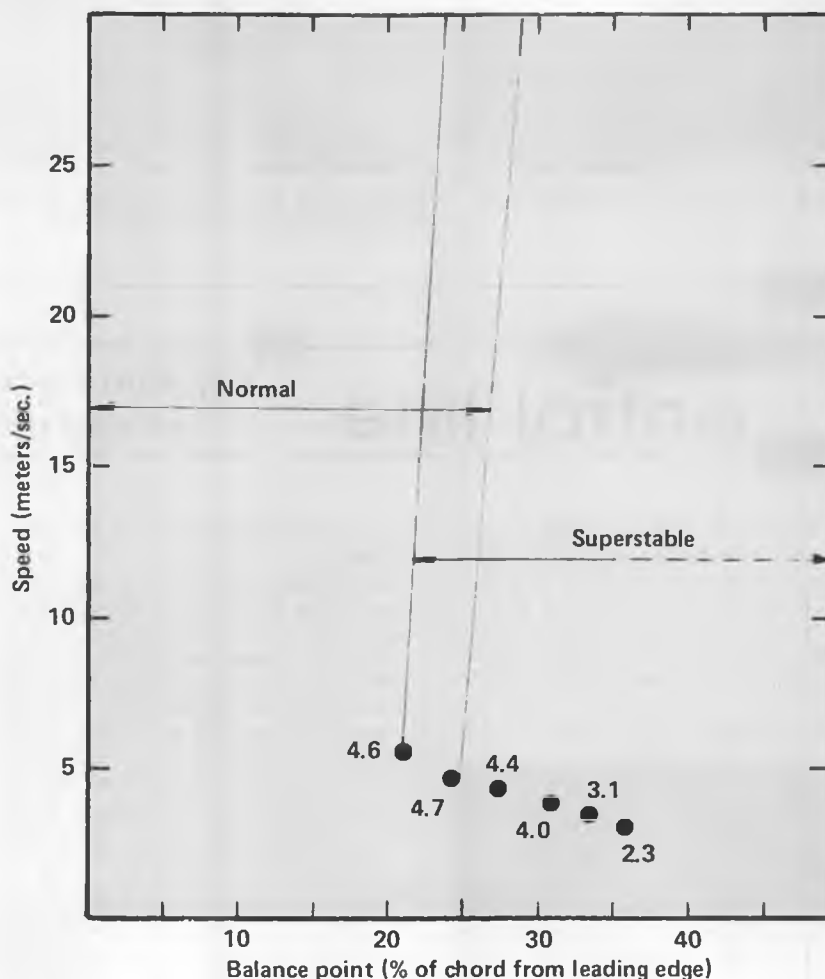


Fig. 4. Flight envelopes for the normal and superstable regimes of 7 gram 8 x 3 x 1/16 inch ballasted planes. Bottom and top of each line are known from flight measurements, as is the fact that the lines slope, but the lines are probably not straight as drawn. The aft balance limit for superstable flight is not sharp. Spots show the measured gliding speed at various balance positions. Next to each spot is glide ratio, horizontal distance travelled per unit of height lost.

around 37%, they got large enough to make the model stall and dive. Presumably as a result of the stalling, wing-dropping set in, and the model sometimes descended in a falling-leaf motion.

Using a different 7 gm model (Fig. 3), I measured the gliding speed over the whole stable range of balance positions. The model had an 8 x 3 x 1/16 inch wing with sharpened leading and trailing edges. The wing could be slid forward and backward so as to shift the balance without altering the model's weight. At each balance position the model was flown both ways up, and the results

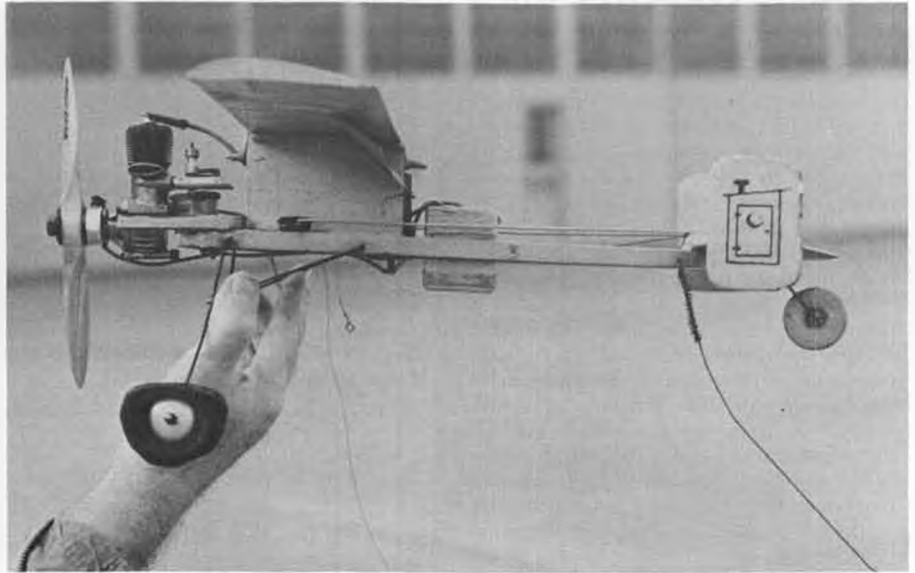
averaged. Knowing the speed, the weight and wing area, I calculated the lift coefficient. It rose fairly smoothly from .264 with the balance at its forward stability limit of 21.4% to .855 at the aft limit of 36%. The balance locations are fairly precise, the lift coefficients less certain. Lift coefficient is lift per unit area divided by the product of half the air density and the speed squared. It rises with angle of attack, which is not easily measured in free-flight models.

Static stability in ballasted planes does

Continued on page 92



NASA's Bob Champine with his 1945 carrier model.



Profile view of Champine's beautifully streamlined carrier model, showing hook and split flaps. Rugged for back-hand or left-hand flying.

# Control line

By "DIRTY DAN" RUTHERFORD  
PHOTOS BY CHARLIE JOHNSON

• You may recall an issue of **MB**, I suppose it was just about a year ago, when there was no CL column. Some thought that wcn had finally gotten rid of me, others figured I had given up pounding the typer, and most just didn't know what happened. Rumor is a few didn't notice or care that there was no CL column that month, but we just can't be



Look at all that advertising space on helmet and vest! Appears that fliers are testing a new knot.

too concerned with the more radical among us.

What really happened was that I did a heavy-hitter bit on a few personal experiences with Quarter Scale R/C models. Or, more accurately, experiences with modelers flying the huge things. Unca' Bill knows how I hate to have stuff edited out of my text, and in fact he very rarely does so, a situation that I thank him for. So when the mentioned article hit his desk, he sent it back, complete with (semi) nasty note. And that is why there was no CL column that month.

Now I was really hacked at the time, as I liked the piece, wouldn't have sent it in if it was bad. But as some time passed and I read it through a couple more times, I must admit that wcn was right; it was something that really didn't need to be published.

Still, there are some things about the big models that I don't care for, so this column will at least start out in that direction and this won't be so off-the-wall as the trash-canned article, not because I am concerned about its getting dumped, but because I have given the whole situation a lot more thought and have something worthwhile to say.

Quarter Scale. What do you think of when the term is tossed about? I first think of what it was originally envisioned being, as outlined in the pages of **MB** several years ago. You may have forgotten, but as I recall, it was all about very lightly loaded, large models drifting around the sky. (Correct, except I called it "Mammoth Scale" because quarter

scale did, and still does imply a lock-in to one scale size, which is not truly indicative of the whole concept. wcn) Sunlight through the silk covering and all that. Kind of a combination of FF Scale, R/C Old-Timers and good old nostalgia. Models that would be overpowered with a honkin' 60, indeed could be flown on a 40 at half throttle or less. This new wave of R/C models actually turned my crank a little, as I truly enjoy rubber-power scale models and the visual effect they give when floating around overhead. Equally enjoyable to watch and fly are the R/C Old Timer models, toss the old FF outlines, substitute something scale, keep it very light, use a well-muffled torquer of a motor swinging a big prop and what a kick it would be to fly on summer evenings. And the second of my thoughts about Q.S. is that it went in a completely different direction . . . a direction that has had a huge impact on modeling and that is far from having run its course.

For those getting ahead of me, you are now prepared for an examination of the safety of Q.S. models, aren't you? Well, that is where we are going, but not via the usual route where the physics experts talk about all the stuff they talk about and that seem to confuse. So just hang on while I draw a fresh cup and make ready to start anew. . .

Quarter Scale, as currently practiced, bothers me a lot for a couple of reasons. The competition within Q.S. ranks is not a structured, what-did-you-score type of thing. There are no rules to go by. We members of the AMA all pay the same





Joe McKinzie and Howard Rush have at it, just before Howard went in.



Tom Fluker just a little happy after winning one of Team spots, being congratulated by Bill Lee.

for insurance, whether we fly rubber-power, CL Combat or roll-your-own R/C Monster Scale. The press coverage of Q.S., with MB's own John Elliot being the exception, is almost universally praising Q.S. while ignoring the accidents that have happened, in fact there seems to be an unspoken code in force where accidents at the big meets simply do not get any mention at all.

The competition thing first. Yes, I know that the Q.S. guys are all crowing about how there is no competition in their meets, just a "fly-in" type of atmosphere, but this is just so much bunk. They are dealing in one of the most demanding forms of competition, the whatever-you-can-do, I-can-do-better sort. There are no score sheets to judge one's performance by, as in most other forms of modeling competition. This inevitably leads to show-biz and razzle-dazzle to get those, uh, let's call them "Atta-Boy" points. In some cases this leads to more scale stuff, in others to better finishes, all with an eye toward more A-B points at the next "non-competitive" Q.S. meet. But what really catches the eye is BIGNESS. Sure, Roy, you can stick machine guns all over that sucker, install all the rivets by hand and put in a super cockpit, but what you really need to wow 'em with next year is a bigger model.

Look at what the modeling press covers if you don't believe me. Build something big enough and you too can have your picture in all of the mags. Don't worry about whether or not it will fly, whether you can build it so it is safe, can even fly the thing if it does indeed come out flyable or any other trivia. Just make it bigger and with more power. Who knows how many A-B points a simple pic in a mag is worth, but it has to be a lot.

Rules, or the lack of them. I know the AMA has some guide lines on Q.S. models, for instance the upper weight limit is supposed to be 40 pounds, but it is obvious that this item is being ignored, so I assume that the AMA isn't even close to having a handle on the situation. Let's agree that there are no rules at all. This is another bad situation, as there

simply are no upper limits on what you can and cannot do with a Q.S. model. I suppose that many applaud that fact, as a competition-oriented modeler who has worked to a set of rules in every event tried, I say that some rules are necessary and long overdue.

Let's look at it from a familiar point of view. You've decided to fly Rat, a relatively unlimited racing event. One of the first things you have to do is read and reread several times the AMA rules on that event. After doing so, you will know that your engine cannot be any larger than a 40, the model cannot weigh more than 4 pounds, that multi-strand flying lines are not permitted, the spinner must not have a sharp point, that the model will be inspected for safety-related items prior to competition, it must pass a pull-test before each flight and that the pull-test is 32 times the weight of the model, which means that camel had better have a very strong and secure control system or you don't race. There are some other things you will learn, but the point is that through the AMA rules, lessons learned in the past are being passed on to you as a requirement that you either meet or don't participate. Also as a result of these rules, manufacturers offer accessories that will work and that are safe.

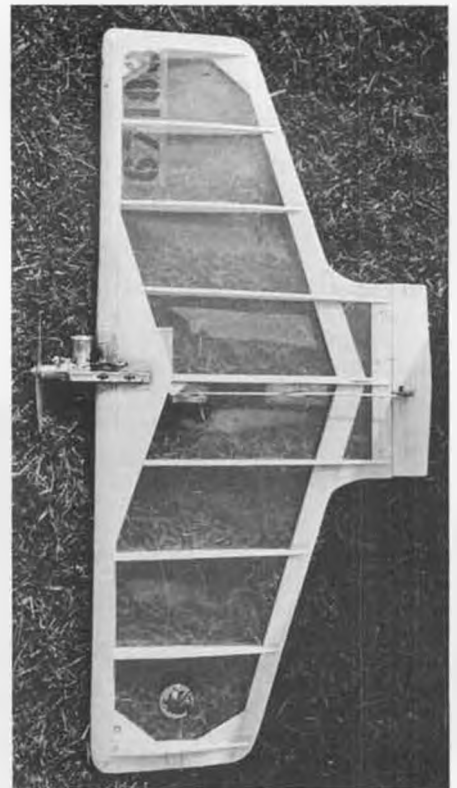
The same situation is true in other events, although the point is more effectively made with events where high speeds are common, such as in R/C Pylon, R/C Pattern, CL Speed, CL Combat, etc. Read the rules for these events and you have a very good idea of what is safe and what is not, pick up a kit or accessory item for these events and you can be pretty sure that it was designed to conform to AMA safety rules. Lessons learned in the past being passed on . . . I have to say that one more time because it is very important to safe competition flying.

Equally important is that safety inspection of the competition models. I must admit that the R/C Pylon guys seem to lead the way here, but I have also had my models checked out many times at various CL meets, both by the CDs and contestants alike. Can even recall several times where suspicious-looking models

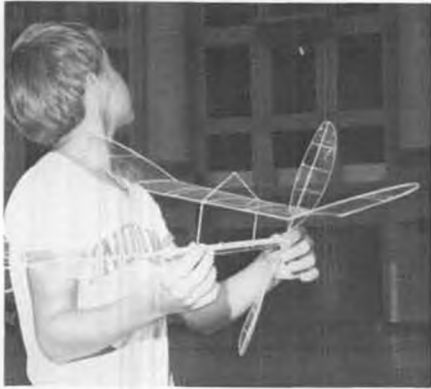
were very closely looked at, just because somebody noticed something that may have been out of order. Nothing like knowing you will be standing close to the flying circle to prompt a little self-preservation inspection of your own, whether on your own models or everybody else's too.

Insurance rates paid for coverage are the same for all of us, yet it is quite obvious that the risks involved in the various forms of flying vary tremendously. To be honest, I don't know how much each of us is paying for insurance, but it is getting to be pretty expensive to join the AMA each year, with a full

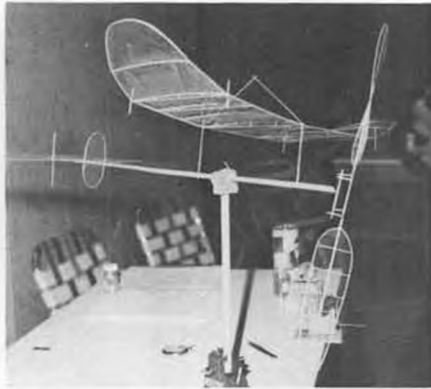
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Dave Wallick's Rusky model. Note adjustable metal motor mount, hard tank, 17 inch chord, 42 inch span, aluminum tube pushrod; lightest weighed 8 oz. minus engine.



Paul Loucha took Second in Junior AMA Stick, with a time of 14:51. Too busy to show face!



Variable pitch mechanism and tungsten wire wing bracing stubs on Jeff Annis' model can be seen in this photo.



The Jeff Annis FID model in flight. Note balconies of inside rooms overlooking flying area. A dramatic flying site.

# INDOOR CHAMPS

By JOSE TELLEZ . . . The National Free Flight Society and the National Indoor Model Airplane Society joined hands to produce the U.S. Indoor Championship, the Seventh National Record Trials, and the Third Peanut Grand Prix. One memorable full week of indoor at Northwood Institute's Atrium, West Baden, IN.

• Can you imagine one full week of indoor flying, sunup to sundown, or in the case of Peanut, a continuous 24-hour marathon contest? Can you visualize a flying site where you are supplied workbenches, living quarters, all meals, and beautiful, peaceful, green surroundings? Add a staff of competent contest directors and assistants, and the best group of indoor modellers from throughout the USA, and there you have WESTBADEN '82.

Two back-to-back contests were held; from June 14 through June 16, the competition was under the auspices of the NFFS, and from the 17th through the 19th, the NIMAS sponsored for the seventh consecutive year their record trials and Peanut Grand Prix.

Although contestants were allowed to test fly at the Atrium on Sunday the 13th, the official flying started Monday morning. For the NFFS, the officials consisted of NFFS President, Tony Italiano, NFFS Director, Hardy Brodersen, and two competent indoor experts, Gordon Wisniewski and Charlie Sotich. With a competent staff and ample timing help

from competitors and staff assistants, the event ran flawlessly throughout the three-day meet.

The first morning was reserved for the Manhattan and Bostonian categories. These two categories were originally conceived to encourage the beginners, but have long since become just two more specialties. The relatively high weight and cross section requirements in the Bostonian and Manhattan rules, encourage abundant creative expression among the designers. This creativity results in models which range from the realistic to the weird, from Bleriot to Star Wars. We saw pushers, tractors, canards, V-tails, floaters, and racers. Del Ogren, for instance, created the GB (Granville Bostonian), a boxy fuselage with a GB profile; we also saw a Canard Pusher built entirely out of styrofoam from food containers, with a fuselage that looked more like a droop-snoot drag racer than an airplane; this model was color coordinated in Big Mac orange and fried chicken white.

If you check the winners listing at the end of the article, you will notice that

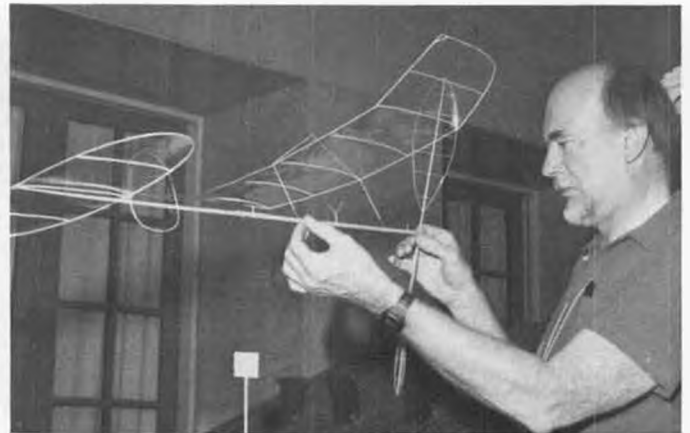
with one exception, the top winner's times are all quite close. I can tell you that the names belong to real expert fliers in the indoor circles, and their airplanes lean much more towards the clean and efficient than towards the "weird" and "cute".

Jack McGillivray, who drove from Ontario, Canada for the contest, was the one exception, posting a considerably higher score in Bostonian than the next highest scoring competitor. Jack actually cleaned house during the week, with multiple wins in Bostonian, AMA Scale, and Peanut.

During the afternoon of the opening day, the events scheduled were Easy B and Paper Stick. Again, these are events conceived to encourage the embryo indoor modeller, but alas, they also have become the domain of the seasoned specialist. The aircraft today are so delicately built that they are just as fragile as the "professional" microfilm jobs, and indeed in Easy B, three experts; Skrjanc, Chilton, and Van Gorder, walked away with top honors. In Paper Stick, we also witnessed the mastery of three well



Father and son, Don and Dave Lindley, Naperville, Ill. Both are indoor experts.



Cezar Banks, San Diego, hooks rubber on his FAI model. Weighs 1.07 grams. He'll represent U.S. in Yugoslavia this fall.



Ron Ganser, Pittsburgh, waits for thermal, to launch his AMA stick model.

known fliers taking the best placings, led by none other than ex-world champ Jim Richmond.

The next morning, June 15th, finally gave room for the amateurs to paddle around the Atrium with their creations in the Penny Plane and novice Penny Plane classes. These models are the "bulldozers" of the indoor world. The indoor pro's carefully store their Mike models away and some even take off for the golf course while the Penny Planes are up. A Penny Plane could easily re-kit an FAI microfilm job in a mid-air without



Richard Obarski, long time indoor man, with beautiful fourth place FAI stick model.

even slowing down! Yet, if you must ever be a beginner, Penny Plane is a great place to start, and one whole morning was allotted for these aircraft.

In spite of the statements I just made above, if you consult the winners list at the end of this report, you will find that the top places were awarded to well known indoor experts! And so it goes. . .

Finally, on the afternoon of the second competition day, we saw what we, or at least what I, came to see . . . the microfilm jobs. The real spirit of indoor flying is embodied in these delicate iridescent craft that float like ghosts in the indoor environment. The AMA stick models are the more dramatic because of their propellers taking over a second and a half to go once around. (Yes, you *Schneurle porters*, 45 RPM! wcn)

Three classes of microfilm-covered indoor models were flown simultaneously during the afternoon and evening periods: AMA indoor stick with a 300 square inch wing limit, FID with a span limit of 650 mm. and a weight over one gram, and the Cabin models which are limited to 150 square inches and follow the L2/100 cross-section rule.

Jim Richmond, who held the world championship title prior to current champ, Erv Rodemsky, flew one of his record models and, in an early flight, this reporter timed him for 32:54, which was high time for AMA stick at the Meet. The airplane is capable and has in the past made better flights, but there was no need to gamble destroying the ship in the ceiling structure attempting longer flights. Jim just calmly monitored the competition to ensure he wasn't passed up. At the end of the Meet, the next closest competitor ended up more than a full minute behind Richmond's time.

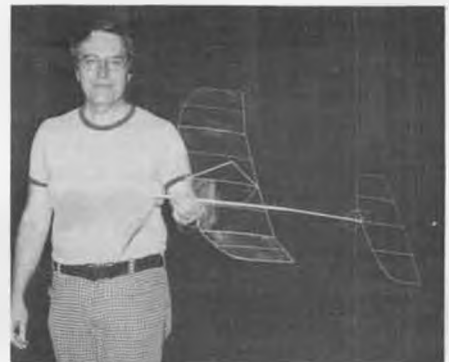
In FID the competition was really keen, and here we saw two members of the FAI indoor team, Cesar Banks and Jim Richmond, starting to tune up for the coming World Championships which is to be held in Yugoslavia and to be flown



The Gossamer man, Dr. Paul McCready, gives Hardy Brodersen a hand with his high technology speed model.

inside a salt mine. Although it was again Jim Richmond who posted the highest time for a single flight, the contest scoring required the sum of the two best flight times. This scoring gave Stan Chilton, from Wichita, Kansas, the top score. Stan is the scientific type of flier; nothing is left to chance, he measures everything and records everything and all this extra care payed off this time, allowing him to edge out our ex-world champ.

In the Cabin class, most of us expected



Jim Richmond took First in AMA Stick. Will be part of US Team going to the salt mines in Yugoslavia this fall for World Championships.



Contest Director/NFFS President Tony Italiano (left) weighs in Stan Chilton's stick model on the electronic scale.



The 'complete' indoor man's model box, constructed and displayed by Richard Doig, Michigan. Took first in Indoor Cabin.





Two bearded giants picking on tiny A.V. Roe 612 Autogiro sent in by Warren Shipp. Frank Scott holds while Don Lindley applies torque metered twist to rubber.



Walt Everson, Florida, had this beautifully built Waco SRE going almost to the ceiling.



Jack McGillivray, Canada and his twin engine Yugoslavian 45-T prone pilot research aircraft. Won outdoor contest with it on way to West Baden.

to see Ron Ganser, from Pittsburgh, maintain the lead with the model which he has so finely tuned and with which he had in the past established the World Record. Although Ron posted a commendable 18:25 flight, a tenacious modeller from Michigan, Richard Doig, finally succeeded in beating Ron with a superb 22:54 flight. Richard is a most friendly soul, a prolific builder, and a very active flier; he has travelled from Michigan to Santa Ana, California, to Akron, Ohio, and to Westbaden, in pursuit of those top places, and fully deserved this first place.

The morning of the third day was reserved for the Hand Launched Glider folks. Unfortunately, in spite of the great facilities, the number of participants was most limited. The three usual top con-

tenders were present, of course, in the persons of Stan Stoy, Bernie Boehm, and Bob Larsh. Stan had trouble getting his "high technology" folders set up and damaged them in the adjustment launches. This essentially left the game up to Larsh and Boehm. It appeared that in the end, this competition would be settled by whoever had more oats in the throwing arm.

Bernie Boehm eventually topped out Larsh by a few seconds. As proof that the contest was won in the launch, Boehm was asked to throw Larsh's losing Glider. Three times in a row, Boehm was able to exceed Larsh's best time with the losing Glider!

Wednesday afternoon was reserved for AMA and Peanut Scale, as well as for

the racing events. Both at this NFFS contest and the Peanut Grand Prix which was held three days later, the quality and quantity of aircraft were a sight to behold. Whereas the Microfilm Models were the main course of this modeling banquet, the Scale jobs were certainly the dessert to be enjoyed. Since most of the aircraft and fliers participated in both contests, I will make my comments on these classes when I cover the NIMAS events.

The racing events were great fun and a challenge. The course is marked by two helium-filled balloons, positioned a set distance apart, which serve as pylons

*Continued on page 95*



Near Cranwell CLA-3 by Bob Clemens, of Rochester, N.Y.



Bucker BU-131, Swiss ambulance plane, sent from Switzerland by Alfred Gunther. Two pilots and zippered inspection panels.



Vito Garafalo, Chicago, built this attractive and nice flying "Rubber Duck" Bostonian. Note well instrumented interior.



Double-threat Peanut "Miss Foo" Folkerts racer won both Peanut and Unlimited Speed events. Flew amazingly well.



Addie Mae Naccarato and two mini Comet Clipper Mark II's. She's built and flown everything from indoor to R/C giants.



Addie's current project for QSAA meet in fall; (Sig?) J-3 Cub for electric power. Son Tony checks it over.

# INDOOR

By KEN JOHNSON

## PROFILE #3. THE ADDIE NACCARATO STORY.

Imagine the surprise to the out-of-town stranger who wanders into the T&A Hobby Lobby store in Burbank, Ca. His mission while on a business trip, is to check out the local supply of indoor goodies. As he approaches the counter he is somewhat let down to see a lady proprietor ready to serve him. He thinks to himself, "I'm gonna have a hassle here, explaining what I need and trying to find out what indoor stock is available.

"Do you stock Micro Lite, and teflon bearings?"

"Sure do! We have clear and Silver Micro Lite and do you need flying scale bearings or the smaller duration ones?"

The lady in this very busy model shop is without question one of the most versatile, prolific model builders this hobby has ever produced. Meet Addie

Mae Naccarato, model designer, hobby shop owner, teacher of many, and a competitor.

Addie started building kites, with her big brother, at age four, in Louisiana. After the family moved to California, she then built her first stick and tissue model, a Rearwin Speedster, at age 12.

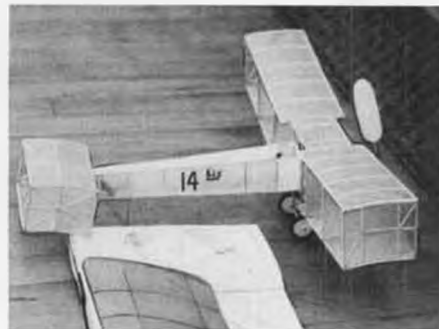
Today Addie Mae looks back on 43 years of building, designing and flying all types of model airplanes. When you ask her a question about a certain type of model, she not only knows about it, she's flown it.

In 1945, she began building indoor models. "In those days we made our own microfilm", she said. That first year she built about 40 mike jobs. The kids weren't allowed to take a bath in that freshly scrubbed bathtub till after she had poured the microfilm sheets.

Addie's husband of many years, Tony Naccarato, Sr., was a modeler par excellence. Together they built many models,

including gas and rubber powered autogiros, and control line speed. Mr. Naccarato was a visionary who designed and built over 70 ornithopters. In 1926, he scratch built his own model gas engine and even built the spark plug. At age 15, son Tony won the carrier control line event at the Nationals. A daughter Suzie, also flew control line.

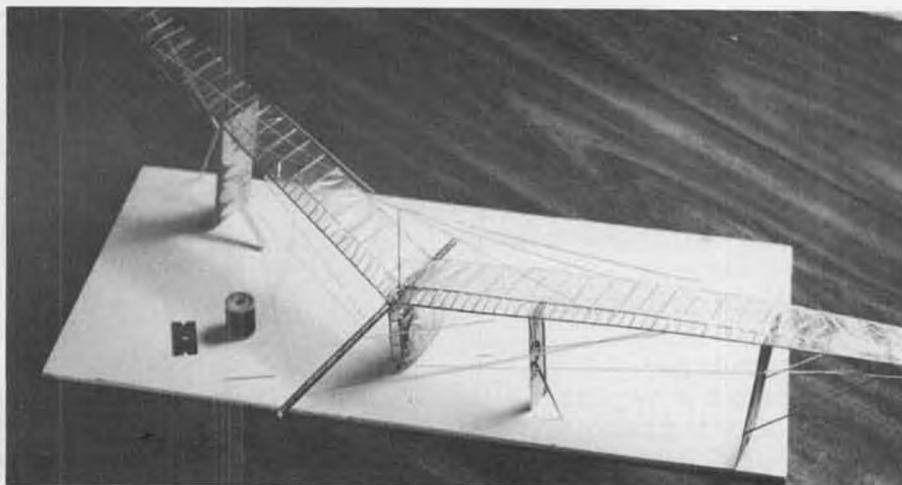
After several years of manufacturing hobby accessories, the Naccarato family opened a hobby shop in 1953. They soon began teaching youngsters the art of building and flying models. Several months ago, Addie and son, Tony, got



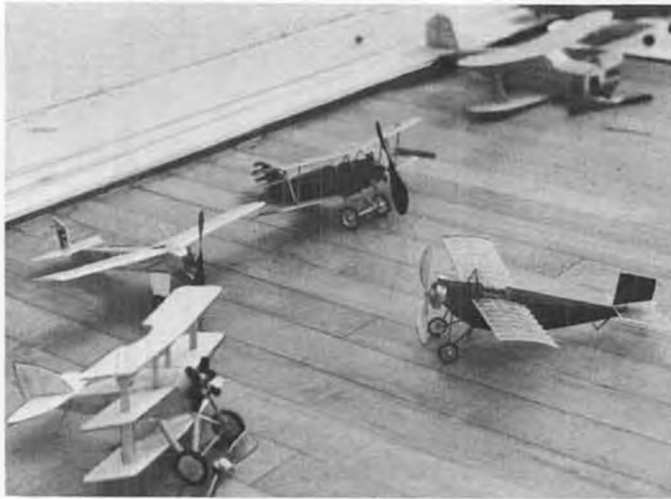
Gabe Mora's indoor scale Santos Dumont. Gabe is one of Bill Warner's modeling students at Paul Revere school.



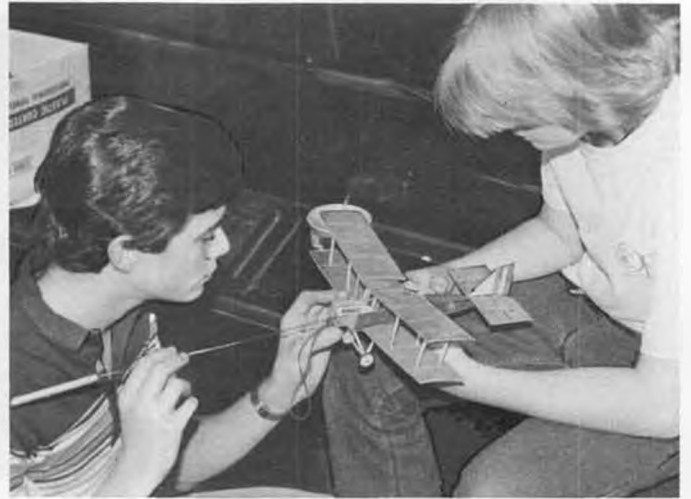
Addie Mae launches Japanese indoor kit model in her T&A Hobby store, Burbank, CA.



Johnson's Gossamer Albatross Peanut built to 9-inch fuselage rule. Set up in jig to install bracing without distorting shape of fragile wings.



Eight-inch span Grapenut entries at recent California meet. Vaughn Whitlock's silver MicroLite covered Farman was winner.



Two young modelers load rubber motor into peanut DH-6 at Burbank High School gym. DH is Mooney design published in MB.

their young proteges on a TV filming of a new kids show titled, "We're Moving." Once a month for the last 10 years the Naccaratos have held an indoor contest at Burbank High gym for juniors and adult modelers. They also conduct classes for R/C and Control Line flyers.

Recently, Addie built a huge 77 inch Farman monoplane electric indoor R/C model in one week. I remember entering the shop one afternoon to find Tony drawing the Farman wings on one counter top while Addie was building the fuselage on the other. This super light (23 oz. ready to fly) model flew for 4-1/2 min. indoors at the Pasadena Con-

vention Center, during the IMS Trade Show.

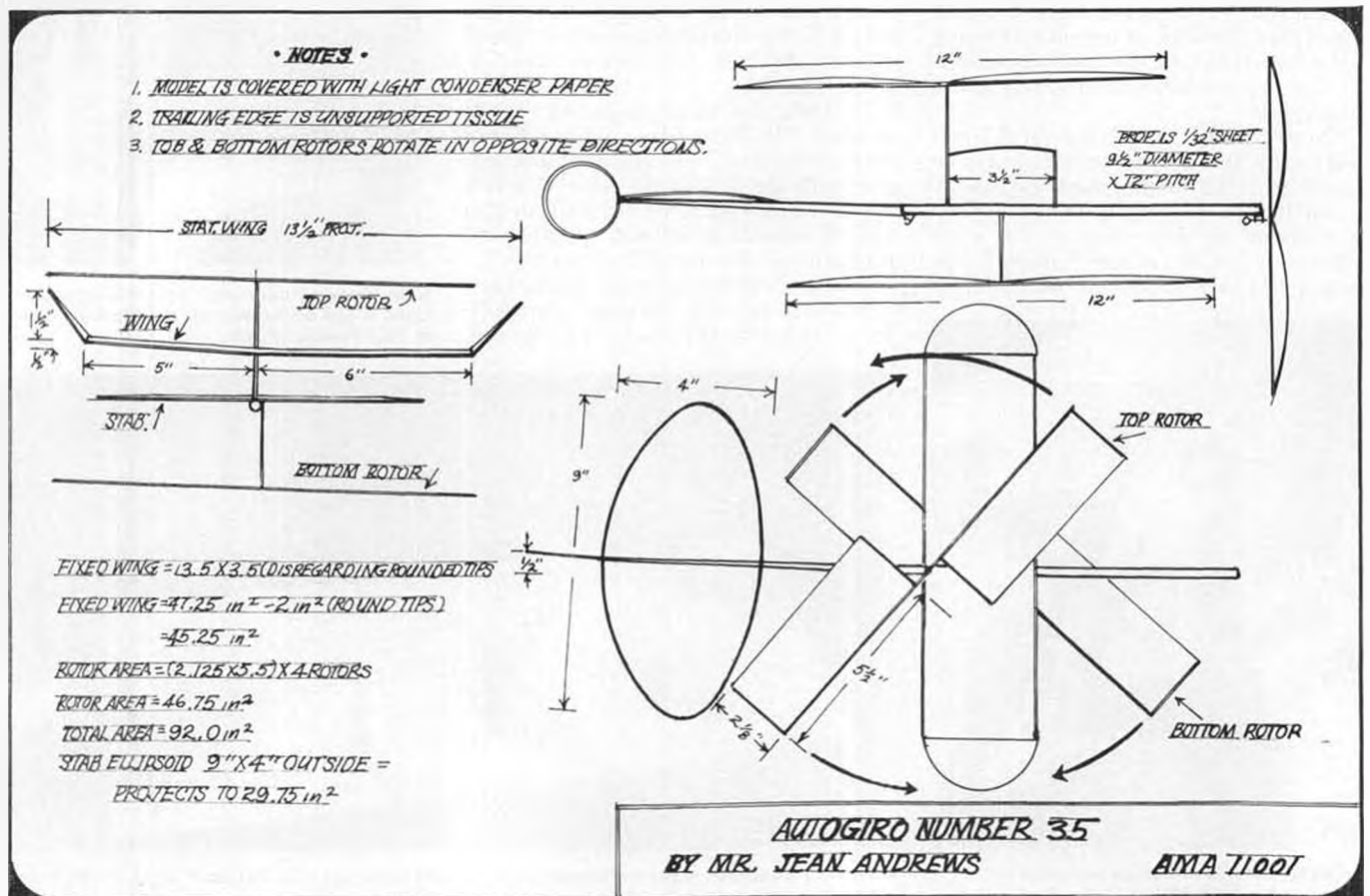
Bringing home hardware from each of the six Nationals she flew in from Chicago to Los Angeles, Addie Mae states that she has no favorite area of modeling, but she does win consistently at the Northrop Flying Wing meet. A frequent sight at big Taft meets is Tony and his mom riding back from a chase on their motorcycle with Addie holding aloft a huge freeflight gas airplane.

Today, Addie was busy sanding a stab on a 1/4-scale electric R/C Cub over on that counter top. This one's for a big meet in Las Vegas in October. "I con-

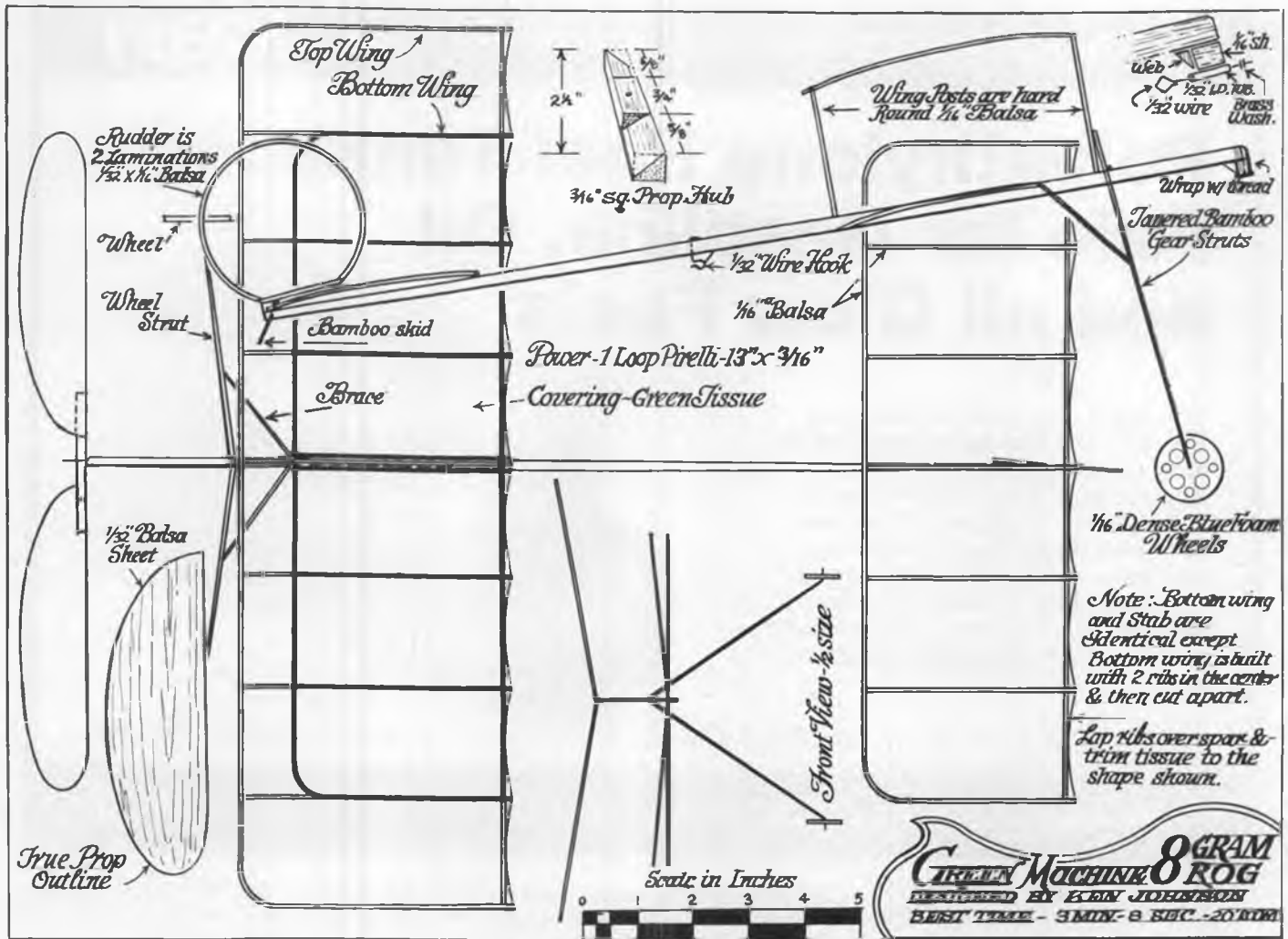
sider myself mainly a sport flyer," says Mrs. Naccarato, as she works away on the Cub. However, don't be surprised if you get beaten in a contest one day by this "One in a Million" modeler from Burbank, Ca. She's been doing it for a lot of years. And imagine how many novice modelers she has helped along the way during all that time.

#### INDOOR CONTEST BOARD

Mr. Bud Tenny, the man most responsible for interest in indoor modeling throughout the world, has been chosen to be the chairman of the newly formed INDOOR CONTEST BOARD. I doubt if there is an active indoor modeler any-







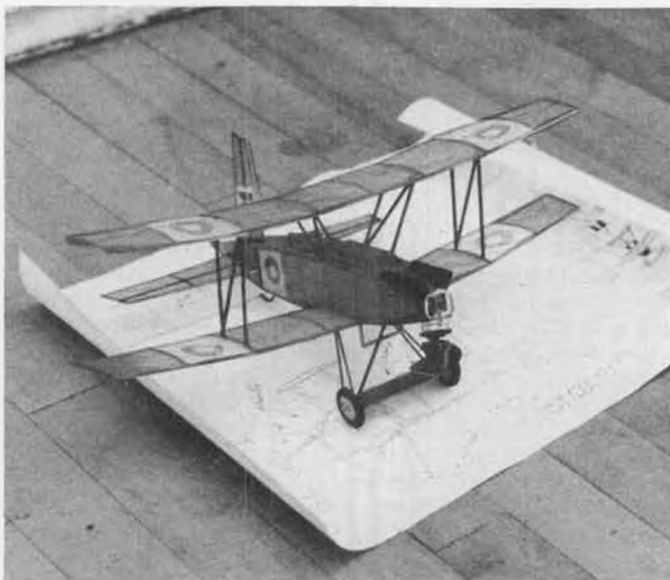
where in the world who doesn't know the name Bud Tenny.

For many years now, Bud has given of himself to build up the interest in indoor. Along with the efforts of his family, Mr. Tenny has sacrificed his own building and flying time to write, pub-

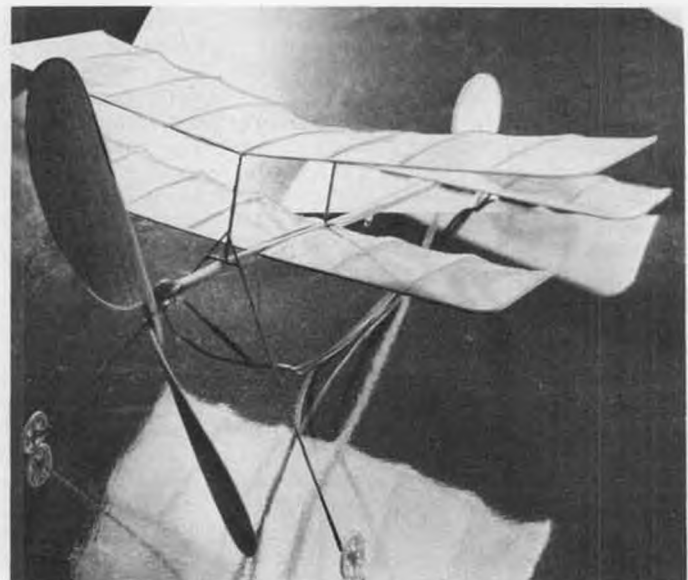
lish, and distribute his monthly paper, *INDOOR NEWS AND VIEWS*. Certainly, there could be no other choice for this post than "Mr. Indoor", Bug Tenny. Incidentally, if you are not a member of the National Indoor Model Airplane Society and receiving the monthly news-

letter, you can join by sending your name and a check for \$5 to Bud Tenny, Box 545, Richardson, Texas 75080. Believe me, the money will be well spent.

Here is the list of contest board members. Note the one for your area of the country and let him know about you and



Casper biplane at Paul Revere indoor annual, built and flown by Dick Baxter, Costa Mesa, CA. A majestic floater!



Green Machine ROG model built from above plans. Extra large prop and landing gear very evident in this photo.

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Dist. XI — Dave Hagen, 19957 S. Redland Rd., Oregon City, OR 97045. It is up to you to let your Indoor Contest Board know how you feel about various indoor proposals. Make your presence and preferences known. Why not write your representative today. All it costs is 20¢ and a few minutes of your time.

One question this columnist has for the above mentioned group is determining who settles matters pertaining to Indoor Scale and Peanut Scale. Is it the Scale Contest Board or the Indoor Contest Board?

Recently, I built a Peanut model of the

Gossamer Albatross pedal-powered aircraft for our local indoor annual. A photo of the plane appears in this month's column. The Albatross was built to the 9 inch fuselage peanut rule. The wingspan is about 33 inches. The Gossamer model flew quite well in our Paul Revere school gym, and did one minute easily without touching the ceiling of about 18 to 20 feet. It flew in circles of no more than 20 feet in diameter. Doubtless, a one-inch scale size version of this craft would still fly in a room of this modest size. Can you imagine a 93 inch pedal powered Albatross flying in 30 foot circles in your local gym? A large florist box could be used to transport this monster. Maybe I'll try one, next. The fuselage length on this airplane would be approximately 22 inches. Many indoor scale models have lengths of 22 inches or more.

#### STRINGING A WING

The above mentioned model is braced with fisherman's fly-tying thread. The real aircraft was strung with thin wire. The fragile wings on this model would hardly support the weight of the thin plastic covering (Absolite-Mike Mulligan's Old Timer Model Supply) without the thread bracing. To hold the wings in the correct position for stringing, a support jig was used. Similar to a jig for mike wing stringing, this was made of a cardboard baseplate and balsa verticals. The fuselage was cemented to the baseplate and the wings attached to two vertical supports on each side. The wing-

tip washout was "braced in" before stringing. Starting at the kingpost, the thread was attached with Testor's cement at each contact point and continued on to the next. It took about four lengths of the thread to complete the task. After the stringing was complete, the points of attachment to the jig were cut free and the wing carefully lifted free of the jig.

I have tried bracing wings and stabs without using a jig. I believe that it is worth the trouble to use the jig.

As with the Albatross model, the entire jig can be rotated to place the model in position to reach the area you are working on at the time. A formica table top is a good work surface to place the bracing jig when doing this task.

#### BUILDING TIP

When covering with Micro Lite or Absolite polycarbonate film, much care must be exercised. Previously, this writer had used clear dope or rubber cement as the adhesive. On one occasion, white glue was tried with some success. Most recently, the frame structure was sprayed with Spray Mount adhesive (from the local art store). When using this material, spray both sides of the wing before covering the film over the first side. This spray stays sticky after it dries. If you spray the adhesive on the bottom side after the topside covering is in place, you will spray the underside of this covering. I tried this spray technique

*Continued on page 66*

# TOP FLITE

## The Props of Champs

Top Flite has the most complete line of props for free flight, control line, slow and fast combat, and speed R/C Pylon, Racing, Sport Flying, Sport Scale, Scale, and Pattern . . . ask for Super M Top Flite and Power Prop designs. Top Flite also has a complete line of Nylon Props.

Top Flite props won 54 1st-2nd and 3rd places at the 1979 Nationals . . . here are some of the 1st place winners. You too can be in the winner's circle. Use the Props of the Champs!

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 C/L Precision Scale Op. — Mike Gretz (Iowa) — 1st  
 C/L Precision Scale Jr. — Matt Bauer (Illinois) — 1st  
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 C/L B-Proto Speed Op. — Wisniewski Team (California) — 1st  
 C/L B-Proto Speed Jr. — Quay J. Barber (Ohio) — 1st  
 C/L FAI Speed Op. — Akeshi Kusumoto (Japan) — 1st  
 C/L FAI Combat Sr. — Tom Fluker (Texas) — 1st  
 C/L Slow Combat Op. — Marvin Denny (Kansas) — 1st  
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Diam.	Pitch
7"	5N, 5W, 6N, 6W
8½"	6½, 6¾, 7, 7¼, 7½, 8, 8½, 9
9"	7, 7½, 8, 8½, 9
9½"	8, 8½, 9

### SUPER-M POWER PROPS

Diam.	Pitch	Large	Diameter
5½"	3, 4	15"	6, 8, 10, 11
6"	3, 4	16"	4, 6, 10
7"	4, 4½, 5, 6	18"	6, 8, 10
8"	4, 5, 6	20"	6, 8, 10, 11
9"	4, 6, 7, 8	22"	8, 10, 11
10"	6, 7, 8		
11"	4, 6, 7, 7½, 7¾, 8		
12"	4, 5, 6, 8		

### SUPER-M TOP FLITE PROPS

Diam.	Pitch
6"	3, 4, 5
7"	3, 4, 6
8"	4, 5, 6, 8
9"	4, 5, 6, 7, 8
10"	4, 5, 6, 8
11"	4, 5, 6, 7, 7¾, 8, 8¼
12"	4, 5, 6, 8
13"	5, 6
14"	4, 6

### NYLON PROPS

Diam.	Pitch
5½"	3, 4
6"	3, 4
7"	4, 6
8"	4, 6
9"	4, 6
10"	3½, 6
11"	4, 6, 7, 8

### SPEED PROPS

Diam.	Pitch
6"	7, 7½, 8
7"	7½, 8, 9½
8"	7½, 8, 8½, 9
9"	7, 12½, 13
10"	8, 8½, 9

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BALSA RIB CONSTRUCTION WING  
RUDDER CONTROL WITH UP TO 3 CHANNEL  
Designed by CLAUDE McCULLOUGH



ACCESSORY KIT AK-246 - \$11.75

ENGINES: .15 - .25 Cu In.  
WING SPAN: 48 In.

**\$39.95**

### KADET MARK I

**SIG**  
KIT RC-51

BALSA RIB CONSTRUCTION WING  
RUDDER CONTROL WITH UP TO 3 CHANNEL



**\$49.95**

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ACCESSORY KIT AK-231 - \$12.95  
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ENGINES: .19 - .40 WING SPAN: 57 In.

### KADET MARK II

ACCESSORY KIT AK-249 - 12.95

AILERON CONTROL WITH 4 CHANNEL  
Designed by CLAUDE McCULLOUGH



BALSA RIB CONSTRUCTION WING

WING SPAN: 57-1/4 In.  
ENGINES: .25 to .40 Cu In.

**SIG**  
KIT RC-49

**\$54.95**

Modelers often want to start in RC with a good-looking pattern or scale model that is complicated to build, has a high wing loading and flies fast. This is a mistake and never works out. First attempts with radio control should be with an inherently stable design having a flat-bottomed airfoil that gives the student time to think and develop automatic reactions. The Kadets, which will fly hands off, are ideal for this purpose. Many club instructors and hobby dealers have told us that two or three check-out flights on a Kadet are sufficient to allow a student to practice fly and learn without constant attention from an instructor. And we know of modelers in isolated areas, with no one to help them, who have taught themselves to fly with the Kadet.

The Kadet series of trainers are available in several versions to meet a variety of requirements. Intended for up to 3 channel radios and rudder control, the Mark I has been successfully soloed by many thousands of novice RC'ers. If you have 4 channel equipment, get the Mark II, newest development in the line, which has ailerons and can also be flown with rudder if desired. The Kadet Junior, using up to 3 channels, fills the need for a compact, economical trainer with a smaller displacement engine.

## STEP 2 - INTERMEDIATE: PROGRESS TO FASTER SHOULDER WING DESIGNS

BALSA RIB CONSTRUCTION WING FEATURING BUILT-IN WASHOUT



**SIG**  
KIT RC-39

WING SPAN: 55-1/2"  
ENGINE: .35 - .40

Designed by CLAUDE McCULLOUGH

### KAVALIER \$59.95

When the student pilot feels secure flying the Kadet and can handle it capably, he is ready to take the next step. The Kavalier has a special wing design, calculated to make this transition easier, with washout incorporated to help prevent tip stall.

LARGER SIZED MODEL - FOAM CORE WING WITH BUILT-IN WASHOUT



ENGINES: .40 - .50 Cu. In.  
WING SPAN: 62 In.

Designed by CLAUDE McCULLOUGH

**SIG**  
KIT RC-32

**\$59.95**

### MARK II KOMANDER

Designed for novice RC'ers who want to move up from simpler models or prefer to start with an aileron controlled airplane. The built-in stability, coupled with good maneuvering and aerobatic ability, allows rank amateurs and low-time fliers to do a creditable job.

## STEP 3 - ADVANCED AEROBATICS

FOAM CORE WING WITH WASHOUT



**SIG**  
KIT RC-35

**\$59.95**

Designed by CLAUDE McCULLOUGH

### KOUGAR

ENGINE: .40 - .50  
WING SPAN: 51 In.

After some flying time on the Kadet, Kavalier and Komander, the student pilot will be ready for this sleek stunter. The large area for its 51" span keeps wing loading low and washout in the tips helps flying characteristics. The choice of the AMA air show teams!

## STEP 4 - EXPERT COMPETITION

FOAM CORE WING

Designed by MAXEY HESTER



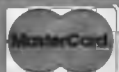
**SIG**  
KIT RC-29

Balsa Skin \$69.95  
Plywood Skin \$72.50

ENGINES: .45 - .60 Cu. In.  
WING SPAN: 67 In.

### KOMET

In the Komet, Maxey Hester has created a pattern ship that meets the requirements of competition flying, yet is equally at home at a Sunday afternoon sport flying session. As in the Kougaur, construction is speeded and looks improved by a formed plastic top.



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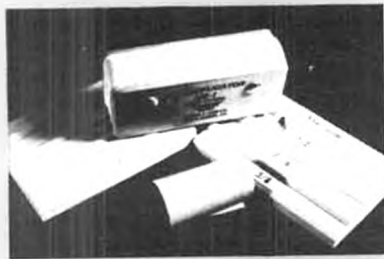
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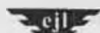
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first on a 47 inch outdoor rubber model of the Solar Challenger. The positive feature of this technique is that the covering film can be lifted off the model structure and repositioned until the skin is tight and smooth. The Gossamer Albatross peanut was covered in this fashion with success. The spray glue should not be put on too heavy. Two light spray passes back and forth should be enough. After the covering is in place on the model, the excess must be trimmed away. A new sharp razor blade will work, but not very well. Try the trick some microfilmmers use to cut away excess film. Set a household utility candle in a jar lid and light the candle. Cut a 4 inch length of .020 music wire and embed one end in a 3 inch piece of 3/16 sq. scrap balsa. Hold the wire end of the stick in the flame until it glows red and run the hot wire along the outside of the wing structure. Don't go more than about 4 to 5 inches per wire heating. The remaining edge of the film may be doped to the wood frame.

### XEROXING OF TISSUE

A difficult trim design, such as the WACO logo name, is easy to put on your scale model covering. The design may already be printed on the plan from which you built the model. A piece of white Japanese tissue or even undyed condenser paper may be scotch taped to a sheet of unused xerox paper. Then put the plan face down on the reproducing machine and run the sheet of taped paper through. Chances are it will reproduce your design right on the tissue. Use Magic Mending Tape and not the shiny tape. Cut the sheet of model tissue away from the xerox paper and Spray Mount it to the surface of your plane. Much better than trying to draw the design right onto the surface of the model.

### EIGHT GRAM ROG DURATION MODEL

Several months ago, our Flightmasters West Club had an event for ROG stick models at the regular monthly outing. Bill Warner dreamed this one up. The only rules were that the model rise off the ground on at least 2 wheels and not have more than a 16 inch span. Oh Yes!, the other stipulation was that the airplane must weigh at least 8 grams, without the rubber motor. Ugh! That's the part I didn't like. To purposely have to build a heavy model goes against my grain. But build it I did. My philosophy on this project was to primarily build strength and lift into the ROG. So I planned my model to be a biplane. That way it would have less weight per square inch of lift. Because it was a biplane, a larger stab could be used. A solid motor stick helped add some of the needed weight. Of course, a sheet balsa prop was in order. And as large as possible. Purposely, I substituted heavier wire for the front and rear hooks. The wheel struts are unusual in that they are of tapered bamboo (barbeque skewers) with .020 axle wire wrapped with thread and glued at the wheel ends. The 1-1/16

inch wheels are cut from dense blue foam. Lightening holes were spun in with round sanding sticks.

A 13 inch Pirelli motor of 3/16 cross section was used for the first flights. It seemed to be the right size. The scale revealed that the model came out to exactly 8 grams. The hand launch flights looked good, but when the ROG was set on the floor for takeoff, it wouldn't. It taxied around in big circles and did a great job of frustrating me. When I would pick the model up and hand launch it, it would fly great. But no take-off. Finally Dick Baxter approached me and suggested that I lift the rear of the stab 1/8" and add weight to the nose to compensate. Add weight to an indoor model? NEVER! As a last resort I tried it. OHMAGOD! It worked! The ROG lifted off nicely and climbed to just under the ceiling. At touch down, the timer's watch read 3 min. 8 sec. As no other flights were near that time, I put the airplane away. It is difficult to push yourself to explore the real potential of a model if the other flyer's times are not near yours. I believe this 8 gram ROG will fly for over 4 minutes, by trying other props and rubber combinations.

This ROG event could be a next step after novice builders have run through the Delta Dart/AMA Racer models. An introduction to duration, before trying Easy B and Pennyplane. If you want to push the time on this biplane, use a hollow motor stick and cover it with condenser paper, or even Micro Lite. Would it do 8 minutes? Who can say? Maybe you can, if you build it with 1/20 sq., a built-up prop and Micro Lite. Are you game to try? (Come on, Ken, leave it alone, for the novices. You've got enough categories! wcn)

### NEW EASY B RECORD

Texan Walt Kulzer reports on a record trials at the Boy's Ranch Gym at Bedford, Texas. This Cat. I site has an arched ceiling 25 ft. high. Walt had earlier set an Easy B record of 11 min., 16.6 sec. Stan Chilton came down to Redford from Wichita, KS and went back home with a 13 min. 26 sec. Easy B record in his pocket. The date was May 15, 1982.

Your indoor editor has flown with Stan at West Baden and I can tell you he is a fierce competitor. His Easy B models are among the best, anywhere. Stan comes to fly. I remember the intense concentration on his face when he is readying his models. Nogawking around and wasting time. He gives 100% to the task at hand, which is putting up the best flights he is capable of doing. He's my kind of competitor.

Stan was seen using a telescoping aluminum steering pole to control his model in the linear drift of the building. The pole is made for painters to reach high ceilings with a kind of brush extension. It reaches a length of almost 30 feet, and can be purchased at certain painter's supply stores. Think I'll go looking for one tomorrow.

### NEW TWIST IN GIROS

Mr. Gene Andrews, of Los Angeles,



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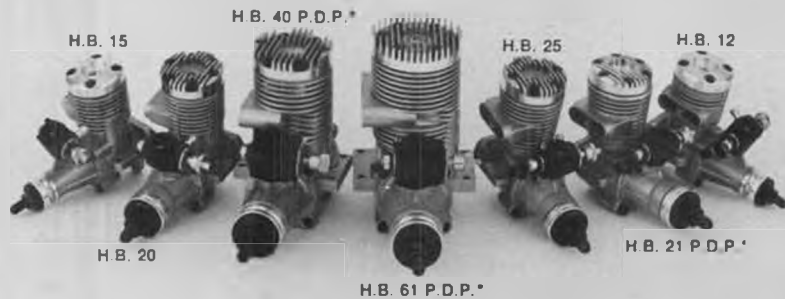
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came out to our recent Cat. I record trials with a new autogiro design. A sketch of Gene's model is featured in this column. The giro is unique for several reasons, the most obvious being that it has two rotors, and each has only two blades. One is positioned above the trailing edge of the wing, while the other is below the center of the wing. The rotors turn in opposite directions. Another new innovation is that the trailing edge of each rotor is unsupported, meaning that one edge has no wood to support the tissue covering. The rotors are built flat and the tissue billows up on the unsupported edge to give the angle of attack. The unusually long nose moment also attracted my attention. The model was somewhat heavy, being covered with condenser paper, and the rotors with Japanese tissue. Still, the model flew for over two minutes to get a new Cat. I giro record.

The autogiro records hold an interest for this writer, as all three indoor giro records were held by yours truly in the late 1960's. I was also going for the outdoor giro record about the same time. The outdoor model used was of coupe d'hiver size and was flying about 2-1/2 min. per flight. A confusing area in the rules book made me think that the record was a single flight total. In truth, it was a 3 flight total. I went home thinking the record was not broken, while all the time my model had been besting the mark on each third flight!

## NEW ACCESSORY PRODUCT

Steven L. Richardson is gearing up to build Peanut size Spandau twin-mounted machine guns for WW-I models. Steve sent me a sample of the guns and they look good. The units are light, and are currently available on special order only. In a month or so Steve plans to have a good stock on hand. He will later introduce Lewis guns, including the slide mount and Vickers guns. Interested modelers may write to Steve at 951 Leslie Rd. #6, El Cajon, CA 92020 for prices and availability.

Several requests for plans on AIR XX oldtimer indoor designs have come in and may warrant doing another plan in the next column. Send photos, comments and requests to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. ●

Counter . . . . . Continued from page 7

Racecar Court, Lorimor, IA 50149, or call (515) 763-2220 for more information.

★ ★ ★

Roush Manufacturing, well known for its quality conversion of Kioritz engines for the giant scale marketplace, has recently introduced the 'Marine Kioritz.' This 2.4 c.i. marine engine is the counterpart to the Kioritz aircraft engine. All of the outstanding characteristics of the Kioritz engine series carry through into this latest addition to the line. At 3.2 horsepower, this engine will move an

Offshore Enterprises 67-inch Deep Vee at speeds up to 40 M.P.H., and will run for an hour on 16 oz. of gas/oil mix. The Marine Kioritz comes complete with water-cooled head, recoil starter and drive shaft adapter. Priced to sell direct at \$189.95. It's available from Roush Manufacturing, P.O. Box 251, Sandyville, OH 44671.

★ ★ ★

McDaniel R/C, the Ni-Starter people, has been busy expanding its line of glow engine ignition systems. Four systems are available for aircraft and cars, plus the BO-Starter with "Power Wrench" for starting high performance, high compression boat engines. Each Ni-Starter is available with either a 110V, 220V, or 12V fast charger for the same price, the 220V charger being designed for the European market. An adapter that attaches to the glow plug and allows for a remote connector to do away with unsightly holes in the cowling is now available.

A new lighting system will soon be available, complete with nav-lights, a xenon strobe, and landing lights. To be available as a complete kit, assembled, or as individual components. For more information, send a SASE to McDaniel R/C, 13506 Glendundee Dr., Herndon, VA 22071. See your dealer or call (703) 435-5805.

★ ★ ★

Short on building time, but you would like to have a well-built Old Timer to go fly, with or without R/C assist? Then the Kloud King could be just what the doctor ordered! Beehive R/C Model Aircraft Co. is producing the Kloud King fully framed up of quality balsa, spruce, and ply. It is also available covered in Super MonoKote in transparent blue/yellow. The span of this replica is 72 inches and a .29 to .40 engines is recommended.

The price is \$139.95 framed up, and \$239.90 covered with Super MonoKote. Add \$8.00 for shipping/handling, Utah residents add 5% sales tax. For more information, send a SASE to; Beehive R/C Model Aircraft Co., Box 744, Layton, UT 84041. Dealer inquiries are invited, too.

★ ★ ★

Model Products Corporation, the people who gave us the "Head Lock Mk III" has now developed and made available the "Head Lock Remote," in single and two-cylinder models. This latest glow plug connector now makes it easy and safe to start those inverted engines, helicopters, boats, cars, and engines installed in oversize 1/4-scale cowls. Consisting of a miniature Head Lock connector, 8 inches of teflon insulated wire, and a steel jack mounting bracket for convenient remote placement of the jack, it is compatible with all existing Head Lock connectors. Suggested retail price of the Head Lock Remote single cylinder model is \$7.95 and \$11.95 for the two-cylinder model. Model Products Corporation, P.O. Box 314, Pompton Plains, NJ 07444.

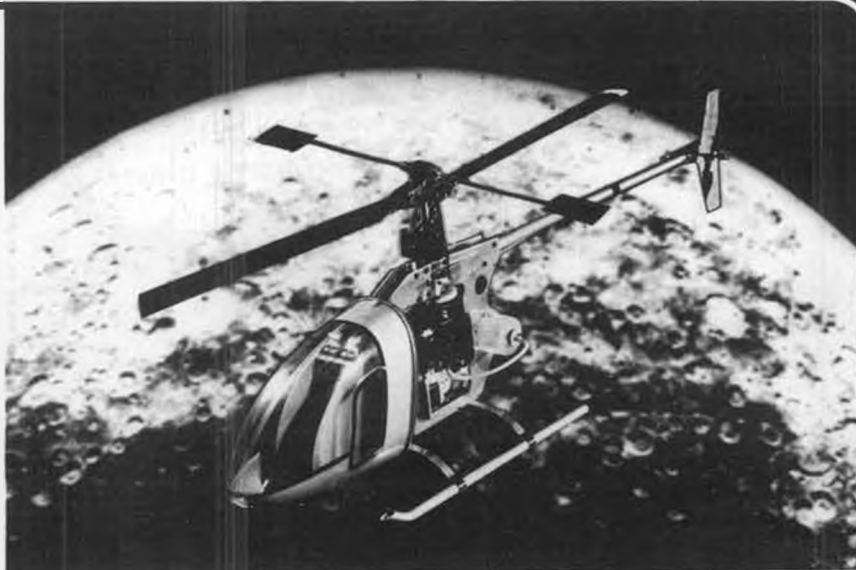
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#### Fuel Lines . . . Continued from page 14

steel. Designs such as this are common in two-cycle engines used in sporting motorcycles and other modest performance machines.

Although reed valve intakes have the advantages of simplicity, low cost construction, and an added feature of being a one-way check valve in the system, their disadvantages preclude their use in high performance full-throttle-operation engines. The major drawback is that they physically impede the flow of

fuel/air mixture. This in turn limits brake horsepower compared to what is attainable with the other commonly used intake . . . the rotary valve.

The three most common variations of the rotary valve intake are:

1. Front intake valve (through the center of the crankshaft).
2. Rear intake disc valve.
3. Rear intake drum valve.

They are shown in drawings 2 through 4 respectively. As you can readily see, they're more complex than reed valves. Let's discuss them in the order listed above.

Of the three, the front intake is the simplest. Since we must have the basic exterior configuration of the crankshaft, all that seems necessary is to bore out the center, cut an appropriate window, and add the carburetor and housing above the shaft. True, but the fuel/air mixture must turn-a-corner, and travel through the shaft . . . both somewhat disadvantageous. Further, extended intake periods require large windows in the shaft and/or front end of the crankcase. That makes them more susceptible to fracturing.

All of these disadvantages are eliminated in the disc, rear, rotary valve design. The fuel air mixture goes directly into the crankcase and neither the crankshaft nor front end have been weakened by porting windows. Unfortunately, this design requires that this accessory be added or hooked onto the

pin of the crankshaft. This disc must fit very close to the backplate, both must be resistant to heat warpage, and the disc must be carefully balanced. They're considerable obstacles, beside the fact that it requires a portion of engine power to drive this accessory system.

To overcome some of these problems, designers have used the drum, rear, rotary valve. This sort of eliminated the warpage and disc-to-backplate fit problems, but it re-added the turning-a-corner problem of the front intake rotary valve. It also retained the additional accessory horsepower loss.

Obviously, none of these three rotary valves are perfect in their present state of development. Nevertheless, they are all better than the reed valves for very high performance engines. Each of them has worked very well on some specific engines. All of them have not worked well on any one engine. As an engineer friend once cliched, "Designed an engine is a real can of worms."

Where do we go from here? Hopefully to even better engines. In the meantime, our present model engine technology isn't bad at all. At least not in my opinion. Until some new breakthrough occurs, here's trusting this has helped you better understand the present state-of-the-art of our engines.

Next month, let's visit the Rossi factory. ●



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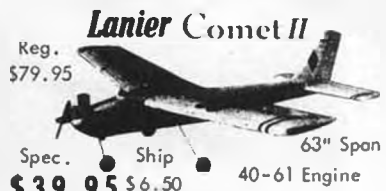
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Great Lakes . . . Continued from page 19

top center section. Make two of the WR3 ribs from 1/8 inch plywood and the rest of the ribs from 1/8 inch balsa. The tip blocks are made from 1/4-inch sheet balsa in three sections and glued together when fitted to wing tip.

### WINGS

The bottom wing is built in two halves over the plan, pretty much the way most trainer wings are built. Pin the front and rear spars down over the plan, blocking the rear spar up off plan with scrap 1/4-inch balsa at least six places. Next, glue all ribs onto spars, then add the leading edge of 3/8-inch square balsa and the trailing edge bottom sheet. Sand top of leading edge to contour of ribs and glue top leading edge sheeting on. Sand top edge of trailing edge sheet to slight bevel behind tips of ribs and glue top trailing edge sheet on with Jet glue. The top blocks W1, W2, and W3 should be fitted and glued on at this time, after which, you may bend the spars down on top and up from the bottom (notch

them into the 1/4-inch balsa top blocks slightly and epoxy). The spars may have to be sawed part way through several places to get them to bend smoothly and then glued and filled with Jet glue and balsa sawdust. Glue short pieces of sheeting on top from tip of the rib out to tip of wing. Make the tip ribs for the ailerons and use these to mark the other ribs in the ailerons so they may later be cut off at the same angle as the tip ribs. Cut the three ribs off in each aileron at back edge of rear spar and cut ribs off at front of aileron where they were previously marked. Add tip ribs and leading edge of 1/4-inch balsa sheet. Glue in 1/4-inch sheet balsa trailing edge section of wing ahead of ailerons. Add the rest of the wing sheeting top and bottom of wing and you are ready to build the other half of the wing.

Glue the two halves together with one inch of dihedral under each tip and reinforce the center section with six-ounce fiberglass cloth and K&B polyester resin.

The top wing is built in one piece over the plan. There is no rear spar, so I block

up the trailing edge of the ribs with a piece of 1/4 inch balsa from the top to the center section even with the front of the aileron and across center section under the back wing mount blocks.

The top wing is built about like the bottom. First, pin down the main spars, glue the ribs on, then the bottom trailing edge sheet and leading edge. Sand leading edge on top and trailing edge sheet on top behind rib tips. Glue the top sheet on the trailing edge, then the leading edge. Remove from board and add 1/8-inch x 1-inch ply strips and wing mount blocks in center section. Add 1/4-inch balsa sheet on trailing edge of center section and balsa blocks in center section. Put the wing tips on and finish sheeting the wing. Mark where the wing mount blocks are located and drill them later when mounting wing on cabane struts. Glue in the I-strut mounts on the inside of the third rib from tip on the top wing and on the outside of the second rib from the tip on the bottom wing.

### COVERING

I covered all three of my Great Lakes models with Super Coverite and finished with K&B Super Poxy paint. I would not recommend using any of the mylar covering materials on this model, as it needs the extra skin strength. However, if mylar covering is used, possibly the wings could be strengthened enough by adding 1/64-inch ply shear webbing on the front and back sides of the spars. Another alternative would be to add functional wing brace wires, but this makes the model very unhandy to take apart for transporting to the flying field.

All of my models have been flown through every type of maneuver I could think of, with no structural failures in any of them when powered with engines up to and including Quadras. I sold the last one I built to a fellow modeler in Kansas City. He installed a World Engines' Twin Tartan engine (2.68 cubic inch glow). It reportedly would do any maneuver in any direction until the stabilizer broke. The model wasn't designed with this much power intended, but might be able to stand it if brace wires were added to the tail.

I have molds of the cowl and wheel pants, and will sell them for \$22.95 for the cowl, and \$16.95 for the wheel pants, plus \$2.50 to cover UPS. I also have about two rolls of 35mm film of the original Kreir Great Lakes, taken in a small museum in Kansas, where the plane is on display. I will sell prints of these for \$1.00 per print. Please specify how many and what type pictures you would like. I have the usual front, sides, and rear shots, plus all details including cockpit and front of engine in closeup shots. I hope you have as good luck and as much fun flying your Great Lakes as I have had with mine.

My address: Larry Scott, R.R. #1 Box 86, Kirkman, IA 51447, phone: (712) 766-3367.

Choppers . . . Continued from page 20

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load capability and may be used later for an on-board camera. All up weight is almost 12 lbs. Special thanks to Dick for letting us in on his projects.

### **SO YOU'RE INTERESTED IN HELICOPTERS**

Beginners . . . Ah, let me take that back and put it in better form.

Novice pilots, or those seriously interested in getting into R/C helicopters should benefit from the next several issues. I'll try to answer as many questions as I can think of that will be pertinent to those of you just starting out. Since this will run for several months, you can send in any questions you might have and I'll be able to answer them while the material is still fresh. Address everything to me c/o Model Builder and they will forward it on.

### **ATTITUDE FOR FLYING:**

The first major requirement must be your attitude as a pilot. If you've flown fixed wing before, you can expect a new and exciting challenge. When you learned how to fly the airplane, it *flew* while you learned to *control* (or direct) it. But a helicopter does not want to fly by itself. It does not have that stability for "hands off" hover. You have to learn how to *fly it and control it at the same time*. This is where your attitude comes into play. If you think you'll go out and learn to hover today and be an expert tomorrow, the odds are you'll be greatly disappointed on the second day.

The helicopter will demand extra

practice and extra patience; more than a fixed wing to get to the same "average" proficiency level. So expect the challenge and meet it head on. I don't want to sound negative about learning how to fly a helicopter, so let me add that while it may frustrate you now and then, it will also give a greater level of satisfaction once you've started to master it. First the five second hover, then 20 seconds, then a minute, and on to complete tankfuls . . . There is a tremendous feeling of accomplishment as you feel your skills increase.

### **ATTITUDE FOR BUILDING**

Just as the helicopter is more difficult to learn to fly than an airplane, it is more critical as you build it. Most sport airplanes will fly, given you have the wing attached to the fuselage. What I'm saying is that a poorly built fixed wing will still fly.

As you build your chopper, keep in mind that a poorly built helicopter *will not even fly*. Sloppy radio installations with binding linkages, unbalanced main and tail rotors, over-the-hill engines; all are completely unacceptable if you expect the machine to fly at all.

Assemble your helicopter with the feeling that "I couldn't have done it better". If you feel that "those gears aren't quite right but they'll be close enough", expect lots of mechanical difficulties down the road. If you *take your time and do the best job you're capable of*, the helicopter will not only

look nice but it will fly just as well.

Now that you're ready for a new challenge, and you're willing to spend the time to build a clean, precise helicopter, I can talk about what kind of helicopter you might be interested in.

### **SIMPLE VS. COMPLEX: FIXED VS. COLLECTIVE**

There are two major types of helicopters. Those that have their blades fixed at a given pitch angle are referred to as "fixed pitch" helicopters. They generate lift by rotor speed. If the rotor turns faster, more lift will be generated and the helicopter will climb. Decrease rotor speed and the helicopter will descend.

On the other hand, "collective pitch" helicopters have rotor blades that vary in pitch angle. The collective pitch helicopter's rotor runs at a nearly constant speed at all times. To lift off, the collective pitch is increased; i.e. both blades increase their pitch angle, the rotor takes a bigger "bite" of air and lift is generated. To keep collective pitch straight from cyclic pitch, just remember that the blades move up or down in pitch together (collectively). I'll talk about cyclic pitch in more detail later.

The main difference between the two in flight is that the fixed pitch machine will tend to have a greater lag or delay between a vertical input and response. It takes time for the rotors to speed up or slow down to change the lift. The collective pitch helicopter has instan-

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taneous vertical control because the blades can change pitch (lift) as quickly as the servo moves.

On the ground, the fixed pitch system is very simple and the collective pitch system is considerably more complex. Next month I'll have nice drawings or photos to illustrate each head. For now, I want to describe the pros and cons of each as they relate to the individual who is learning how to fly.

Undoubtedly the collective pitch helicopter is easier to fly, especially in forward flight and coming out of forward into a hover. If Kiwi pilots never crashed then they might as well start with collective pitch. But when tipovers come, the turn-around time back to flying condition is a lot longer and critical adjustments must be done all over again.

Since the fixed pitch head is much easier to set up (and less critical during set-up, as there is less linkage to deal with) it becomes the best choice for the novice pilot who will have to learn how to hover from square one.

Usually, fixed pitch helicopters are less expensive too, so the pilot can try a helicopter and then move on to something a little more sophisticated once he has mastered the basics.

All of this is not to say that you can't learn to fly on a collective pitch machine. The only problem comes when you set up then tip it over, as described above. Dad and I learned on the Kavan Jet Ranger. We took it inside our garage and a high school gym (with ventilation). One of us would loosely hold the tail boom as the other flew. A three foot hover worked fine, and the loose grip allowed all motions to be followed except for quick tail rotor commands. If things got a little squirrely, tightening the grip on the tail boom brought the helicopter back over the starting spot, and another shot at flying without any broken blades! After several tankfuls we'd lift up to a three foot hover, and after all was stabilized, we'd let go of the tail boom for "free hover" practice.

Both of us learned to hover in less than one gallon of fuel by this procedure, and

we never broke a rotor blade. From there we went outdoors on calm mornings or evenings, gradually expanding our capabilities.

The Jet Ranger was well suited to this "hands on the boom" technique since the boom was good sized and there was adequate tail rotor clearance. Most of the aluminum boom helicopters will not adapt to this method, so I am urging you not to try it this way. I'll describe another method in the upcoming months.

Anyway, many others have also learned on collective machines, so if you know what you're doing and understand how the helicopter operates, learning to fly on a collective chopper becomes feasible. Another exception would be if you belong to a helicopter club, or a group of active helicopter pilots in your area. They can show you specifically how everything operates and can assist you with set-up procedures. If you're in an area where you're the only one, stick to the simpler fixed pitch helicopters, there will simply be less headaches for you.

### WHICH FIXED PITCH HELICOPTERS?

As far as fixed pitch helicopters available, the major ones are the GMP Cricket, the American Mantis, and the Schluter Mini-Boy.

The Cricket is a small .25 powered ship, first introduced several years ago. It has become very popular since then with an extensive list of dealerships throughout the country. Personally I have seen more people learn to fly on the Cricket than anything else, although all brands are popular in different parts of the country.

The Mantis and Mini-Boy are both .40 powered ships. Each is available with fixed pitch, with a collective retro-fit available at extra cost. These options are nice as you don't have to buy a completely new helicopter to broaden your experience.

Circus Hobbies is importing the Kalt line of helicopters, and Kalt's best training ship would be the Baron .40. I have not had the chance to closely look over the Baron .40, so I can only tell you that I have heard that the quality and performance are good.

About the best suggestion I can give you for the purchase of your first ship is to check with the helicopter pilots in your area. Chances are they have a particular ship that has worked well for them, and parts would probably be close at hand, too.

If no one is close to you, try to obtain some reviews of each helicopter in the various magazines available: Do some research. Then choose the one that has the features or options that you are looking for in your price range. Best of luck, I'll see you next month. ●

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Scale . . . . . Continued from page 27

sideways in a tight turn and twice the recovery rate coming out of a stall turn, as normal.)

I was requested to put in a normal, complete flight. This was accomplished,



## CAMARO F3B

This is EISMANN's newest F3B model. A formidable contender already having taken some first places in European competition. This model uses a Wortmann airfoil which is proving to be very efficient, also has canopy speed brake.

The kit contains an epoxy fuselage, foam wings covered in Obichi wood, ailerons are cut out, tail surfaces are cut out shaped and sanded. Includes necessary hardware and detailed plans. (Instructions in German)



Span	2750 mm
Fuselage Length	1280 mm
Wing Area	60.10 DM2
Weight	2000 P
Airfoil	Wortmann Fx60/100
Price	\$295.00

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Span	2800 mm
Fuselage Length	1290 mm
Wing Area	56.1 DM2
Weight	1900-3400 G
Motor	200-600 Watt
Airfoil	Eppler 387 modified
Price	\$299.95

## FOCUS F3B

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Length	1360 mm
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Weight	1900 G
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however, I did add some embellishments of my own to make it a true judging critique. I did not include a pilot as required by the rules and the called Stall Turn was in reality a Wing Over. I was caught on both counts and correctly downgraded. It is really rough to have 10 judges watching your flight, working hard to catch every little mistake. Then to join them in the careful evaluation after the flight as they compare scores and their reasons is an ego destroying trip. It's so much easier to get the sheet later and wonder why the blankety-blanks gave you a 6 on a maneuver you know you should have had a 9 on! I must say that the scoring was realistic and generally most tightly bunched, with rarely more than a one-point spread above or below among the 10 judges.

The Reno weather provided a bit of everything for the flying. It was warm (but not really hot). It was calm, when it wasn't windy (but not really windy). It was clear (except when it rained). The prevailing wind was from the west like it always is (except when it wasn't, which is generally). In other words, it was typical of any scale contest weather. It was not typical! One can only imagine the look of amazement on the faces of foreign competitors as a genuine western U.S. dust devil decided to visit the flying area late in the competition. It ensnared Jean Rossueau, who was holding his model at the time, and judge Tony Aarts' hat, which spiraled its way across the field, until rescued by Marcel Jonckheere and our daughter, Cathy, on her trusty loaned moped used to carry scores to tabulation.

The thin air claimed a number of models, which was indeed unfortunate. Mick Reeves' Stand Off Spitfire fell out of the top of a loop into a spin that ended on the pavement. Charlie Chambers' ducted fan Cougar succumbed twice. The first time on take off, it hit on a wing tip and sheared off one panel. It was repaired overnight (shades of Steve



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Sauger in Sweden in 1976) and made the first successful World Championship's ducted fan flight the following day, much to the pleasure of everyone, including Larry Wolfe, Jet Hangar Hobby's daddy, who was present to help Charlie during the week. Unfortunately, on the third flight, the Cougar's engine went lean and in an effort to get it back to the field, it fell out of the air. For many present, probably the most disheartening crash occurred to Bob Wischer. Bob has competed in every scale world championships but the first. In each of these six, he has always been an extremely reliable performer. His engines always seem to run well, his radios work, and Dolly always helps him put in good flights. I suspect many of us just always take for granted that he will be properly prepared and will put in good flights. This championship was no exception in each count. Bob's new Ryan SCW, in the most natural looking aluminum finish anyone can recall seeing, was ready. Bob and Dolly were ready. However, it was not to be for them this year, for the beautiful Ryan, part way through the first flight, for one reason or another, became a casualty of

the scale "wars". I know you will join his many friends from around the world in urging Bob and Dolly to participate in the competitions. The innovative techniques and the deep sense of devotion to scale modeling would be sorely missed in our fraternity.

The previous comments were not in any way to minimize the loss suffered by other competitors in the competition. Certainly Earl Thompson, who lost his Focke-Wulf FW44J, and others who damaged models should be noted. I guess the personal ties we have developed with Bob and Dolly over the years make the loss so much more vivid.

The flying proceeded somewhat slowly, even with the patient urging of Betty Stream, the very competent Flight Line Director. This is common in FAI competition, and often results from a combination of things. Certainly one is the fact that the competitors from other countries are "out of their element." Jet lag, equipment differences, etc., contribute to slowing things down. In addition, even though all judges spoke English this year, each of us know that total understanding often takes a little longer. Certainly, as the rounds of Stand

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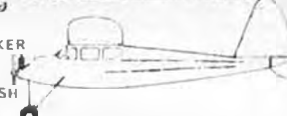
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Off progressed, it was obvious that the individual to beat was Wim Reynders from Belgium, with an excellent flying Mosquito. The team to beat was Sweden, which was working on a repeat of Ottawa in 1980. In addition, the presence of Carlo Mapelli from Italy, due to his superb flying, was to be reckoned with. In the end, the trends from the very first flight were proven to be true. The Swedish team walked away with team honors in Stand Off, with Italy second, and the U.S. third.

The individual honors went to Wim Reynders of Belgium, first, Mikael Carlson of Sweden, second, and Carlo Mapelli of Italy, third. On the U.S. team, Cliff Tacie finished the highest rank with a 7th place for his Spezio Tu Holer. Cliff had the third highest static score, but was unable to put together the right combination of prop, engine run, weather, etc., to get that one really super flight. Charlie's Cougar, working with a rather good static, didn't have the necessary good, complete flight. Phil

Sibille, the third team member in Stand Off, was unable to get his new ship ready in time and was forced to fly his "old reliable" Spitfire. For one reason or another, Phil was working with a low static score, and even superior flying could not save the day for him. It would appear, to this reporter, that there was a much wider spread in the static scores than in earlier competitions. This is not to suggest that the spread wasn't warranted, but it did result in taking a significant number of the models out of the active competition from the start.

In F4C, the United Kingdom once again asserted its scale leadership role by finishing 1st, 2nd, and 9th, to garner the team award. Canada finished second in team standings with Germany third. The individual awards went to Terry Mel-leny of the U.K. with his 10-year-old Moth Minor. Mick Reeves was second with his Spitfire IX, and Jean Rousseau, the 1980 winner, third with a Cap 20. The highest finisher for the U.S. was George Rose with his P-6E Hawk in 10th place.

Both Bob Wischer and Earl Thompson were far down due to not having a complete flight. There was, as in Stand Off, a very large spread in static scores. Once again I cannot attest as to the reason for this spread as the judges and the modelers are the only ones privy to the documentation and discussion. It would seem, however, that a closer spread than that which occurred this year would tend to make for a more competitive event. For instance, in 1980, the top five places in F4C were separated by 50 points out of 5000+. This year the spread over the same number of finishes was almost 700 points. Obviously, many factors are involved in that consideration, but there would seem to be some correlation.

The award ceremony at the field was certainly one of a kind. Monty and Patty's EAA group from California flew in a gaggle of homebuilts and antiques on Saturday. These were gathered about the award platforms and formed a perfect back-drop. The Groves' Focke-Wulf (the big version of Earl Thompson's model), a 1929 Ford Trimotor, Starduster, half-scale Corsair, and oodles of others framed the winners as they received their diplomas, medals, and trophies. A rather tense moment occurred when Monty Groves, Jr. and his wife flew the Focke-Wulf in on Friday evening. Weather had forced them to stop in Carson City, but the weather man had said no problem, so they motored through the mountains only to meet a big, hairy, thunderboomer at Stead when ready to land. With their parents at one end of the active runway and Cathy and I in the van near the center of the apron, they suddenly appeared on the ground taxiing out of the driving rain. 'Twas a couple of really wet people. Open cockpits just don't offer much protection!

We also witnessed two interesting full scale flights. The OMAC (Old Man's Aircraft Company) performed a second flight of their new pusher aircraft. While no details are available, it would appear that some problems might have ensued. The flight lasted perhaps three or four minutes. The Lear Fan flight followed low and high speed taxi runs on Thursday that was deemed most successful. The dedication and interest that permeates the Lear family was rather evident throughout the week's activities. It was a real surprise to note that between the taxi tests and the flight the following day, the aircraft "grew" a jazzy blue trim paint job to its basic white.

As always there are hundreds of little vignettes that occur during the week. It was interesting. . .

To watch two-year old Riaan VanWyk of South Africa chase soap bubbles blown by Anne Ray, the wife of Stand Off judge, Pat Ray.

To note the wonderful, friendly attitude of the desk and Bell personnel at Circus Circus. Pity the poor Bell Captain as five large model boxes crowded his little room for a night.

To see Phil Sibille managing to get his

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motor home (which appears to be 150 feet long) in and out of a parking space that would normally stymie a Volkswagen.

Watching everybody suddenly descending on Don Jehlik to custom mix some fuel after my trial flight, proving that maybe a little nitro might help.

Noting Kjell-Ake of Sweden crawling on his stomach across the "desert" sand reaching for liquid as his team mates snapped photos of the dying soul. (Should have seen his face when I casually suggested he might want to watch out for rattlesnakes.)

To hear early morning tales (mostly fabricated) about how much each person won the evening before. (I won \$2.45 . . . not counting the \$5.00 I lost!)

Finding a safe in each room (Ours contained two transmitters and two teddy bears, a graduation gift for Cathy from Dolly Wischer.)

Watching the first successful ducted fan flight in International competition by Charlie Chambers. A thrill for everyone.

Noting the nice bouquets of flowers Suzi Stream and Cathy received for a week of really dedicated hard work. Cathy loved working with Ken Wardrip and his wife, Barbara, who ran a glitchless Apple computer for the entire week.

Observing the pearl gray limo with super dark windows that cruised slowly by the judges and through the landing circle. Nevada 15 turned out to be

Harolds Club and I really wasn't too sure I wanted to tell them they did a no-no (The airport did! Whew!).

Finding out the morning after that the fire alarm went off on the 10th floor of the hotel when you're on the 18th!

A final salute must be given to Patty and Monty Groves for the very fine job which they did putting together the Championships. Such an undertaking is a difficult task at best, filled with variables and unknowns designed to snare the best prepared. In the case of the Seventh Scale World Championships, very few items fell through the cracks due to the diligence of the Groves and Headquarters staff composed of Giselle Jackson, Micheline Madison, and John Worth. I know Patty and Monty heaved a great sigh of relief as the proceedings ended, but they must have felt a great sense of accomplishment as well for a job well done. Though final figures are not available as of this writing, it would appear that the championships were at least self sustaining. Now we have 1984 to look forward to. On to Paris! •

## Big Birds . . . . Continued from page 25

Nuts that are well anchored and supported in 1/4-inch ply; then the round boltheads would simply ride in the nut (this works okay, but has two limitations: you've got to plan ahead for the installation of the nuts, and the broad flange of the nuts doesn't allow for more than one balance point to be used); or 2) many

wing center sections are glassed and/or have the structural integrity to support the entire bird without having the bolt heads dig in or tear through the surface (this might be the least favorable for many wings); or 3) tape a small piece of hard aluminum (or other metal plate) to the underside of the wing where the balance points are to be located (this procedure works very well as the balance points can be identified by using magic marker). In some cases, where the bottom of the wing has a convex curve, as with symmetrical airfoils, you might want to indent the "X" mark so the boltheads have something to lock into; otherwise you could have the whole airplane come sliding off the balancer.

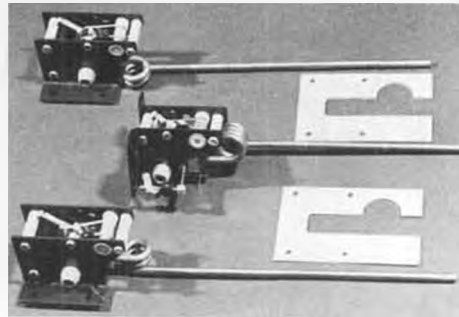
How well any of these methods work depends very much on the weight of your bird and the kind of finish/surface at the wing root or center section. And talking about weight, I did test this rig with the angled balancing beams as shown in the pix, and can vouch for its ability to support at least 35 pounds . . . safely. But it wasn't till after all the pictures were printed that I realized how easily vertical supports could be tied in to really lock the angled beams in place and increase their capability to handle even heavier loads (see sketch).

I had planned to use 2x4's for the base, but found the 2x3 was just as good . . . and cheaper. And you do have the option of going to 5/16 balancing bolts if it'll make you feel better to have a larger head to help spread the load a bit. Also, I



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### DIESELS, CAMELS AND SUCH. . .

Figured that I'd get some mail about diesels, but was totally unprepared for the deluge that followed the June column.

I had no idea that so many guys used diesels, and was pleasantly surprised about the number of "closet diesel lovers" who stood up to be recognized. Of course not all the mail was pro-diesel; a few of the letter writers informed me that by expounding the very dubious virtues of the smelly diesel, I had finally proved to one and all that I

had absolutely no taste . . . and certainly no couth.

In fact these anti-diesel people were quite rabid about their feelings and, to make sure I understood how disgusted they were with me, used many descriptive and easy-to-understand four letter words. I guess you could say that they wouldn't be caught dead near a diesel, no less anyone who used them. One of these fans of mine was even nice enough to include some "medical advice": "All the ingredients that go into diesel fuel are indisious," he wrote, "and can do the same kind of damage as MEK. And don't forget that you're spewing that unburnt diesel muck all over us innocent people."

One reader from the northeast went so far as to compare diesels to camels, stating that "both are grossly foul and shouldn't be allowed near civilized people." I had to refute that comparison (he did include an SASE) having gained first-hand knowledge about camels and their "lovely" ways back in the old days while on a special assignment for the Air

Force. I literally had to live with the "humpers" for too many months . . . and as far as I'm concerned, there's nothing as foul, and mean, and spiteful, as a camel . . . and that's one of his better days. They have a disgusting habit of spitting, and unlike a horse that'll void simply because it's scared or answering the call of nature, the camel seems to take great joy in going potty at the worst possible time and all over the nearest legs and feet (you learn not to lie down too near a camel) . . . and I might add, in very copious amounts. No other living thing or piece of machinery deserves to be equated to such a beast.

Bill Mitch, of Hebron, Indiana, was one of the many diesel afficianados who dropped me a line, and he included a few of his favorite recipes. For sport flying, Bill recommends . . .

30% Oil (SAE 50) 38.5 oz.

30% Ether 38.5 oz.

37% Kerosene 47.5 oz.

3% Amyl nitrite 3.5 oz.

And for competition, Mr. Mitch offers this slightly different concoction . . .

25% Castor Oil 32 oz.

30% Ether 38.5 oz.

40% Kerosene 51.25 oz.

3% Amyl nitrite 4 oz.

2% Nitro benzene 3 oz.

He added a very important footnote about the fuel. "The amyl nitrite is like nitro in glow fuel. And do be careful with the nitro benzene; it stays in the body." (Perhaps that "medical" advice mentioned earlier was aimed at fuel with nitro benzene in it.)

Since Bill has been mixing his own diesel fuel for quite a long time, I asked him about mixing, storage, and availability of the ingredients . . . and here's the answer he shot back.

"You should be able to get ether from a drug store, or wherever they sell chemicals. I pay a little over 10 bucks a gallon for the stuff.

"If you store ether for a long time you have to make sure there's no air in the bottle. Either fill the bottle right to the top, or shoot some CO2 into the container before capping. Oxygen changes the molecular structure of ether and makes it unstable . . . and if jarred it could detonate. However, as long as it's diluted in the fuel there's no problem.

"The amyl nitrite is another story. It's hard to find and is expensive. I've gotten mine through a friend who works for Standard Oil. Check around the truck stops and read the labels on diesel engine additives; some of the power boosters have amyl nitrite in them.

"I use 'Shell' Aeroshell Aircraft Oil, but any non-detergent 50W will work just fine. I stick with the Aeroshell 50W because it's also used in my antique ignition engines. You can use castor oil, but it costs a bit more; the gallon I bought last summer was \$16. The motor oil is just a little bit dirtier."

It turns out that Bill Mitch is one guy who really knows how to enjoy his hobby; he seems to be into almost all aspects of modeling. Besides BIG Birds, diesels, and antique ignition, he flies

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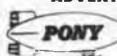
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patterns and old timers . . . and control line, would you believe.

"It all depends on my mood," he sez, "and a reminder that diesel fuel will work okay without the amyl nitrile; sort of like a no-nitro glow fuel."

If you've got anything more to say about diesels, shoot it to me and I'll make sure the word gets passed along . . . if it's constructive.

#### SCALE COLORS

If scale's your thing, then you're gonna have real nice things to say about the Hobbyoxy people. . . 'cause they're busy creating formulas for mixing the most asked-for WW II camouflage colors, using standard Hobbyoxy paints, of course.

One of the first mixing formulas they tackled was the very hard-to-match Olive Drab 41, also known as pre-1964 Federal Standard 34087. It seems that the color of OD was changed in '64, but with true bureaucratic efficiency, the Feds gave the same (old) number to the new color. Wasn't that a swift move? Anyhow, here's the way to achieve a perfect match for the old OD:

- Two parts H66 Dark Red
- Two parts H81 Black
- One part H10 White
- One part H49 Cub Yellow

Mix them all together, add an equal amount of Part B Flat Hardener . . . and there's your OD 41.

A mix for Neutral Grey 43, FS 36173, was also perfected . . . and this is for the undersides of those USAAF flying machines:

- Four parts H10 White
- Two parts H81 Black
- One part H26 Light Blue

And, as with the OD mix, add an equal amount of Part B Flat Hardener for the proper matte finish.

**CAUTION:** These formulas were developed for Hobbyoxy colors only. Since pigment and colors are not the same, other brands of paint won't yield the same results. Also, please mix each component color *thoroughly* before blending with other colors. And be sure the Flat Hardener is well mixed so that you do end up with the right degree of flatness.

Don't want you guys who prefer WW II Navy birds to feel left out, because Hobbyoxy is burning the midnight oil trying to perfect Sea Blue 35042, Intermediate Blue 35164, and White 37875, for all those Wildcats, Corsairs and TBF's. And for those who love Spitfires, FW-190's and such, you'll soon be seeing a host of RAF and Luftwaffe colors.

I'm not one to bother with this aspect of scale detailing, but I can appreciate how much it's bound to help anyone who's hung up on making warbirds as scale as possible. When you contact Hobbyoxy about these colors, tell 'em MB sent ya. . .

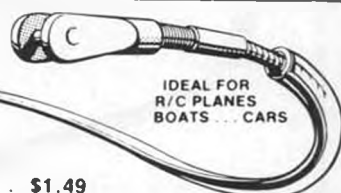
#### HEAVY DUTY SERVO ARMS

In these days of exaggerated claims and overdone superlatives, it's nice to know that most of our hobby manufacturers are straight-arrow. The case in point being Kraft's new HD servo arms

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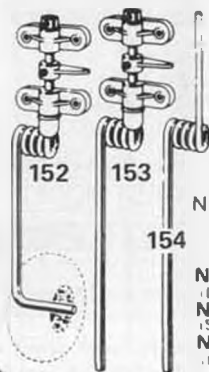
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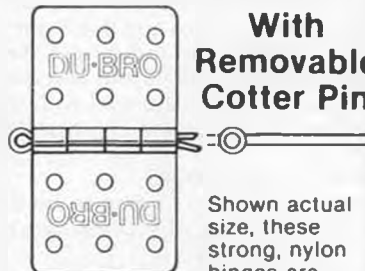
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... which come in three different shapes (see photo). The offset arm was good thinking and can be used for additional linkage to retract a tail wheel, turn a pilot's head, or whatever else you can dream up.

I know that Kraft isn't the only company to come out with HD servo arms (Rocket City has them also), but theirs are the only ones I've had the opportunity to use. According to my measurements, a standard arm is only .060-inch thick while the new HD arms are .085; truly a thicker(er) servo arm that's got to be much stronger and more rigid. And besides fitting the Kraft 15 and 20 servos, these arms will also mate well with the output post found on the Dunham HD mechanics.

### DRINKING AND FLYING

Foiled ya! This isn't going to be the usual epistle about why drinking and flying don't mix well. . .

Instead, I'm going to tell you that you can "SIT BACK, RELAX . . . AND 'FLY' OUR PLANES!" . . . because these are permanently multi-layer etched WW I and WW II birds on 14 ounce tumblers and tankards. These beautiful aircraft are there for the life of the glassware, and won't wash off after only half a dozen times through the dishwasher.

The glass surface is etched at varying depths leaving a luxurious texture . . . creating the ultimate look in decorative glassware, so it's the perfect gift for the modeler or aviation buff who seems to

have everything else (and don't forget about Christmas being just around the corner).

How can I be so positive this stuff is so great? Well, partly because I have a WW-I and WW-II set, and use them daily . . . and partly because I make this glassware and I know how good the quality control is. The WW-I Aeroplanes include: Fokker DR I; Fokker DVII; Albatross; Camel; Spad; and the SE 5. The WW-II Warbirds offer your choice of any six: Bearcat; Corsair; FW-190; ME-109; Mustang; Spitfire; Thunderbolt; and the P-40.

As a matter of fact, you can mix and match also . . . and any six tumblers or any four tankards are the same price, \$22.95 ppd.; and 8-inch ashtrays are \$12.50 each (specify airplane). Well over half of the sets have gone to scale buffs . . . Gotta admit these are "want-to's" and not "need-to's," but they sure look good and don't have to be kept for those special occasions only.

### PREJUDICED? WHO, ME?

I've been accused of being prejudiced toward the QSAA, by virtue of strongly advocating the IMAA every month without a word about the Quarter Scale Association of America.

What can I say, except that I am guilty as charged . . . and even though I've been an IMAA Director, and am not a QSAA member, I shouldn't have ignored the QSAA. Although I believe that IMAA has so much more to offer the BIG

Bird Buff, and its low profile, uncontested/no trophy fly-in's suit me to a "T" . . . I should have acknowledged my responsibility to you, my reader, and not shown any favoritism. Certainly an organization that promotes the safe flying of BIG Birds deserves recognition.

So, while I'm chewing on this big, delicious piece of humble pie, let me remind you that QSAA's 6th Annual Fly-In is all set for October 28 to October 31, at the El Dorado Dry Lake Bed near Las Vegas. Hopefully the Wind Gods will feel benevolent this year and try to make up for the past sandstorms by programming just enough wind to make takeoffs and landings easy. For all details, send a business-size SASE to: Pat Bunker, QSAA Sec., 6532 Bourbon Way, Las Vegas, NV 89107; for those who like to support Ma Bell, Pat's phone number is (702) 870-6076.

### TIP OF THE MONTH

Literally, and figuratively . . . "If it don't stink, don't stir it."

Al Alman, 12707 108th Ave. Ct., East, Puyallup, WA 98373 (and keep those cards, and letters, and pix a comin', gang).

Formation . . . Continued from page 28

Stuyvesant, and Simprop Electronic provided them with the high standard of R.C. equipment that is necessary for this kind of formation flying. The planes they use are the successful models of world champion Hanno Prettnner.

Starting in 1978 with CURARE models, they now are able to "read and write" with this design, however, they are changing this year to the "Magic", which is a little bit faster. The P.S. Team flies together two or three times every week, and even more before contest or demonstration events. Very important is the technique of giving the commanding instructions. The one giving them should wait for a split second to make it possible for the other two to receive the message before acting.

Helmut Wolf gave me two important tips for all guys who do want to try formation flying.

First one: Never use the motor at the



highest R.P.M., but always use them throttled.

Second one: Every pilot should have and hold his own path in the sky, never crossing the line of his neighbor. It is very difficult to fly formation in turbulent circumstances. The trick here is to fly smaller maneuvers and use "brakes" by slipping softly to give the other teammates the possibility to hold or refind the formation.

It will be obvious that formation flying is something that can be a good replacement for simply flying back and forth in typical "Sunday flying" style.

Try it yourself and enjoy it as we did by seeing it at Harsewinkel!

Soaring . . . . . Continued from page 31

leaving you stranded.

The second way is to launch high enough, with an airplane efficient enough, to not need to find lift. Simply stay out of sink air and fly around! Impossible? Not anymore.

Since the last WCs at Sacramento, the serious F3B fliers have been developing super strong, powerful winches. These fliers took note of the incredible advantage that the Canadian team had (at least potentially, if not actually) when launching against all other teams. If it hadn't been for the structural problems that they had with their planes, they might have ended up in one of the top three team placings and taken some individual trophies, too! When everything worked for the Canucks, they outlaunched everyone!

Now, if you had a launch of say, 800 feet and a sink rate of 1.5 feet/sec. (which is reasonable) you could stay aloft for six minutes without having to find any lift. Even a reasonable amount of sink could be handled with ease. From 800 feet, a plane with a 1.5 ft./sec. sink rate wouldn't come down for over 8-1/2 minutes, or, at the end of 6 minutes, it would still have an altitude of 260 ft.

This may be a little oversimplified, and doesn't take into account the Law of Murphy, but you get the picture.

Distance is likewise, no problem. Let's take a look at what 800 feet buys you.

A twelve-lap FAI distance course is 1,800 meters. Converting this to feet, we get 5,904 (12 x 492'). Let's assume that when you launched to enter the course, the air was stable, dead air (not very likely, but let's just assume). Now, let's figure out how much glide ratio or "L/D" you need to complete the 12 laps. Since a glide rate is horizontal distance over vertical distance: 5,904/800 should give us an absolute minimum sink rate. 7.38:1 is what it takes. Most FAI/F3B ships are probably somewhere around 20:1 L/D. Sound easy? This team championship *should not* be decided in the distance or duration rounds . . . if the competitors have learned their lessons from the '81 WCs.

This year, more than ever, speed times will be the crucial issue. As Jerry

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Crainock of the SFVSF is fond of saying, "You can only NOT LOSE in distance and duration (since you can't get more than a max), but you can WIN in speed."

Again, an 800 foot launch will prove very advantageous in obtaining high scores. At 800 feet, a lot more kinetic energy is available for the pilot to use as he sees fit.

Getting back to the "glider-missile" idea, I think you can see that with a limited winch line length of 200 meters (winch to turnaround), a whole bunch of energy is needed to accelerate the GM to a speed that will enable it to "zoom" or coast to the desired 800 ft.

I have seen this launch technique work. The technology has been with us for years, we simply didn't have the gliders to stand up to such incredible line tensions . . . until now.

Engineers have known for centuries that the thicker you make a cantilever beam, the stronger that beam will be, and that the thickness to strength ratio is not a linear relationship. A beam twice as thick as another will be more than twice as strong.

Thick airfoil sections, with their thick spar depths, have been around for decades on full size aircraft. But those thick sections typically were disastrous at Reynolds Numbers under 200,000 where our models typically operated. Only recently have any really good sections come along that were both thick and low in drag. Two of these airfoils are

the MB-303515 and the MB-253515. I have included these profiles with this column for your edification. The Eppler 205 is for comparison.

Imagine what thick spar depth in combination with a really strong carbon fiber spar could give you in the way of strength. You need not fear breaking the wings on launch ever again.

Now, the only thing left to do is design and build your glider-missile launching device. Allow me to describe how Dick Odle has made his.

As you can see by the photo, this winch is large. It weighs 150 pounds with two batteries. I would say that there is at least 30 feet of steel tubing in it. It is powered by your choice of one, two, or three deep cycle marine batteries (usually Die Hards). It has two 6-volt, long-shaft Ford starter motors (stock, except for a key notch in the shaft). The custom made line drum is supported on both ends of its axle by heavy duty ball bearings. Two gilmer belts drive the line drum from the two motors. For safety's sake, the winch pedal disconnects from the control panel. And finally, on the control panel, there is a switch for testing the condition of both batteries, by means of two volt meters.

Dick's winch is very impressive. You really can't help but be impressed. It doesn't merely launch glider-missiles, it almost puts them into orbit! And if this isn't powerful enough for you, Dick claims that for a few dollars more, he can

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double the power of both motors by adding two more field coils to them.

Would you believe this winch has a name? It does. It's called "The Gorilla." The Gorilla is a development of what Dick refers to as primate winch technology. It's my guess that somebody told Dick that his idea of a "fun" winch was a little bananas.

I hope that F3B flying doesn't get too far out of the capabilities of the typical contest soaring enthusiast. If it continues to escalate into a technology war, fewer and fewer people are going to want to get involved in it. It's expensive, it's time consuming, it's dangerous. And it's only a matter of time before somebody gets killed during a launch from one of these super winches. Things happen faster than you can react to them at 100+ mph. Things can fail under the stress of the takeoff that you wouldn't expect. I had a bellcrank break off from the inside of my fin on a zoom launch causing my ship to go subterranean in a big hurry. Since it was carrying two pounds of ballast, it would have hurt had it hit someone. It was doing 80 miles per hour, easy.

I would expect, before too long, a rule change limiting the power of FAI winches. Just how they plan to limit the winch's power, I couldn't guess. The Federation has already limited us to 12 volts, and that hasn't changed a thing! The "weak link" rule was just a rumor, but it has the potential for being the

fairest means of limiting power.

Enough about FAI. If you have any thoughts on FAI, I would be glad to "air" them. Just drop me a line.

★ ★ ★

For several years now, there has been a lot of interest in R/C hand launch gliders. Dave Thornburg really got the ball rolling with his little HLG "Sunbird," published in *MB*. Then, a little while later, Bob Owens came out with his "Zephyr" HLG, and more people tried HLG flying. Between those two gliders came Mike Bame's HLG, the "Meadowlark."

The Meadowlark is a foam wing HLG that weighs 16 oz. It can be thrown 30 to 40 feet in the air with the help of a wood tongue which sticks out of the fuselage on both sides. It handles like a champ and feels as light as a feather, and with a wing loading of 4.7 ounces per square foot, it should. Mike used the time honored Mirage airfoil section on the Meadowlark, which produced a faster flying HLG than he really wanted, but in wind or turbulence, the Meadowlark really performs.

If one were to build a Meadowlark or similar HLG, it might be a good idea to build two wings, one foam and one built-up. This would give you the best of both worlds: stability in gusty winds, and light air buoyancy.

Personally, I think something along the lines of a Gentle Lady would be just fine. It would save you the hassles of

designing an HLG yourself, plus it would be a more versatile aircraft.

Perhaps you have some ideas on hand launch gliders. Maybe you have designed a really hot HLG and you would like to share it with other *Model Builder* readers. Send me a photo or a three-view and a description of your bird, there are plenty of folks who are interested in it.

★ ★ ★

For those pilots interested in flying in the 1983 Two Meter World Cup, now is the time to start designing and building your best two meter sailplane.

Most of you have heard of the 2MWC. For the rest of you who haven't heard, the 2MWC is a multiple task contest featuring all of the elements of an FAI contest (speed, distance, duration), but with a few twists. The duration event maxes at 10 minutes versus 6 minutes for FAI. The distance event is open ended, not a 12 lap max as in FAI. Distance is scored man-on-man, as is duration. The speed task remains virtually the same as FAI (4 laps of 150m). And just to make things interesting, on the second day of this two-day contest, there is a 10-lap simulated cross country event that is really unique. Contestants are given five minutes to complete the 10 laps. Penalties are high for non-finishers in flight groups that have 10-lap finishers. Sounds like full-size rules, doesn't it?

The tasks are varied as you can see. Designing a glider for all performance levels isn't easy. Compromises are going to be unavoidable. However, next to FAI, the 2MWC is the most demanding, most challenging, most fun contest you could ever fly in. Perhaps the 2MWC will challenge you into action. Get busy! The 1983 2MWC will be held in late spring in Southern California, and there is just enough time to get your 2-meter together.

That will do it for this month. As I promised, here is my address: Bill Forrey, 487 Mesa Road, Santa Monica, CA 90402; (213) 459-1760. Please remember, for this column to represent you and your interests, I need to hear from you.

Have fun, good lift. ●

Plug Sparks . . . Continued from page 34

fine field for free flight. Of course, out here in California, we would regard this site as a good picnic area rather than a free flight field. Spoiled rotten!

Murphy, in his CIA Informer Newsletter, states that although the meet was not as well attended as the 1981 contest, (probably due to the forecast of inclement weather), Crazy Karl (Spielmaker) and Company knocked themselves out again to make the contest as enjoyable a show as the first one. Thanks M.A.M.!!

Sorry we haven't received a box score on this meet, but that shouldn't prevent the MAM boys from staging number three meet next year!

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53 Lambert St., East Bentleigh, Victoria 3165 for photo no. 10. Most California modelers will remember Dennis for his activities at the Taft FAI World Championships. At that time, Dennis was most instrumental in any success the Australian team had, as he was always available for help.

After the FAI contest closed, he and the Australian team went to Sacramento to enjoy the meet put on by the Sierra Eagles at that world famous flying site known as Waegell Field (also site of the recent FAI World Championships).

Dennis then worked his way down to the Pond household in San Jose, from where he was able to accompany this writer to the O/T R/C Contest at San Luis Obispo, known as the Pond Commemorative. Dennis, as usual in his obliging manner, was immediately drafted to process models and dispense fuel for the Texaco models. While he was resting, he also ran the Frequency Control Board.

Dennis is enthusiastic about his Rocketeer A, and H&F kit, powered with an Ohlsson 23. He reports in usual British type of understatement (I've seen his models go!) the model goes rather well, very fast in both climb and glide. The model "gets up" there but never stays up.

His latest model, a Modelcraft Pacific Ace, shown in the photo, is his present delight. Powered with a Forster 29, Dennis says this is a great combination,

although the engine seems small in all that airplane. Dennis feels the model was beautifully designed, making it a real pleasure to build. Best part of the model was the construction.

Dennis has singlehandedly been spearheading old timer activity in the Melbourne/Victoria area. Mervin Buckmaster, while visiting Parker, was absolutely amazed at the stately performance of Dennis' Megow 50-inch rubber powered Rearwin Speedster. As a matter of fact, it makes a wheels on landing everytime. No wonder Editor Merv Buckmaster (*Airborne* magazine) is so enthusiastic about old timers!

#### JOE OTT AGAIN

The last time we mentioned Joe Ott in this column was when this writer met Joe for the SAM Champs at Taft. Prior to that, we had had a long discussion about radios, motors, and radio kits.

Although he is 82, Joe Ott talks and acts like he is only 40! His enthusiasm for a new trainer type radio control model has spread to the point where St. Croix Inc., P.O. Box 279, Park Falls, Wisconsin 54552 has decided to diversify from its present line of fishing rods.

Photo No. 15 shows Joe Ott with his "Golden Eagle", designed strictly for the beginner or sport flyer. Tests and flights have been so successful that photos and writeups have appeared in the Park Falls Herald. As the paper noted, the flight tests were important, as this might have an influence on the growth of St. Croix,

Inc.

According to the writeup, President Gord Schluter stated production is about two months away, although test flights were an unqualified success. Joe Ott and test pilot Jim Schmidt state, "We see no major changes at all. The Golden Falcon flew almost any configuration and its landing without power shows the natural stability it has." We can only wish Joe the best of luck on his new venture.

#### UN-OBIT NOTICE

How do you say a guy isn't dead when you have already run an obituary on him? Hence, the "un-obit" notice. We are referring to Stephen Kowalik, designer of the Miss Delaware and Ideal Air Chief.

As Mark Twain said, "Reports of my death were greatly exaggerated". This applies to Steve. This author was rather stunned at the SAM Champs at Chicopee when Charles Thuet, 30 Carlisle Road, Newark, Del. 19713, stated that Steve was still alive. Those interested in contacting Steve Kowalik can reach him at 501 Lore Ave., Wilmington, Delaware 19809. Better yet, call him at (302) 764-8632.

#### HELP WANTED

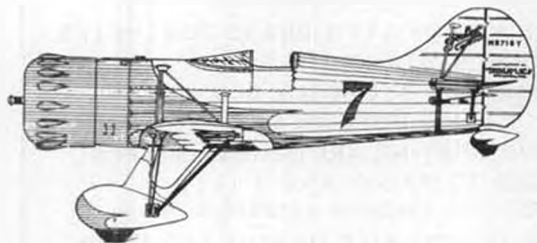
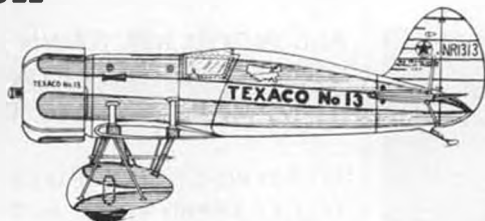
Just like the ad says, Mort Ross needs help in forming a SAM Chapter in the Long Island area. Mort lives at 8 Brean Ct., Northport, N.Y. 11765. Ross would be most pleased if you are interested and would drop him a line. Better yet, why don't you call him at (516) 757-5567?



# RACEPLANES

BY R.S. HIRSCH

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## MORE HELP WANTED

Have received several telephone calls from Joel R. Qualls, 2902 W. Alice Ave., Phoenix, Arizona 85021, asking if anyone out there has plans to the old Douglas Model Aircraft Co., "Flying Cloud". This rubber model is not to be confused with the later Henry Struck version as kitted by Berkeley Models.

If any of you know of or have a copy, drop Joel a line or better yet, call him at (602) 995-5834.

## THE WRAP UP

We were caught a little short handed in our writeup this time but be of good cheer, men! Next month, we will have a complete report on the 16th Annual SAM Champs held at Westover Air Force Base, Chicopee, Massachusetts over the Fourth of July holiday.

Good contest, good weather, and a good time was had by all! •

## Elect. Flying . . . Continued from page 37

than the weight of the electric unit. A Leisure 05 system with six 1.2 amp cells weighs 17.5 ounces with propellor and spinner. A small radio of 2-3 channels has an airborne weight of 6 ounces or less. Using my 50-50 formula, this gives an airframe weight of 11.5 ounces. That is a very practical weight for a Q-Tee size power airplane.

It should be noted that performance depends not only on weight but also wing loading and wing area. I will dwell on both these factors in a future article, but a few points will be made here. If you are a novice, you will have problems if the wing loading is over 20 ounces a square foot or you are flying an 05 size model at over 40 ounces. This does not encompass powered sailplanes, as they are a slightly different breed.

**BATTERIES ARE A PAIN TO CHARGE PROPERLY.** If you can handle the intricacies of building and flying a radio

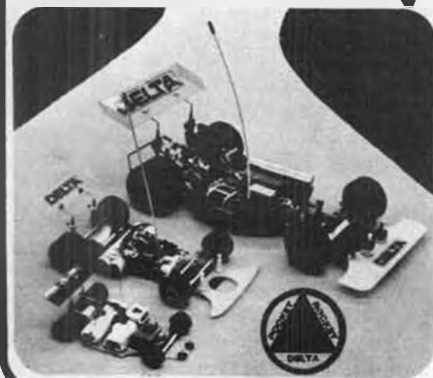
control model, you are above average intelligence and can certainly handle the charge sequence. I plan an entire article on batteries and charging, but again, will make a few points here. You should use a battery pack made up of 1.2 amp NiCd cells, either General Electric or Sanyo. The smaller 550 ma cells used in the past do not have the capacity or current draw capability to make them worth while for our application. The change from 550 ma to 1200 ma is the biggest single factor in those increased flight times advertised by the 05 manufacturers.

Your battery pack should contain no more than 7 cells. If more voltage is required, make packs of equal number and hook up in series. Your 12-volt car battery can not fully charge more than 7 cells at one time. As for charging, I recommend and use a charger employing a digital volt meter. Leisure's digital charger is well done and worth the asking price. Using a digital charger is nearly foolproof; just check the current rate for 1.2 ampere/hour cells, usually between 3 to 4 amps, depending on the brand, and charge until battery voltage peaks. The alternate method is to charge until the batteries are warm to the touch. This is kind of like winding a rubber motor, the max duration will occur one turn before the rubber motor breaks! Repeated max winding will tire the rubber motor and eventually fatigue it. Your batteries are the same; over charging can damage cells, causing venting. Venting should be avoided, cells are expensive and like teeth, with careful attention will give good service for a long time.

**ELECTRIC MODELS HAVE NO PERFORMANCE.** You can now do anything with electric that you can do with an infernal combustion engine. When NASA started sending things into space, they developed a new type of electric motor-magnet system known as rare earth, or Samarium Cobalt magnets. Motors using these very efficient magnets are the most powerful in the world. Geist, Keller, and now Astro Flite manufacture Cobalt motors. I recently had the opportunity to fly Bob Sliff's "Fast Eddy" 05 pylon racer powered by an Astro 05 Cobalt and seven 1.2 amp cells. The model weighed 43 ounces and had only 200 square inches of wing area. I have never seen such performance from an electric model of this size. We set up a 100-meter speed course to check the model's speed. The model traversed the 100 meters in under 2 seconds or over 107 M.P.H. This was with an 05, no prop rework and definitely not a record attempt airplane. I believe that 130 M.P.H. is not out of the question, and the Astro 40 Cobalt may be even faster. The fast Eddy Cobalt 05 combination flies very much like a quarter midget.

I have included pictures of the Fast Eddy and my F3E sailplane, the Olympian. The Olympian is a 123 inch wingspan powered sailplane that is powered by a Geist 40-14 Cobalt motor using the Geist 3 to 1 reduction and folding prop.

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The model uses an Eppler 205 airfoil and has an all up weight of 80 ounces. The Olympian may well be the fastest climbing Electro-Sailplane in existence. Its climb is in excess of 1000 ft a minute, and depending on conditions, climbs of over 1300 ft. a minute have been recorded. In Germany and Switzerland they have pylon racers with airspeeds over 110 M.P.H. I just read a German model magazine that described a full blown Electric powered pattern ship. Even helicopters are possible, but require more research. As you can see, performance is a reality.

**ELECTRIC POWER IS MORE EXPENSIVE.** This is the bottom line and I have one reply. YUP!!!! MAYBE!!! There is no question that the initial entry cost is higher for electric. But once the equipment is purchased, you have it forever. Glow motor operation requires constant purchases of glow fuel and batteries and glow plugs to keep you going. In the long run, I think things would work out that electric is less expensive.

You know, electric is a lot more practical than you think. There are places that you simply can't fire up a gas motor and noise is likely to become an even bigger problem in the future than it is now.

During the course of these articles, if I should offend or perhaps voice a different opinion than yours and you feel strongly enough about the subject that you'd like to reply, feel-free. Enraging the reader is the most sure fire method of getting audience participation that I know.

Good luck with your electric and be sure to tune in next time. We're going to investigate Electric Powered Sailplanes.●

**Electric . . . . . Continued from page 39**

7-1/2 minutes charge time! That's pretty fast. Jef obviously knows what he's doing, but I wouldn't recommend it for beginners. He has four battery packs, so he flies continuously until he has to give up his frequency! Jef concludes by saying that he feels the Chipmunk is a winner, and is sad that it and the Cardinal will soon be only memories. I agree with Jef, I haven't flown the Chipmunk, but the Cardinal is a good design, and with sub-C cells, was all that a sport flyer would need to get a good start in electrics.

On a new topic entirely, I recently ran some photos of a solar powered free flight, which inspired Will Bosco (Garberville, California) to send in some information and photos of his "Solar Boy". Its great appeal is its simplicity and low cost. The Mabuchi 26 motor cost 50¢, and the six solar cells (four 2 inch and two 3 inch halves) cost \$1 apiece. The prop is the 7 inch Peck Polymer, on direct drive. The wing is 27x7 inches, with an all up weight of 2.25 ounces. Will says that he keeps it from flying away by setting the tail boom for level flight, with some right or left turn to burn off the power climb. He flies in dead calm, in a

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wind it would be gone forever! His first flight was so good he almost lost it; fortunately it climbed into a large fir tree. Will says its neat to walk out of the house with it and see the propellor start turning, when he takes it in the car, he removes the prop, as the light through the windows is enough to make it go! The next step is a DT, a wise idea, I think.

I recently did some bench tests on the Astro 035XL. It is an impressive unit. It turns a gray Cox 6x3 at 12,500 rpm at 12 amperes, and a 5-1/4x3 Top Flight prop at 14,500 rpm at 9 amperes. I flew it in a Cox Centurion ready-to-fly plane, and in an Ace Wizard. Both flew very well, using the Cox 6x3, but, unfortunately, I burned a winding, so I don't have more to report. The 6x3 may be too much of a load; Dave Katagiri has been flying his original design with the 035 on a 6x3 prop, with no problems, so I may have been unlucky. At any rate, the 5-1/4x3 should be plenty for most 1/2A size planes. The Wizard and the Centurion had excellent climb, and power to spare for stunts. Dave does simple pattern with his design, which is much like a Jr. Falcon.

Till next time, learn with electrics! ●

**Electronics . . . Continued from page 41**

the use of Spectrol potentiometers, which are about as good as money can buy; in this case, Type 157's which are rated at .5% linearity. Assuming everything else in your R/C system is of equal

quality, this will assure you of perfect stick-to-control surface tracking, without any variation from one side to the other, or change in ratio as the stick travels away from center.

The other improvement, one that can be felt upon removing the centering springs, is the use of small precision ball bearings to support the moveable frame and bale. Linked with the almost friction free movement of the Spectrol pot shaft, the resulting smoothness has to be felt to be believed.

One of the hardest tests for a gimbal assembly to pass is so simple that you can make it. Just place the side of your finger against the stick, and push it over directly into a corner. You will find that a disgustingly large majority of them zig zag considerably, only the very best travel this path in an even straight line. This one does so as good as I've seen.

Upon connecting the assembly to my digital ohmeter to check the return-to-center accuracy, I find, as expected because of the mechanical excellence, that there is an inconsequential variation in the resistance upon repeated movements of the stick, with no difference apparent when changing the stick movement from opposite sides.

For me, the spring action is a little strong, possibly because I have become accustomed to others with lighter spring action. Changing springs is simple . . . unsnap one and put in the other. I did so, installing some springs that I happened to have on hand, until the action was unacceptably soft. Backing up to the

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amount that felt right, I again checked the resistance readings at center, again with more than adequate accuracy displayed.

The gimbals require electronic, that is, separate pots for trim, which you must consider in any application you may have in mind. Other than that, if you are tired of dragging around the sky, check with Ace R/C for a set of the ultimate gimbals . . . and please have that sangria after you are through enjoying them for the day!

### ROYAL ELECTRONICS PROTACH

One of the many things that I enjoy about our hobby is the continual sharing of expertise that goes on, often even between individuals who are at that very moment actually engaged in some sort of flying competition. It may go back to the very beginning . . . there are those who taught themselves to fly, but by far and large, the greatest majority of us had an instructor in the early stages of our R/C career. One of my good friends with whom I share assistance, is MB's engine expert, Joe Klause, whose monthly column we all enjoy. Joe is always there when I need help with my alcohol burners, so it was a pleasure to be able to do something in return when he called to ask if it were possible to extend the range of the RCM/Royal Electronics "Protach" tachometer to read higher than the 25,000 RPM that it is designed to do, by at least one more expanded step.

For those of you not familiar with it,

the Protach, which is in my opinion one of the better meter-type tachometers available, first appeared as a roll-your-own project in RCM in July, 1975. Soon after, it became available as a kit, or already assembled from Royal Electronics. As proof of how good a design it is, it is still available today, in its original form. Costs a few bucks more, but then what doesn't? One of its best features is that it displays the engine's RPM in increments of 5000, doing so in six switch-selected steps with a 1000 RPM overlap on each range. With the meter used, this gives you readable 100 RPM markers, with easy interpolation down to 50. My scratch-built model is on its fourth or maybe fifth year, and except for a battery replacement now and then, has been completely trouble-free; this is indeed an excellent unit.

So much for the commercial, let's go for some results. Referring to the original article and/or the schematics that come with the Royal kit, we find that the Protach meter operates on current supplied by a 741 op amp IC, designated as A5. This current is equal to that flowing through a precision resistor, R29, in the output of the preceding stage, IC A4, also a 741. Progressive scale expansion takes place by the addition of resistors R31 through R35, which are 150K precision types, mounted on the printed circuit board attached to the side of the pushbutton switch S1. As each progressively higher range is selected, another 150K is paralleled to those already in the circuit, resulting in a 4000 RPM subtraction from the indicated value.

To add another range, it is necessary only to add another 150K resistor in parallel to R35, the last 150K in the string, with the pushbutton switch being in the 20 - 25K position.

There are two ways to do this. One would be to add a small toggle or slide switch to place this resistor in or out of the circuit, thus keeping all of the original ranges, plus the added one which would now read 24 to 29K. Another way would be to sacrifice one of the original ranges, any one that you feel you can live without. For example, if you don't need to accurately read anything in the 0-5K range, which you can still do in the non-expanded, all switches up range of 0-25K, we can eliminate it and start off one step higher. In other words, switch position one will read 4-9K, position two will read 8-13K, etc. To do this, we have only to add one more 150K resistor, between the junction of R-30 (40.2K 1%) which is also mounted on the Switch PC board, and the R-31 - R-35 string, to ground. The easiest place to do so would be right at the lands to which the incoming orange (junction of resistors mentioned) and black (ground) wires coming from the main component board are connected.

If you would rather sacrifice one of the other ranges, add the additional 150K resistor across the corresponding 150K R-31 to R35. For example, adding the extra resistance to R-31 would drop out the 4-9K range, making it read 8-13,

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with each succeeding range now reading one step higher and the end one giving us what we started out to get in the first place, 24 to 29K.

Unfortunately, precision 1% tolerance resistors such as the one required are not easily available in quantities of one, even in the larger metropolitan areas with large electronic supply houses. You can get one directly from Royal Electronics, it's Part No. 006024, at 50¢, but there is a \$2.50 per order handling charge, which makes one resistor a bit expensive, but maybe you can order something else you need at the same time and ease the pain slightly. If you own or have access to a digital VOM, you can purchase a handful of considerably less expensive 5% resistors, out of which you will usually get at least one of the exact value that you need.

Ah yes, one of the great things about the hobby is the sharing of expertise! Joe, I'll be over soon with all my Quickie and Quarter Midget engines for you to make run in this new 24 - 29K RPM range!

**AND STILL MORE RESISTANCE. . .**

. . . reminds me of a girl I knew in New Zealand. . .

Those of you who do much electronic experimenting, or building, or service work, know just how nice it is to have a stock of at least the most commonly needed items into which you can always reach for the exact value component when you need it. It seems that you always have the electronic size just

under and just over the one you need . . . rather like finding out on Sunday afternoon when the hobby shop is closed that the only piece of 1/4-square balsa you have is exactly one inch too short for the project at hand.

Keeping a stock of electronic goodies can be prohibitively expensive, but I recently ran into an acceptably priced resistor assortment about which I would like to tell you. Actually, there are two assortments, from Digi-Key Corp., P.O. Box 677, Thief River Falls, MN 56701.

Assortment No. RS125 contains 365 1/4-watt, 5% carbon resistors; five each of values 1.0, 1.2, 1.5, 1.8, 2.2, etc. through the resistor value table up to 1.0 megs. Assortment No. RS225 contains 360 same wattage same tolerance resistors, five each of the intermediate values 1.1, 1.3, 1.6, 2.0, 2.4, etc., through 910K. Each assortment costs \$9.90, which comes out to 2.7 cents per resistor, a good price for low quantities of each value such as this. By comparison, the same resistors ordered individually by specific values are 25¢ for a five-pack, and the corner Radio Shack store gets 8¢ per.

The same assortments with No's RS150 and RS250 respectively are available also in 1/2-watt values, for those of you involved in circuitry requiring larger resistors.

This company also has a pretty complete line of electronic parts, and a catalog free for the asking. The service every time I have ordered from them has

been good and they have an 800 number which you can call for credit card orders. Even if you don't order a resistor assortment, you should write for a catalog.

### GETTING LIT!

Light Emitting Diodes, or simply LED's, as they are commonly known, have certainly made a place for themselves in the hobby, being found in battery chargers, as battery condition indicators, test instruments, aircraft position lights, and many similar uses. They are inexpensive, reliable, and except for being hard to see in direct sunlight, fill many useful needs. Like many other solid state components, LED's have evolved into many different types, with differing specs, and in different sizes, shapes, colors, etc. However, they all share some basic features, which makes them easy to wire into a circuit. All it takes is some voltage . . . though they do have some rather low current carrying limitations which must be controlled by a series resistor of the proper value.

The simple schematic included shows how to hook them up, and the formula to figure the value of the series resistor is equally simple:  $R = E - V / I$ , where R is the resistance in ohms, E is the value in volts of the supply, V is the design forward voltage of the LED, and I is the design current of the LED in amps. If you don't have specs for the particular LED you are working with, or if you are using some of the many unidentified LED bargains to be found in the electronic marketplace, use 1.5 volts and 15 to 20 mils, which will

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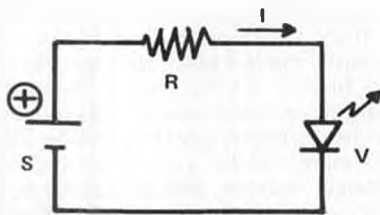
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produce sufficient illumination for most purposes.

Incidentally, the cathode side of LED's is identified by a flat spot on the bottom side of the case, and also by a longer lead. For testing unidentified or questionable LED's, apply three volts through a 33 ohm resistor.

There are now LED's that blink, and some that glow red, green, or yellow by controlling the applied voltage. They have to have some interesting uses in R/C ... just as soon as I find some time...



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## SHOT DOWN BY PAC MAN?

There are many household and commercial electric and electronic devices which are capable of producing radio interference, not only to our type of systems, but to all radio and television receivers. Such devices are known to the Frank Charlie Charlie, as ham operators refer to the Federal Communications Commission, and as such, have to have its approval, granted after testing to insure that such radiations are kept down to specified limits.

However, in a move somewhat contrary to past policy, as reported in The Washington Post, the FCC recently proposed to relax such radio interference requirements as applicable to coin operated video games, such as Pac Man, Space Invaders, etc. The Commission stated that while incidental radiation from such devices can produce interference to radio and television receivers, such games are normally located in commercial areas away from home entertainment equipment. As a result, game makers will only be required to certify to the FCC that all required interference tests have been performed.

There really is no reason to panic; such "incidental radiation", though it could easily fall on frequencies that are important to us, would be of very low power, and would seldom get outside

the local pub. If you are flying close enough to any business that contains such games and were subject to such interference, you were flying much too close anyway.

R/C Auto . . . Continued from page 43

## RENT-A-RACER. . .

Back away I mentioned letting others drive my cars, just so they could get the feel of driving them. That wasn't meant to lead you into thinking that my race cars are always just perf, as they aren't, especially when what I want in handling isn't what everybody wants. The real point of this is that whenever you get the chance, you should drive other racer's cars, especially if that car looks as if it's easy to drive and quick to boot. One of the most difficult things in learning to race is what you are trying to achieve with car setup. You could spend months testing in the street before accidentally coming across that magic combination, mainly because until you get there you're not sure where you're going.

I can still remember the first time I drove a proper 1/8 car, having raced my own for a few times. The difference was remarkable, and the car I had wasn't all that bad, either. Actually, I thought I had the hot tip, as I had driven some other cars that were just simply terrible and figured that all I needed was some more experience to put it all together. The experience did help some, but driving a car that really worked showed me, in just a few laps, how I wanted my car to handle and all I had to do was play with it until it all came together. It took awhile, but it was so much easier, knowing what I was trying to achieve and all it took was the borrowing of somebody else's car for a few laps.

In 1/12 racing, I had a similar thing happen to me. In the 1/12 Gas racing there wasn't much done with handling, as we were all so busy trying to keep the damn engines running, but even so, there were techniques to make the car easier to drive quickly. When 1/12 Electric racing started up, I lost my advantage of (usually) being able to finish the race with the motor still

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running, and turned to handling tricks. Then the first Associated RC12E hit the Seattle area and I had it, along with the definitely superior handling the car gave. In this case, I didn't have to borrow another car to see what a real 1/12 car could drive like, but it was still a real shock, one that you can't appreciate unless you were active in 1/12 Electric racing back in the very early days.

So grab the driver of what looks like a good handling car, cut a few laps with it and see what you think. If you like it, check very carefully to see how his car is set up and then duplicate it. Do be prepared, however, to do a little more than that, as quite often, two cars that appear to be identical will not handle in exactly the same way, so more fiddling will be required. But don't stop there, keep trying to improve the car, as getting your race car set up as well as the best car in the area only puts you on equal terms. The idea is to get the good ol' unfair advantage, not just parity!

Another item mentioned in this column is the use of another race car as a mule. The DRT quite often does this, we will be out practicing and instead of changing all the cars around just to change stuff, will use one as the mule, running the modified car against the mule to see if the changes have helped or hurt performance. Just be sure that whatever car is used for a mule is already set up pretty close to right and that it is a consistent car. This technique works very well in testing motors in 1/12 racing, do be sure to eliminate as many variables as possible, though.

#### PRACTICING...

As long as we are talking about practicing and getting the magic setup on the car, one of the things that we do in this area is to practice on a set night of the week, every week. It happens that we only race the 1/8 cars at our Wednesday night sessions, probably because the guys racing 1/8 here are gung-ho, and it is easier to come up with a practice site for the 1/12 cars with many just running them in front of their house. The important thing here is to appoint a place and day for practice and not change it. No more calling half the club members just to get one or two guys out to practice, on the set night everybody who can just shows up, there are always enough bodies to make things interesting.

Generally, we just set up a 4 or 5-turn road course, using some miniature plastic "plow discs" that Delta sells for just this purpose. These discs can be moved by a car, especially one with a body mounted very low in front, but they work OK and are a lot easier to lug around than real plow discs. Practice is a very informal affair, with lots of grudge races taking place, but the best feature of these Wednesday night sessions is that while there is racing to enjoy, there is not the usual race day pressure of having to be ready or repaired in just a few minutes for another heat race. And you have the chance to try different setups on the car, things you wouldn't try on race day, as a mistake can be costly

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then, where it doesn't make any difference at all when just grudge racing. It's also an excellent time to pick on somebody else's car for use as a mule. Just be sure he isn't changing stuff as fast as you are!

#### THAT HOT TIP ON BATTERY PACKS...

Just as I was slipping this month's column into the mail, realized that a promise was made last month to let you in on the big racing tip.

This tip comes straight from Team JoMac, although others may have also come across it by now, as I have been hearing rumblings that are very similar to JoMac's experience, although just yesterday I heard that Ralphie Burch and Team JoMac had won Production class at the '82 ROAR Nationals, so they still have an edge.

The tip is that to get the maximum out of a battery pack, you get a one-shot run out of it and it noticeably drops in capacity for the second run. I believe that it stays pretty much constant from the second run on through its useful life,

but that first run can be *super*. The pack cannot be tested prior to its use, which means there is an element of chance here, as the pack can have a "low" cell in it that effectively cancels out the potential gain. What JoMac has found is that a brand-new pack can be assembled, fast-charged to capacity immediately prior to the race, no slow-charging at all, and if all the cells are good, which is pretty likely as there aren't many bad cells produced, that pack will give more power through the race and will also push the car for up to a lap of extra time!!

Think about that for a minute... a new battery pack for each important heat race or main event and when you're racing for the big win, aren't they all important? We've got a potential problem here, folks.

And that is just one of the reasons I was given permission to write about it, as before racers are faced with having a few sets of new packs (at around \$40 per) for each weekend of racing, there will have to be some new rules put in effect, as



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none of us wants to get involved with that kind of expense. Maybe you feel that such a situation is self-limiting, and is in a way, as very few could afford the expense, but if this technique continues to prove out, I can see where sponsored drivers could be furnished with new packs for each race, including the local races, instructed to use them once, clean them up a little and send them back to the factory for sale as new packs or in car kits!

We already have rules about Stock and Modified motors, if the batteries are going to be a problem in realizing equal competition, there is no reason why we can't handle the situation with a couple

more rules. I suspect that by the time you read this, Don McKay at JoMac will have already started the ball rolling in this direction, as he is very aware of the fact that if we don't have some limits imposed, 1/12 racing could price itself right out of existence, a happening that none of us wants.

R/C Boats . . . Continued from page 45

they say records are made to be broken and Ed Fisher has certainly done that a few times. In fact, Ed is fast closing in on having established 100 N.A.M.B.A. records since the organization was formed in 1971. That in itself is some kind of record. I still haven't figured out if it's "good news, or bad news" that I get to race these two boats at our Northwest tunnel events.

Here's a suggestion for those running the K&B 7.5 Outboard. Anyone who owns one of these critters knows that it's one heavy hunk of stuff bolted on the transom of a boat. When a 7.5 outboard propelled craft flips, and tunnels have an affinity for this maneuver, the mass of the engine places a tremendous amount of strain on the rudder servo gears. Norm Teagure, N.A.M.B.A. National Tunnel Chairperson and outboard record holder, developed a simple idea to prevent the engine from traveling so violently during a flip. The devices act as stops to limit the amount the engine can

turn. Prather Products has an item available that I believe they call "Servo Savers" that limit the engine's turn. I don't recall the price of this device, but would venture a guess that it's not much more than it would cost to replace stripped gears. I made a set of these motor movement limiters from sheet aluminum. I will gladly provide a sketch of these limiters to anyone sending me a stamped, self-addressed envelope. I believe they are an excellent device to have on boats powered by the K&B 7.5 Outboard.

## A FEW PERSONAL COMMENTS ON THE 7.5 TUNNEL CLASS

As this article is being prepared, our Northwest racing season is just about half completed. I've competed in a number of 7.5 outboard tunnel races the past few months and have developed a liking for this class of boat. Although the class has not obtained the popularity of the 3.5 tunnel class, the competition in my area has been very close and spirited.

One of the more obvious differences between the 3.5 tunnel class and the 7.5 tunnel class is the size of the boats. It's my opinion the 7.5 size tunnels appear more realistic while running. From an aesthetic viewpoint, the larger 7.5 tunnels get the nod from me over the smaller 3.5s.

As might be expected, the 7.5 tunnels are faster than the 3.5s. However, some believe that having twice the displacement should provide twice the speed. This, of course, is not the case. A comparison in record times shows only a five mile per hour difference in straightaway speed and just a couple of seconds in the .9 mile oval record. These record speeds are optimum times. I have found that on the average, my 7.5 tunnel times are 12 to 15 seconds quicker on the same day compared to my 3.5 tunnel times. Racing a tunnel on windy, rough water conditions is difficult. The larger 7.5 boats will handle these conditions somewhat better than the smaller tunnels.

The final item that I found appealing about this class is the K&B 7.5 Outboard itself. My experience with this engine has been very positive. In nearly thirty heats of competition, I haven't experienced an engine failure. Please don't think that everyone who owns one of these engines has experienced similar successes in keeping the engine running during a race. There are some who can't keep it going. These same folks couldn't keep their 3.5 outboard running, either. It appears to me that the engine is highly reliable. Even the best engine will be a nonperformer if proper installation procedures are not followed.

## J.G. PRODUCTS OFFERS NEW PROPS

J.G. Products, 8030 Fordham Road, Los Angeles, CA 90045 is offering a new R Series for 3.5 and 7.5 engines. The RG-25 should prove popular with those running 3.5 deep vees. This prop has a diameter of 1.625, a pitch of 2.50, with .93 square inches of area. There are four new R Series props intended for use with the 7.5 outboards. These four props are

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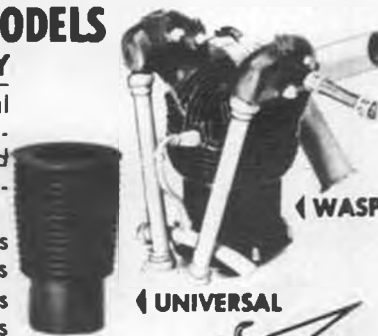
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designated RH-25, RI-25, RH-27, and RI-27. Both RH versions have 1.750 diameter while the RI versions have 1.875 for diameter. The 25 designation denotes 2.50 pitch and the 27 means 2.75 pitch. I have tried these props on my 7.5 tunnel and the 27 type is a little better in performance. J.G. Products has a new chart listing all their props, specifications, and prices. Send a self-addressed, stamped envelope to J.G. Products for this valuable information chart.

## HERE'S ANOTHER OPINION NO ONE ASKED ME TO GIVE

By the time you read this column, assuming it's the current issue, the 1982 N.A.M.B.A. conducted at Los Angeles will be concluded by two months. Job commitments prevented my attending the event this year. I have some real reservations about how N.A.M.B.A. and I.M.P.B.A. conduct their national events. I've talked to others about my concern and a couple of boaters even agree with me.

My big gripe about model boating Nationals is that everyone who pays their entry fee enters the same division. Unlike model car or model aircraft national events where there are ability level classifications, contestants at national model boating events compete in only one ability level. I personally wouldn't consider that level as expert. Having never flown R/C aircraft in competition or raced model cars, I'm not familiar with their systems of advancement. It probably isn't all that complicated. For sure it can't be overly complicated in model cars, because I believe Dan Rutherford can figure the system out. I would guess you race at local and regional, earn placement points, and begin advancement based on points accumulated.

It's my contention that model boating needs to look into some type of ability grouping. Maybe just two divisions. Call them Standard and Advanced. For that matter, call them anything you want. Offer both divisions at your nationals. Until you have accumulated a certain number of points at district level competition, you compete at the Standard level. It wouldn't take any longer to complete the Nationals and it just might make for better racing at the Advanced

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level.

I would be interested in hearing from readers about this suggestion. There are numerous advancement systems we could use as guidelines. Would racing in Standard Class keep you from attending a national boat race? I'll assume that if I don't hear from anyone, that everyone agrees with my idea and I should start the necessary paperwork to get it into the rulebooks.

Jerry Dunlap, 119 Crestwood Dr.  
S.W., Tacoma, WA 98498. •

Hannan . . . . . Continued from page 46

method of experimentation." Sounds as new as yesterday, but this quote came from *Aero* magazine, March 18, 1911.

### RAIDERS OF THE LOST AMBROID

Steven Spielberg, director of such far-out films as "Jaws", "1941", "Raiders of the Lost Ark", "E.T.", and "Poltergeist", was a model builder in his younger days.

### SOLAR SUNBONNET

During a recent Flightmaster rise-off-water meet held at Lake Elsinore, California, Bob Haight, of Las Vegas, Nevada, appeared with a remarkable hat. This was a pith helmet fitted with solar cells feeding a tiny electric fan to cool the head of its wearer. Stand-by power, in case of cloud coverage, consisted of an auxiliary battery pack (pen cells)!

### SCALE IS IN THE EYE OF THE BEHOLDER

Georges Chaulet, tongue firmly in

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cheek, points out that all of the Hughes "Spruce Goose" models now flying are totally non-scale, as of the second time they flew! (think about it)

### FREE FLIGHT IS DEAD?

Paul McIlrath, of Cedar Rapids, Iowa, noted that Ralston Purina, U.S. cereal manufacturers, advertises free air fare on Republic Airlines to any child between ages 2 and 16. How? Well, to qualify, five proof-of-purchase seals from breakfast cereal boxes are required, and each child must be accompanied by a full fare-paying adult. Still. . .

### BOSTON, CANADA?

Simon Blake, of Edmonton, Alberta, sent one of this month's photos, explaining that his club, the Edmonton Model Aeronauts, had conducted a one-design Bostonian contest, utilizing Walt Mooney's MB Boston Found. Simon was the proud winner, but freely admitted he was almost beaten by "a ten or eleven-year-old kid" who came within one second of his duration. Mike Kay made the handsome trophies for the event.

### ZAIC DOES IT AGAIN

The orange-colored book section of our model libraries will be soon expanded, thanks to Model Aeronautic Publications, Box 135, Northridge, California 91328. We've just had a preview of Zaic's latest compilation *Model Airplanes and the American Boy*. This jewel covering the period 1927-1934, is a collection of articles, plans, tips, and

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Airplane Model League of America (AMLA) news as it was featured in the *American Boy* magazine. Painstakingly assembled with assistance from many friends over some 16 years, the volume represents a beautiful summary of the most productive era in the history of model building.

Sparked by the heroic deeds of Charles Lindbergh and other famous aviators, the hobby grew to proportions never approached since. While the AMA seems large with about 80,000 members, the AMLA could boast of some 400,000 representatives! How did they manage it? The answers are here for all to see:

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motivated support by members of the aviation industry and leading aviators, such as Admiral Richard E. Byrd, Bill Stout, Edsel Ford, Clarence Chamberlin, Orville Wright, Alexander Klemin, Eddie Stinson, and Eddie Rickenbacker, coordinated in masterful fashion by AMLA Secretary Merrill Hamburg. Even President Hoover played host to some of the modeling champions! Supporting firms included the Ford Motor Company, Curtiss-Wright Flying Service, Cracker Jack (!), Standard Oil Company, Boeing Aircraft Company, Bellanca Aircraft Corporation, The Waco Aircraft Company, Chance Vought Corporation, Fairchild Airplane Mfg. Corporation, Consolidated Aircraft Corporation, Western Air Express, Pitcairn-Cierva Autogiro Company of America, The Hamilton Standard Propeller Corporation, and many more!

**PUBLICITY:** AMLA activities extended far beyond the *American Boy* magazine audience, thanks to co-sponsorship of its programs by newspapers all over the United States, as well as assistance from the full-scale aviation publication, *Aero Digest*.

**INCENTIVES:** AMLA promoted contests continually, and encouraged potential contestants constantly with sound advice, and prizes that stimulated truly massive participation. How about expense-paid trips to Europe, plus cash, plus trophies?

And proxy entries were not only

allowed, they were heartily solicited. (Peanut Scale enjoys widespread support by proxy, why not other classes now?)

**ASSISTANCE:** Kits, plans, instructions and hints were published in profusion, and a question-answering service was available. (Ed Whitten, of today's Beginning Aero Modelers Association is trying to revive this particular aspect of individual problem-solving).

**VARIETY:** Outdoor, indoor, r.o.w., gliders, flying scale, and exhibition scale were given equally generous encouragement.

**RESULTS:** Comprehensive reports of the contests, descriptions of winning models, and recognition for their builders were regular features. Read this book and see Carl Goldberg in action while still a teenager!

**PRACTICAL PHILOSOPHY AND HUMOR:** Lessons for sound and cheerful living were an integral part of the AMLA formula for success. Perhaps a bit more of each could be applied under today's conditions?

**THE BOTTOM LINE:** Did it work? You bet, and the influence lingers on now. A more-or-less random sample: Almost everyone is familiar with the beautiful models of Lou Proctor. How did he get started? Well, it seems that back during 1929, he was attracted by an AMLA contest announcement, and felt inspired enough by the challenge to devote 16 hours per day for six weeks to building a 24-inch span static scale Vought Corsair biplane.

This was no ordinary project, but one incorporating individual cast engine cylinders, operable dual controls, and every detail accurately reproduced. Although Lou was unable to attend the contest in person, he mailed his Corsair in to compete against a field of entries so numerous that ten days were required just to judge them all! One can well imagine Lou's suspense while awaiting results.

When at last he received a telegram at his Vancouver, Washington home, it made his efforts seem well worthwhile... he had placed first in scale. And his reward? A trip to Canada, then to England, where he met the Prince of Wales and Thomas Sopwith, toured the Hawker Aircraft factory, witnessed a Royal Air Force show, attended a Wakefield contest, crossed the Channel to France where, if I recall correctly, he had lunch with Louis Bleriot! Is it any wonder that Lou's model building enthusiasm persists to this day?

Many other familiar names appear in the pages of this book, confirming the long-lasting influence of the AMLA and the *American Boy* magazine. Frank Zaic has preserved a great deal of the era's vintage flavor by including various advertisements of the time. How about a brand-new Plymouth for \$495? A Kodak Brownie camera for \$2.25? Or a recipe for a do-it-yourself *Oh Henry* candy bar? It's all here.

We were fascinated by the model airplane ads too, especially some of the more obscure firms, including "Self-bilt

Toys Co.", "Broadfield Aeroplane Co.", "Unique Model Aircraft Co.", and (honest!) "The Collins Plow Company"! More familiar names now, but running only tiny adverts back then, were Comet Model Airplane & Supply Co., Junior American Aircraft Co. (presumably Jim Walker), Brown Jr. Motors Corporation, and Cleveland Model & Supply Co., Inc.

We enthusiastically endorse this publication. Price had not been determined as this review was being composed, but was expected to be about ten dollars, surely a bargain. (Just received a phone call from Frank . . . it's \$9.50. wcn)

#### WORLD'S BRIEFEST CONTEST REPORT

Frank Scott, Dayton, Ohio, pen-on-postcard: "Just back from the (West-baden) "24 hour Peanut Grand Prix" . . . anything more fun would be morally reprehensible!"

#### WE GET LETTERS

Although we receive numerous compliments about **Model Builder** and its various departments, this line from Ray Steck, Pottsdam, Pennsylvania, was the topper: "There isn't anything in **MB** I don't enjoy! . . ." Thank you Ray, you made our day. (Amen! wcn) ●

**Peanut . . . . . Continued from page 47**

standard practices with respect to Peanut Scale constructional techniques. All basic structure is conventional, so this article will be limited to things that are a little different from ordinary, i.e. the propulsion system installations, the landing gear wire structure, and some of the cowl details.

First, obviously, both the CO-2 powerplant and the rubber powered nose block must fit into the front of the engine cowling. The rubber powered noseblock and propeller assembly is quite conventional, but it is suggested that a plastic propeller be used and no attempt to lighten the block be made if the model is to be truly convertible, because some ballast will probably be required to match the C.G. location that will be obtained with the CO-2 engine.

The CO-2 Q.C. package, besides being made to fit, was also designed to hold the filler nozzle securely . . . to eliminate tubing vibration as much as possible and to provide a flow of air over the engine and the tank. The scale nose cowl inlets are used to provide a flow of air past the top of the cylinder. The tank and filler box is open at the top and bottom back to the middle bulkhead so air can flow through and back along inside the fuselage. The bottom is closed aft of the bulkhead but the top is open and holes are cut in each of the sides. These holes allow air to pass out of the box around the tank, and also are required to accommodate the tank with a minimum box width. The air then can pass out of the fuselage through both of the cockpit openings.

The resulting Q.C. package is neat and strong. The filler is supported by a solid block. The Q.C. package is removed for filling and held with the nose uppermost

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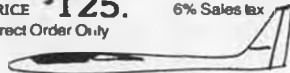
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while transferring the CO-2, for the best loading. On the model in the photographs, the Q.C. package is held in only by friction, and in over 40 flights, the nose has shown no sign of moving forward in flight although the friction measures less than 1-1/2 ounce. Of course, the thrust necessary to fly this model is only on the order of 5 or 6 grams, which is only about a seventh of the friction. If the lack of a positive retainer worries you, create one, but it does not appear necessary on the original model.

The propeller used is the one that is presently being provided with the Campus A-23 engine. Make sure it is properly balanced, otherwise no modifications are suggested. The spinner on the model was molded over a balsa pattern on a Mattel Vacu Form, trimmed to fit the propeller and cemented to the propeller using one of the instant adhesives and a little baking soda in the joints, after the propeller is securely on the engine. Be very careful not to get any adhesive on the engine, it would lock up instantly and there is certainly no warranty against that.

Engine power adjustments have been made through the nose cowl air inlets using a small screwdriver to push on the tiny notches around the top of the cylinder. This has been satisfactory, but you may find cutting a door in the nose cowl advantageous.

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of two separate tripods, the landing gear wire is designed to be made in three separate pieces: the central "V" including the wheel axles, and the two upright shock absorber legs. The front view shows the true pattern for the wires. Solder the wires together just inboard of the wheels. Slot the fuselage uprights and cross piece to install the wires. The struts go just aft of the wires except for the thicker lower portion of the shock absorber, which is made in two pieces and sandwiches the wire. At the bottom surrounding the solder joint is a stubby cylinder which on the real airplane probably contained the wheel brakes.

All struts, landing gear, cabane, and wing "N" struts have a streamlined



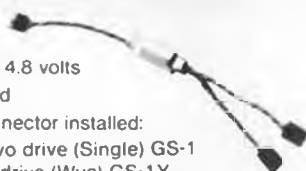
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cross-section.

Cowling details can do much to enhance the model. There are six exhaust stacks on the bottom, and four significant scoops which should not be omitted. In addition, there are a series of louvres on the right side of the cowl.

The model was built to simulate an airplane that was flown in "Scuola 1 periodo di Siena, Siena-Ampugnano, primavera 1941 . . . at least that is what the three-view in "Dimensione Cielo #10 Scuola Collegamento" says. I found the color scheme delightful and tried to simulate it as lightly as possible. The model was covered with white light-

weight Japanese tissue and given two coats of very thin clear dope. Then the white areas and the insignia circles and the tail stripes were masked off with plastic frisket paper and one very light coat of silver sprayed on. After demasking, all the color details were added using Staedtler Lumocolor permanent felt pens which are designed for use on acetate sheet transparencies and which work just great on nitrate dope finished tissue paper.

This model has given me a great deal of fun and I can be sure that if you build it it will do the same for you. ●

**Stability . . . . Continued from page 53**

not require low aspect ratio. A 15.5 gm model with a 36 x 3 x 1/16 inch square-edged wing would glide with its balance anywhere between 20.5% and 36.7%. There was no wing dropping, but the phugoid (roller coaster) stability was poor. Shortening the wing to 4 inch span revived the wing dropping, repaired the phugoid stability, and gave a balance range of 21.8 to 35.3%. The model then weighed 5.5 gm. Sharpening the leading and trailing edges of both wings made no great difference.

Catapult launching of the 8 inch span models was done with letter carrier's elastic bands, each a 3 inch loop of 1/4 x 1/32 rubber. With balance forward of

23.75%, the models flew straight on all launches. With it aft of 23.75%, but not too far aft, the models flew straight on most launches, if carefully warped to straightness, yet if struck by wind gusts, they might go into inside or outside loops of small radius. The same model would do inside or outside loops, depending on its luck with the gusts. Looping is to be expected if the superstable regime persists at high speed, because a stable airplane loops if flown fast. Evidently superstability persists.

Shifting the balance aft makes straight flight harder to achieve. The straightness of the model gets more and more critical. With its balance at 25% a well-straightened model could be catapulted to great height, if untroubled by gusts on the way up. Arriving there at low speed, it would start to glide. It might then glide smoothly to the ground, or get tripped out of its glide by rough air and plunge downward, perhaps to go all the way, perhaps to snap into a pull-out or loop, and glide once more. It might then plunge again, etc. With the balance at 27% the flight pattern was similar except that the slowing model would end the upward part of its flight with a quick loop. With the balance at 29%, the model would go straight only a few feet after the launch, even after the most careful straightening. It appears that the faster the model goes, the farther aft the balance can be without the model's snapping from straight flight into loops.

"Straight flight" at high speed is not perfectly straight. The model follows a fairly constant pattern of mild pull-ups and push-overs, showing that trim as well as stability varies with speed. The models are not entirely symmetric. The fin projects one way up because it must miss the hand that holds the catapult. The fuselage is above or below the wing. These asymmetries, and the inevitable imperfections and warps, must be compensated for by intentional warps. Evidently the amount of compensation required is not quite the same at all speeds.

With the balance somewhere forward of 23.75% the model ceases to fly at all in the superstable regime at high speed, but will fly superstably if launched in the glide. It thus mimics a zero-zero chuck glider. Catapulted at exactly the correct angle, the model will reach a great height in the normal regime, there find itself travelling horizontally at gliding speed, make the transition to superstability and glide all the way to the ground if rough air does not upset it. If upset, it will nose down, accelerate, and not recover at all if it has been well straightened, or recover very slowly if it has a little camber. If, at the top of its trajectory, it passes through the horizontal attitude while flying too fast, it will follow a nearly ballistic trajectory, and never shift to the superstable regime. If it passes through gliding speed while still climbing steeply it will stall and then plunge toward the ground in the normal regime.

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Summing up, the ballasted plane can fly superstably with its balance between 22% and 36%, but when the balance is forward of 23.75%, superstable flight occurs only at low speed. It can fly in the normal regime with the balance anywhere forward of a point that shifts backward progressively from 25% at low speed to 29% at catapult launch speed. The flight envelopes for the two regimes are shown in Fig. 4.

#### PITCH DAMPING

Unlike the ballasted plane, a chuck glider will not fly superstably at high speed. If one moves its balance farther and farther back, it becomes unable to glide long before it does superstable loops after launch. Typically, the high speed part of the flight looks fairly normal, but as the model slows to gliding speed it rears up, stalls and staggers to the ground.

The chuck glider cannot do the ballasted plane's little high speed loops because its tail gives it much more pitch damping than the ballasted plane has.

To think about pitch damping, first note that because the center of drag is not far above or below the c.g. (this is especially true of the ballasted plane) any pitching moment due to drag is quite small. Therefore any lift moment must be small also. The center of pressure must be close, in the fore and aft direction, to the c.g.

For a model to have longitudinal stability its center of pressure must move forward if its angle of attack is lowered. Far aft balance (and c.p.) positions correspond to high angles of attack, which are obvious to the eye with ballasted planes. Lowering the angle moves the c.p. progressively forward to a bit ahead of 22%, but further lowering moves it back once again.

Consider a gliding ballasted plane. The lift equals the weight of the aircraft. Now make the model move at catapult speed, six times as fast, along a track so it has to go straight. Its lift rises by 36 times. If the model is freed from the track, this enormous lift will make it pull up and loop.

When the model loops, its curved path gives its rear part a higher angle of attack relative to its path than the front part. A flat wing doing inside loops is like a positively cambered wing moving straight. If nothing else changed, this effective camber would move the c.p. aft. As the balance remains where it was, the resulting nose down moment would pitch the nose down. The consequent lowering of the angle of attack would move the c.p. forward until it was again in coincidence with the balance, thus eliminating the nose-down moment. So an airplane flying in a curved path flies at a lower angle of attack than it would in a steady glide. The lighter the model is, for a given size, the more curved is the path, and consequently, the greater is this reduction. Because a tail is much farther aft than the rear part of the wing, path curvature causes a larger increase in its angle of attack, and the large force that results is applied at the end of a long



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lever arm. Adding a tail therefore greatly increases the nose-down pitching moment, and causes a large reduction in path curvature and angle of attack of the wing. A canard surface in front has a lower angle of attack than the wing, and again causes a nose-down pitching moment, reduced path curvature and wing angle of attack.

Aero engineers treat the path curvature effect in a different way that means the same in the end. Rather than consider the shift in center of pressure consequent on flying in a curved path, they break the aerodynamic force into the sum of a force at the original c.p. and a damping torque proportional to the pitch rate, and in the direction that slows the pitching.

If the balance of a ballasted plane is ahead of 23.75%, the lowering of the angle of attack by flying in high speed loops is evidently sufficient to drop it below minimum for superstability, because at high speeds the model can only fly in the normal regime.

In a chuck glider, the stabilizer, far away from the wing, greatly increases the pitch damping. Instead of shifting the c.p. backward by a few percent of the chord, if the model were guided round a loop at its gliding angle of attack, it would shift it a chord length or so. Unless the balance is one chord length aft of the location that trims the glide, the model will fly in the normal regime at high speed. With the balance this far aft, the model will not glide.

Conventional chuck gliders have more pitch damping than is needed to suppress superstable flight at high speed. A very small stabilizer is sufficient. A modest amount of sweepback or sweep forward can do the same job by increasing the fore and aft extent of the wing while leaving its chord unchanged.

At the apex of the launch trajectory, a designer wants a chuck glider to change from the normal to the superstable regime. The model is here flying slowly, whether right side up or inverted, and following a path shaped like the top of the St. Louis arch. The lift force is from below. The wing pulls toward the outside of the curve, not the inside, so pitch damping here increases the angles of attack, which is what is needed to shift

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the model from the normal to the superstable regime.

#### PITCHING INERTIA

I made one ballasted plane with a fuselage as long as that of a chuck glider. It was marginally stable at best, in the glide, without some added pitch damping. The extra pitching inertia gave it such a slow and lightly damped pitch response that its pitch attitude would get out of step with its flight path. This was cured by adding a canard and a tailplane each 7% of the area of the wing a distance 5-1/2 inches, center-to-center, ahead of and behind the wing (Fig. 5). Because the fuselage was slightly arched, the incidence of the two surfaces differed by 2.4 degrees. The model would

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glide stably either way up, but faster when the longitudinal dihedral was negative. Thus, even for a model with zero camber, the pitching inertia that a fuselage adds makes a tail, a canard, or sweep necessary for gliding stability. It is not needed to secure stable center of pressure travel, which superstability already provides, but to give extra pitch damping.

### TRIMMING RULES FOR SUPERSTABLE GLIDERS

The longitudinal trim of a chuck glider at high speed depends sensitively on the longitudinal dihedral. A small warping

up or down of the trailing edge of the stabilizer makes a large difference in the flight path. This warping has much less effect on the glide. Superstability gives the model so much effective longitudinal dihedral that modest changes in the real longitudinal dihedral are small by comparison. To trim the glide one must shift the balance. This shift, in turn, has little effect on the high speed trim, because the pitch damping is so large that only a small change in pitch rate is needed to compensate for the change in the moment of the balance about the zero pitch rate c.p. These trimming properties are

well known, but unless the presence of superstability and the effect of pitch damping are recognized, there is no sensible explanation for them.

TO BE CONTIUED

C/L . . . . . Continued from page 55

membership costing \$30 now, with rumbling going on about pushing it even higher. Admittedly, for the active flier, especially active competition fliers, whatever portion of that 30 bucks goes for insurance is probably worth it. But there is still a problem, as a bunch of AMA people have to subsidize the insurance costs for those in the high-risk category and I think we can be absolutely certain the insurance company we deal with (whichever one it is, nobody seems to know or to be willing to tell if they know) looks on the Q.S. models as especially risky. First, just because of their size, secondly due to the absolutely outrageous powerplants being used in them, and then because there are few, if any, controls on them in the form of rules or even a list of suggested safety practices.

Last item up is the press coverage of the Q.S. meets. OK, once in awhile a crash is noted, maybe even a picture of a model going in, as with that big bomber that went to Good Riddance Land. But by and large all is perfect and in control, according to what you read. A few months ago a major Q.S. meet was described to me by a friend as the scene of models raining out of the air, and although I have decided not to identify him, he is a respected competition modeler as well as a columnist for things R/C, one who knows very well what is going on and not prone to livening up a story just to make it better. Yet the reports on this meet were super rosy. Hey, I'm not asking for the crashes to be glorified, but all crashes represent a mistake of some kind, let's start eliminating future mistakes by telling what happened and how it can be avoided. There isn't a rulebook to put these safety items in, remember.

Say, that felt really good to get that off my chest, but it wasn't written for that reason alone. I am concerned about the future of modeling, CL modeling in particular, and can see where just one or two accidents could really have a big impact on us all. No, I won't conjure up a scenario for you, anybody with intelligence at all can figure out the possibilities.

When will something be done about it? Got me, but if history does indeed repeat itself, look for some positive action from the AMA just after the dreaded, but almost inevitable, serious accident occurs. Count on being asked to help pay for it in many different ways.



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### Workbench. . . .Continued from page 6

providing service and repairs.

British modelers are invited to make inquiries and place orders, and the company looks forward to the opportunity to serve their future requirements.

### THIRTY PIECES OF SILVER

The above title belongs to another interesting newsletter editorial by Ray Cummings, editor of *Hear-Ye*, newsletter for the Valley Forge (Pennsylvania) Signal Seekers. I say "another," because we just recently published a fine piece by Ray which defended the local hobby shop in its intense battle with the mail order discount operations. The following is another topic that should be of interest to all R/C hobbyists.

The other day I was at the local hobby shop rapping as usual about RC. The owner was proudly displaying his latest

construction project . . . a one-third scale SE-5. The size is modestly awesome by any standard. Prop size 24/6, Big Kioritz engine (3.2 HP) and wheels right off a baby carriage. With airplane "models" approaching 50 pounds, driven by engines that can develop three HP, one can only wonder where fantasy ends and reality begins.

We drifted out front, where four young men (late teen-early twenties) were inquiring about parts for their hobby interest of RC racing cars. In the course of the discussion, it surfaced that three of them were using frequencies that were assigned model airplane use to control their machines. I became interested at this point and started asking questions. The dialogue went something like this:

QUESTION: "Did you realize that you are using RC frequencies that are specifically assigned to model aircraft use

only?"

ANSWER: "No."

QUESTION: "How did you come to acquire the radio transmitters on aircraft frequencies?"

ANSWER: "One got his from mail order, the other two were sold their sets from local hobby shops."

QUESTION: "Did the local hobby shop salesperson know that you intended to use your RC radio set for cars and not airplanes?"

ANSWER: "Yes. As a matter of fact, one of the salespeople was a flyer and a former member of VFSS."

QUESTION: "The salesperson knew that you were going to use the radio for the operation of RC cars, yet he sold you frequencies that are restricted for aircraft use only. Do you know why he did this?"

ANSWER: "No. We were never told anything about restricted frequencies.



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All we want to do is operate the cars and have some fun in the process. We have been operating them for some time now and this is the first time we have learned that we are on the incorrect frequency." QUESTION: "Now that you know that you are using frequencies assigned to airplanes and not cars, what do you intend to do about it?"

ANSWER: "Go right on using it, just as before. It's the set that we were sold and we intend to use it. We don't know anything about airplanes or assigned frequencies and we really don't care. It's not our problem."

At this point they all seemed to look at one another and decided that it was time to split. Perhaps they could see the look on my face and the anger building inside of me. Two of them were using frequencies that I use; Red/White, Green/

White, the other was using Orange/White. It's too bad that our brief relationship had become adversarial for they were all decent guys and their answers were all honest and just about what you could expect them to say. My resentment was not directed to them but rather to the person who sold them the equipment and the system that allows this to happen in the first place. They have a right to enjoy their hobby, just as I enjoy mine. That we are now causing each other pain and anxiety is the direct result of the person who sold them the system on the wrong frequency for their purpose of operating cars on assigned aircraft frequencies. Allowing hobby shop salespeople or worse (remote mail order houses) the option to supervise the distribution of available frequencies ... shared, restricted or

otherwise, is so senseless and irresponsible that it is no system at all. Allowing the Fox to guard the chickens would appeal to the same mentality.

There are things about RC that really annoy me. I become frustrated and angry every time the subject comes up. Radios and the "control" of same is the love/hate relationship that makes us what we are and breaks us at the same time. I would personally spend \$1000 or more for a radio set that cannot be interfered with. We are talking about "control" ... without which one really has nothing. The investment of time and money spent building beautiful models is ridiculous and adolescent when one contemplates the thought that control is so marginal (really a gift from God) when the airplane is committed to function as a flying model.

If I can be the Captain of my fate then I am willing to pay for it. Let ME be responsible for my accidents and not the forces of destiny. I enjoy gambling, but not when it comes to flying my airplanes that I have worked on for months and cost a small fortune to maintain. I hate being at the short end of the stick and victimized by the greed, apathy, arrogance, and incompetence of so many who are in a position to do something, yet instead, choose to pass-the-buck. Who is to blame for this latest atrocity, committed against the flying RC community. Let's start with the manufacturer of RC cars.

MANUFACTURER: Being a Johnny-come-lately into the RC market, one would think that he might take into consideration that the airways are already crowded and limit his product to

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certain frequencies by building into the design a receiver that will only accept input from that which is not restricted. Does he choose to do so? NO! Why? Business is the answer here. He wants all he can get and is not going to raise the price of his product and limit his market at the same time. His product can be used by any frequency and he allows the choice to be made by the consumer and distributor of his goods. This is a cop-out on his part, motivated by money, and the RC flyer pays for it in pain.

**HOBBY SHOP SALESPERSON:** In the world of hobby shops, the standard is everyone different. They are all in the business, however, and in the dollar culture of the business environment, money talks and nobody walks. I have defended the hobby owner before (Penny Wise and Pound Foolish) but now I come to bury him. Indiscriminate selling of radio frequencies makes a mockery of any system designed for the good and safety of all. Integrity is usually in short supply where money is concerned, and any system that lets these people make responsible decisions is naive at best and criminal at worst. To the moneychangers out there who laugh all the way to the bank, I quote from LUKE: "IT WOULD BE EASIER FOR A CAMEL TO PASS THROUGH THE EYE OF A NEEDLE THAN FOR A RICH MAN TO ENTER THE KINGDOM OF HEAVEN."

Once again, it is the RC flyer who pays in pain for the indifference of others who could make the system work but choose instead to sell what they have regardless of the consequence of such action.

**THE AMA:** Ah, yes, the AMA. You were waiting for that one now, weren't you? There is so much that it could do. After all, it's the only RC regulatory agency that we have. Why is it not more effective in preventing loose conditions to exist. It is massive and has its only monthly publication. It can be expected to bring an influence of considerable pressure towards any target of its choice. Yet, in spite of it all, we have the chaos that reigns supreme today. Its work toward getting us the new frequencies is commendable, but is it too little, too late? We do not need suggestions. . . we need laws that have teeth in them. The AMA has not done enough and I blame it because it happens to be all we have. At least it is not a case of greed here. . . However, the bottom line is just the same: It is the RC flyer who pays in pain, just as before.

What's it all leading to? Where are we right now in the flying season of 1982? Planes are getting so big as to defy the imagination and control is being subject to ever increasing infringement. We are on a collision course with law suits, injury, and who knows what? How many are going to have to be hurt before sanity and law and order can regulate the apathy out of this hobby of ours?

Instead of developing bigger and more dangerous quarter-scale airplanes. . . the energy should go into better

means of control . . . really foolproof means of control, regardless of cost. Without that, we are like children playing with matches, lost in a world of make believe. Reality will come soon enough when the mass you have launched into the air goes out of control because someone over the horizon turned on a transmitter to race his RC car on your aircraft frequency. If you are lucky, it will just go into the ground and make a big hole in both the turf and your pocket-book. Next time you see me at the field, don't laugh if you see me wearing a steel helmet!

**New Ruler . . . Continued from page 34**

One design that did not deter even some of the less energetic competition model builders of the period, was the New Ruler. Although a little tricky to build in spots, hundreds of New Rulers showed up at contests soon after plans appeared in the April and May 1940 issues of *Air Trails*.

Struck designed this model to meet the new NAA gas model rules for 1940; a model "must weigh at least 80 ounces for every cubic inch of motor(s) displacement." This, and the eight ounce minimum weight per square foot wing loading, pretty much dictated wing area and total weight once the engine was selected. Struck's resulting design was thus aptly named, the "New Ruler".

In his April 1940 article, Struck went on to say, "Aerodynamically, stability is most important. A model should climb evenly and in circles to avoid a dip when the engine cuts. During the glide the circle should be constant, without any tendency to waver or 'crab.' The model should not be critical to adjust, and any slight accidental change in setting should not bring on disaster.

"A parasol wing will keep the nose up and magnify the desirable effect of a polyhedral wing. A large lift stabilizer will dampen the nosing-up tendency of the parasol before a dangerous stall results. The area of the rudder and the rear of the fuselage are vital to spiral stability. If the area is too small the ship will whip suddenly into a tight spin. If too large, the ship will tend to remain in whatever position it assumes, with the possibility of either a straight loop or a tightening spiral. From experience we have found the best position of the C.L.A. (center of lateral area) to be about one fourth of the fuselage length behind the C.G. (center of gravity).

"The construction of the ship would permit the various structures to be easily lined up without sacrificing cleanliness. Every part should be quickly demountable for transportation and shock absorbing. The entire engine unit should be available for instant checking, including the important flight timer mounted in a handy position, for setting or release when the model takes off.

"All these ingredients have been incorporated in the New Ruler. The consistent performance of the ship has demonstrated them. Powered with a

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As with last month's O.T. Model, Bill Gibson's "Arrow," we are including the designer's detailed instructions with each set of full-size plans ordered. This should help modelers get through some of the tricky areas of construction.

And please, if you build a New Ruler, make a cowl. The ship just doesn't look right without one. (Hmmm . . . wonder if we can get Tom Keeling, of TFD Fiberglass to crank out a cowl. We'll send him a plan . . . you write and tell him you want one.)

**Indoor Champs . Continued from page 58**

around which the models must turn. By adjusting your model to fly a circular pattern, it may be made to fly outside both Pylons. The model is timed for two full turns around the course and the



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lowest time (highest speed) wins. Two classes were scored; the Peanut and the Unlimited.

The event looked interesting enough that a most illustrious guest, Paul McCready (of Gossamer Condor fame), who was to be the speaker for the evening Awards Banquet, was induced to participate by assisting NFFS Director, Hardy Brodersen, to fly his unlimited class racer.

To my surprise and admiration, it was a small scale model that won both the Peanut and the Unlimited Class races. The model was the Miss Foo, one of the Folkert's racers from the Cleveland days. This aircraft killed its pilot, Gus Gotch, when a canvas seat failed during a high G pylon turn. Martin Varney built this model and did an admirable job of adjusting it to fly around the course fast and very stable. I still don't understand with what golden touch some modellers like Martin are gifted. Klutzes like me build a high wing parasol and can hardly make it fly, yet he comes along with this short span, straight-wing racing bomb and makes it fly like a dream!!

We barely had time after the flying to clean up and reappear looking half civilized for the Awards Banquet.

My opinion of banquets is almost as low as my opinion of the keynote speeches at banquets. At Westbaden, however, this event had to be the highlight of a most successful and enjoyable Meet.

Who would you believe could drag a very busy and well known celebrity from California to Indiana to liven the dinner of a group of Indoor Modelers. Well, for one, Don Lindley, a modeler and contest director who worked it out all by himself.

Thanks to Don, we enjoyed a fascinating hour listening to Dr. Paul McCready tell us about models and ideas that culminated in his winning the two Kramer prizes; the Solar Challenger Paris-to-London flight, and his dreams for the future. A truly remarkable man, and if you ever have a chance to listen to him, by all means, do!

Dr. McCready seemed as interested in the models as we were in his unusual man-carrying machines. He left the contest with an armful of NFFS digests,

symposium reports, and a copy of Ron Williams' book, "Building and Flying Indoor Model Airplanes" autographed by all the contestants.

Thursday through Saturday the events formed part of the annual National Indoor Model Airplane Society Record Trials or VII NART. This annual event was choreographed by Dr. John Martin of Miami, Florida, and Don Lindley acted as contest director. Although there is a point system contest, the main objective of the Meet is to give its participants an opportunity to set records in the various indoor categories.

The scoring was established by comparing each flight against the existing record for the ceiling height, category of airplane, and contestant age, and deriving the percentage above or below the record. This means that any score above 1.0 is a record breaking flight while those less than 1.0 establish a position in the contest but do not exceed existing records. Dave Lindley, for instance, established the highest score for the meet, 1.24, with a Penny Plane. This means that Dave beat the existing Penny Plane record for senior age fliers by 24%.

If you consult the results tabulated at the end of this article, notice that it was the younger fliers (those in the Junior and Senior categories) who walked off with the first four places. Dave Lindley, Paul Loucka, and Bobby Skrijanc have been attending these indoor meets regularly and have had excellent indoctrination from their expert fathers to bring them to this level of flying.

The first Open Class flyer in the winners list is down at fifth place, and that honor goes to a very deserving Cezar Banks (San Diego, Calif.), who tried very hard and succeeded in exceeding the record established long ago by Jim Richmond. Cezar's record-breaking flight drew a well deserved applause from the witnessing crowd.

The Peanut Grand Prix event started at 8 p.m., June 18th, and ran through the night until 8 p.m., June 19th! There were about 75 scale entries in various classifications, and an enormous diversity of subjects, from the vintage Santos Dumont canard up to several twin-engine aircraft. I believe the only type of craft not represented was a jet, and it would not surprise me to see one show up next year, driven by a rubber powered ducted fan. (There it is builders, an exotic suggestion to gain you max points next year; say you read it in MB.)

The quality and variety of aircraft were the best this reporter has seen and what was most surprising was those models that were most far out seemed also to be the best performers. For instance, take Jack McGillivray's model of the 45T Yugoslavian twin-engine research aircraft. This tiny twin-engine Peanut was a superb and consistent flier. How Jack packed enough turns into the rubber which fit into the diminutive nacelles, I will never understand. Jack mentioned he had trouble during the initial testing until he decided to inter-change left and right counter-rotating propellers. Seems

the new airflow achieved was right for this configuration. If you doubt the flying ability of this twin, let me repeat for you Jack's story.

Driving down from Canada to Westbaden, Jack and his band of Canadian Modelers stopped at an Outdoor Peanut contest and entered the 45T Twin. On its winning flight, and after the model had maxed, the unwound motor allowed one of the props to drop off. Jack carefully followed the one of a kind hand-carved propeller to the ground. The prop was promptly recovered but the airplane was lost, nowhere to be found. Finally his crew climbed a tall tree to look down and located the 45T among the weeds.

It was surprising to see the number of Peanuts that were sent in to be proxy flown, and this made the Meet international in scope. In addition to Canada, which was represented by a very able team, there were models sent in from West Germany, Switzerland, and England. A Romanian modeler also shipped a Peanut, however, this one had not arrived for the Meet.

There were about a dozen proxy fliers to handle the models which were shipped in, and I can assure you that they worked as hard and as cautiously as if these were their own models. Each of these proxy fliers is a real expert to whom I would happily entrust my own creations. You can be rest assured that if your proxy did not win, it was because someone built a model even better than yours! Look at the list at the end of this article and you will notice the number of proxy-flown ships that ranked high in the placings.

I collected the following list of proxy fliers who deserve my credit and congratulations, and I hope I have not inadvertently missed someone:

Bill Biggie, Bill Chris, Walt Everson, Vito Garafalo, Don Lindley, Chuck Marcos, Del Ogren, Charlie Sotich, Frank Scott, Martin Varney, Millard Wells.

The high time for the Peanut Meet went to Millard Wells, a prolific modeler from the Miami area, who flew a Beardmore Weebee. The best static score went to another Miami flier, Mike Arak, with his Nieuport 17. The Best Achievement Award is now in the hands of Jack McGillivray for his Yugoslavian 45T which was described above, and finally, the Grand Peanut Award was presented to Warren Shipp, whose A.V. Roe 612 Autogiro was proxy flown by Don Lindley, assisted by Frank Scott.

In closing, I want to let you all know that the schedule for the 1983 Westbaden Indoor Meet has been set for the third week in June, barring any unforeseen events. If you are at all interested in Indoor it is hard to see how you could miss this one. Sell your Mother-in-Law's jewels or hock your furniture but be sure you make it to Westbaden. If I can help you with any further information, don't hesitate to ask at P.O. Box 733, Laguna Beach, CA 92652, or through MB.

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- Deeply Knurled Grip
- Long-Life Stainless Steel Blades

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### uber Skiver Precision Cutting Tool

Available in seven satin anodized handle colors: silver, blue, red, green, gold, black, and violet. Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . \$14.95  
Individual handles (specify color) \$5.95  
Vial of 6 blades (No. 10, 11, or 15) \$2.10  
(No. 12 or 20) \$3.30

## MODEL BUILDER PRODUCTS

621 West Nineteenth St., Costa Mesa, California 92627

### WINNER LIST

#### MANHATTAN CABIN

1. Charles Markos . . . . . 9:57
2. Larry Loucka . . . . . 9:50
3. Walt Van Gorder . . . . . 8:40

#### PAPER STICK — OPEN

1. Jim Richmond . . . . . 25:38
2. Ron Ganser . . . . . 25:11
3. Ed Stoll . . . . . 23:29

#### PAPER STICK — JUNIOR/SENIOR

1. Dave Lindley . . . . . 15:15
2. Paul Loucka . . . . . 10:50
3. D.G. Brown . . . . . 7:46

#### EASY B — OPEN

1. Gerald Skrjanc . . . . . 20:43
2. Stan Chilton . . . . . 20:31
3. Walt Van Gorder . . . . . 20:19

#### EASY B — JUNIOR/SENIOR

1. Robt. Skrjanc . . . . . 11:08
2. D.G. Brown . . . . . 7:52

#### BOSTONIAN

1. Jack McGillivray . . . . . 648 points
2. Martin Varney . . . . . 327 points
3. Robert Clemens . . . . . 297 points

#### AMA STICK — OPEN

1. Jim Richmond . . . . . 32:54
2. Richard Doig . . . . . 31:24
3. Paul Tryon . . . . . 29:32

#### AMA STICK — JUNIOR/SENIOR

1. Dave Lindley . . . . . 17:43
2. Paul Loucka . . . . . 14:51
3. Mike Clem . . . . . 13:58

#### ROG CABIN — OPEN

1. Richard Doig . . . . . 22:54
2. Ron Ganser . . . . . 18:25
3. Larry Loucka . . . . . 16:49

#### F1D — OPEN (2 best flights)

1. Stan Clinton  
32:30 + 30:56 = 63:16
2. Jim Richmond  
29:35 + 33:30 = 63:05
3. Ed Stoll  
29:40 + 29:26 = 59:06
4. Richard Obarski  
30:48 + 27:45 = 58:33
5. Paul Tryon  
28:17 + 28:58 = 57:15

#### PENNY PLANE — OPEN

1. Walt Van Gorder . . . . . 11:34
2. Gerald Skrjanc . . . . . 11:30
3. Bob Warmann . . . . . 10:45

#### PENNY PLANE — SENIOR

1. Dave Lindley . . . . . 11:30
2. Kris Warmann . . . . . 10:42
3. Mike Clem . . . . . 3:34

#### PENNY PLANE — JUNIOR

1. Paul Loucka . . . . . 11:05
2. Robert Skrjanc . . . . . 7:46
3. David Brown . . . . . 3:37

#### NOVICE PENNY PLANE — OPEN

1. Cezar Banks . . . . . 11:43
2. Walt Van Gorder . . . . . 11:32
3. Bernie Boehm . . . . . 10:22

#### NOVICE PENNY PLANE — SENIOR

1. Mike Clem . . . . . 9:28
2. Kris Warmann . . . . . 6:05

#### NOVICE PENNY PLANE — JUNIOR

1. Paul Loucka . . . . . 11:12



## RUBBER STRIP

**FAI RUBBER. Made in U.S.A.**  
**SIZES: 1/4", 3/16", 1/8", 3/32", 1/16", by 1mm (.042") thick.**  
**BOXED 16 ounces of rubber per box.**  
**PRICE: \$12.00 per box, postpaid in U.S.A.**

**NEW PIRELLI**  
**SIZES: 6mm, 3mm only, 1mm thick**  
**PRICE: \$18.00 per hank (approx. 1/2 Kg.)**  
**TIMERS: KSB, Fuel & DT: \$11.50 ea. plus 10% UPS.**

Sole U.S. Distributor and World Wide Sales. Send 25¢ for 1981 CATALOG.

**F.A.I. Model Supply**



P.O. BOX 3957 TORRANCE CA 90510

- 2. Brian Varney ..... 6:38
- 3. David Brown ..... 3:27

### HAND LAUNCHED GLIDER — OPEN

- 1. Bernie Boehm ..... 128.6
- 2. Bob Larsh ..... 119.0
- 3. Stan Stoy ..... 95.2

### HAND LAUNCHED GLIDER — SENIOR

- 1. Brian Fulmer ..... 104.6
- 2. Brad Fulmer ..... 97.8
- 3. Kris Warmann ..... 91.8

### HAND LAUNCHED GLIDER — JUNIOR

- 1. Paul Loucka ..... 80.6
- 2. David Brown ..... 45.2

### AMA SCALE — OPEN

- 1. Jack McGillivray (SE5) ..... 177
- 2. Ed Stoll (Corben) ..... 171
- 3. Ken Groves (Bucker Jungmeister) .... 166

### AMA SCALE — JUNIOR/SENIOR

- 1. Kris Wormann (Pilatus Porter) ..... 87
- 2. Dave Brown (Lacey M10) ..... 65

### PEANUT SCALE — OPEN

- 1. Jack McGillivray (Volkspplane) ..... 199
- 2. Ken Groves (Fike) ..... 192
- 3. Jim Miller (Piper Vagabond) ..... 183

### PEANUT SCALE — JUNIOR/SENIOR

- 1. Brad Fulmer ..... 142
- 2. Brian Fulmer ..... 131
- 3. Brian Varney ..... 107

### PEANUT SPEED

- 1. Martin Varney (Folkerts)
- 2. Millard Wells (Anderson)
- 3. Terry Markava (Lacey)

### UNLIMITED SPEED

- 1. Martin Varney ..... 5.49
- 2. Brian Varney ..... 8.60
- 3. Chris Matsuno ..... 9.91

### NIMAS VIII NART (INDEXED CONTEST)

- 1. Dave Lindley (Penny Plane Senior) .. 1.24
  - 2. Paul Loucka (AMA Stick Junior) .... 1.14
  - 3. Paul Loucka (FAI Stick Junior) ..... 1.13
  - 4. Bob Skrjanc (Paper Stick Junior) .... 1.09
  - 5. Cezar Banks (FAI Stick Open) ..... 1.04
  - 6. Stan Clinton (EZB Open) ..... 0.992
- When indexes above are greater than 1.00 a new record has been established, i.e. 1.24 indicates 24% above existing record.

### PEANUT GRAND PRIX PIONEER CLASS

- 1. John Martin (14 Bis)

- 2. Rainer Lotz (14 Bis)  
(Proxy from W. Germany)
- 3. Mike Arak (Chiri Biri)

### WARPLANE CLASS

- 1. Dave Kiefer (Sopwith Tripe)
- 2. Jack McGillivray (SE5)
- 3. Mike Arak (Nieuport 17)

### GOLDEN AGE CLASS

- 1. Alfred Gunther (Bucker BU131)  
(Proxy from Switzerland)
- 2. Robert Clemens (Farman Moustique)
- 3. John Martin (Dornier Mercur)

### MODERN CLASS

- 1. Jack McGillivray (Yugo .45T)
- 2. Jim Miller (Piper Vagabond)
- 3. Lou Leifer (Volkspplane)

### FIKE-LACEY CLASS

- 1. Ken Groves (Fike)
- 2. Jim Miller (Lacey)
- 3. Butch Hadland (Lacey)  
(Proxy from England)

### WEIRDO CLASS

- 1. Warren Schipp (AV ROE 612 Autogiro)  
(Proxy from San Diego)
- 2. Bill Hannan (Chauviere Autogiro)  
(Proxy)
- 3. Dave Kiefer (Sopwith Triplane)  
(Proxy)

### HIGH TIME — Millard Wells (Berdmore Weebie)

### HIGHEST STATIC POINTS — Mike Arak (Nieuport 17)

### BEST ACHIEVEMENT — Jack McGillivray (Yugoslavian 45T Twin)

### GRAND PEANUT — Warren Schipp (AV RO 612 Autogiro)

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# Q&A

## WITH A MASTER MODELER



EDWARD CHAVEZ, San Antonio, Texas;  
"Master modeller of historic aircraft" for  
the famous Nut Tree Airport & Restaurant  
and the Smithsonian Air & Space Museum.

**Q.** What is your first step in building an exact scale model?

**A.** I check my supply of "HOT STUFF" and SUPER 'T'. I use them throughout the construction, so there's just no point starting without them.

**Q.** Couldn't you use just any glue?

**A.** "HOT STUFF" joints don't fail. I can't trust my models to 'just any glue'! Besides, who has the time for mixing and waiting for old fashioned glues to dry?

**Q.** This sounds too good to be true. Isn't there anything you don't like about "HOT STUFF" and SUPER 'T'?

**A.** I don't like to run out!

Eddie's latest model, a Lear Jet 25XR  
was built for Dee Howard Aircraft Co., San Antonio, Texas



**LEAR-25 IN 1/12 SCALE**  
Model incorporates all  
Dee Howard modifications  
and is completely detailed  
inside and out.

### "HOT STUFF"<sup>TM</sup>

ORIGINAL PENETRATING FORMULA

¼ Oz.      ½ Oz.

**2 Oz. ECONOMY SIZE**

AVAILABLE IN CANADA



ANY WAY **YOU** LIKE!



DISPENSE **THREE WAYS!**  
DO NOT REMOVE SAFETY-LOCK INSERT



### SUPER 'T'

GAP-FILLING POSITIONABLE FORMULA

¼ Oz.      ½ Oz.

**2 Oz. ECONOMY SIZE**

AVAILABLE IN CANADA

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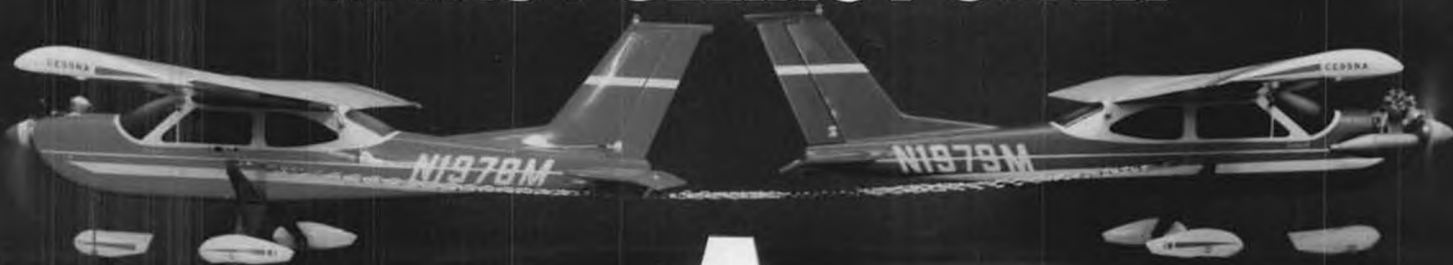
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# THE TUG OF WAR THAT PROVED ENYA'S PULLING POWER

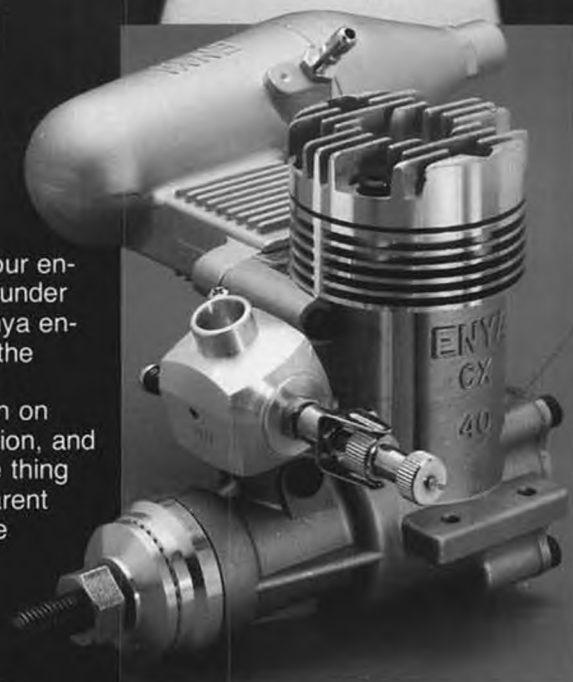


We welcome tests that prove our engines are powerful performers under all kinds of conditions. That Enya engines are winners and among the most powerful you can own.

Over the years we've taken on some very formidable competition, and yet with every test we run, one thing becomes more and more apparent . . . Enya produces not only the most consistently reliable engines, but they are among the most powerful and competitive on the market.

## ENYA . . . A WINNER

This tug of war helped prove the point. We took an Enya 40CX AAC and a leading maker's 40 Schneurle ABC off the shelf, put them in identical Cessna's, attached the same pitched props, a special harness and let'em rip. The result? Our pulling power was superior. Enya won the competition. There were no weather variables.



No flier competency involved. Just sheer power.

## MORE THAN JUST TORQUE

We believe this new Enya will give you more power than just about any .40 side exhaust you can buy. It also means you can count on more power when you're pulling off high-G maneuvers, or when you're climbing into a

stiff headwind with a heavy load. Enya was built to deliver more. The .40CX was designed with an aluminum alloy piston running in a hard chromed aluminum cylinder to produce more RPM's and longer life. In addition, we provide a 7mm intake carburetor instead of the conventional 5mm to 6mm intake carburetor to make it run better at both high and low speeds.

In short, when you need extra pull from your engine, you can count on Enya. Thousands upon thousands of fliers look to Enya for power they can use and reliability they can depend on. We make them strong, we make them last. See the full line at your hobby shop and start pulling your weight.

## ENYA MODEL ENGINES

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