

MODEL BUILDER

MARCH 1985

U.S.A. \$2.50

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volume 15, number 158

WORLD'S MOST COMPLETE MODEL PUBLICATION

FEATURES:

- 1984 T.O.C.
- Q.S.A.A. Fly-In
- Ultra-Slow Flight
- El Primero One-Design

CONSTRUCTION:

- Buttercup R/C
- Twin-Pusher O.T.
- 1/2 A Texaco Playboy
- Wheelair CO₂



- Staten Island Ferry Part. 1





NEW WAVE.

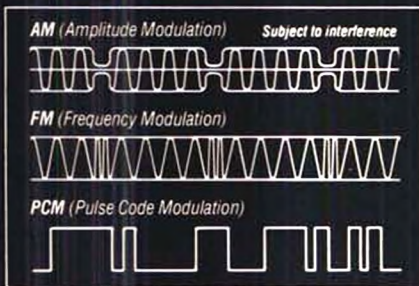
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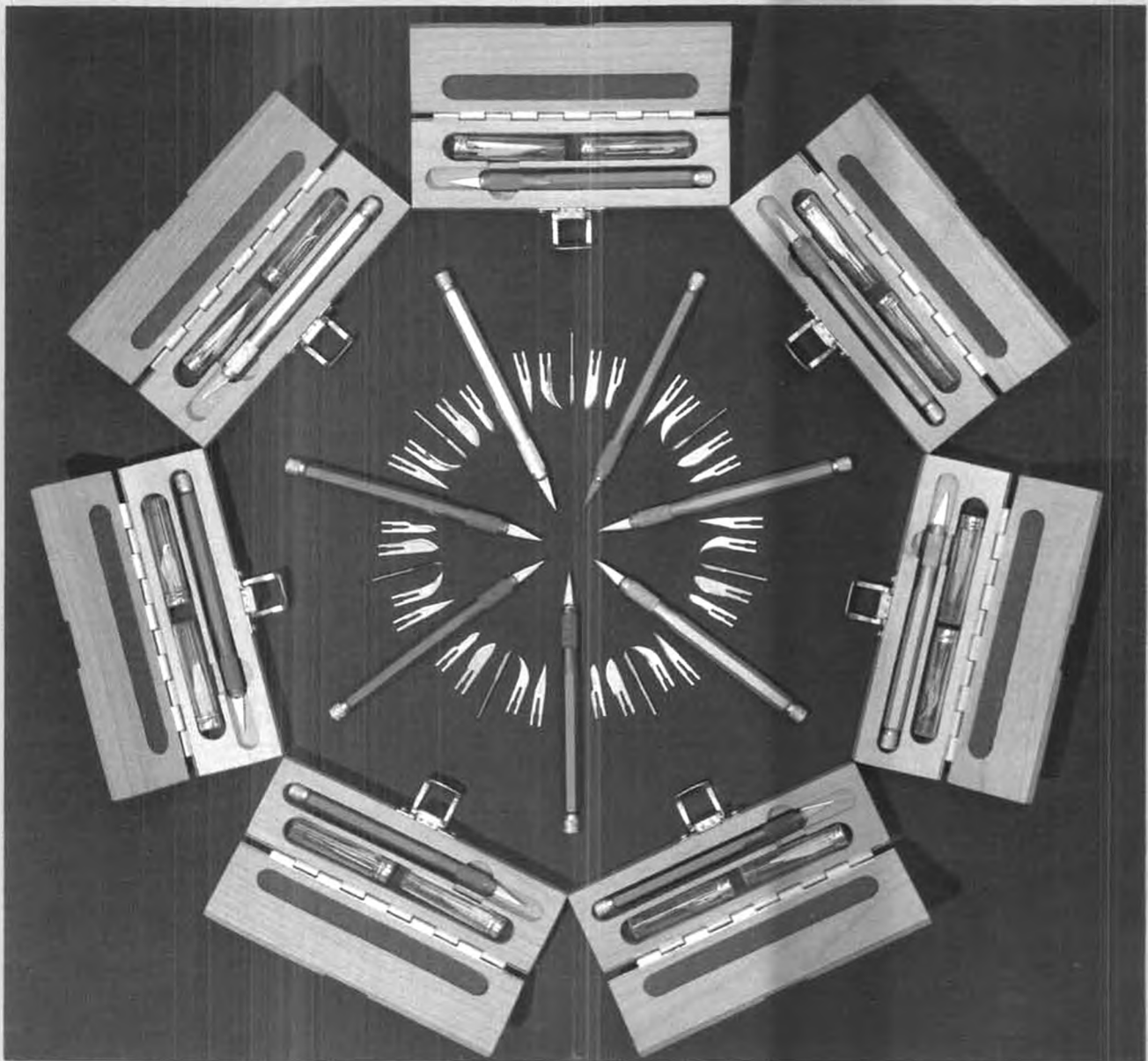
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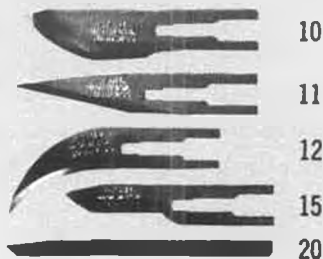
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MODEL BUILDER



MARCH

1985

volume 15, number 158

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Cover: This could be a first . . . the first time a human being has been able to sit in, not on, a model aircraft. On the other hand, Jerry Gardner's "model" is more precisely a half-size aircraft. The half-size "pilot" is Melissa Lee, age 4, of Las Vegas, Nevada. The photo was taken by Eloy Marez at the 1984 QSAA Fly-In. See story beginning on page 14.

Insert shows the pit area and Circus Circus clown, at the 1984 Tournament of Champions . . . also in Las Vegas. Story begins on page 11.

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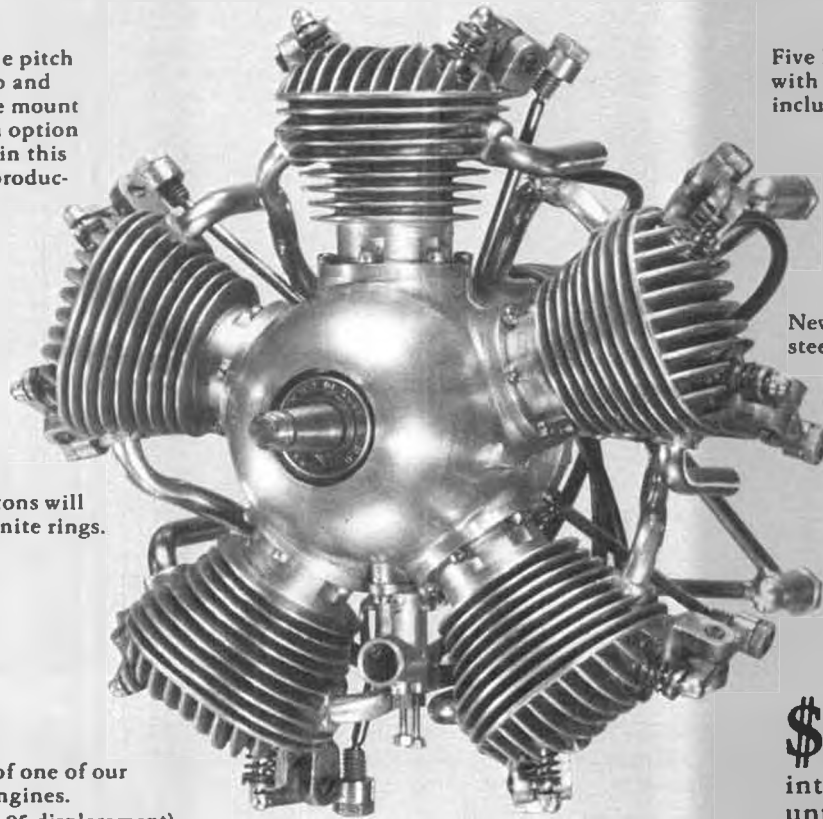


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includes the previously critical distributor and low compression. MAHS has achieved the production of a good running M-5 as the original design and concept really intended. All engines will be test run. *This M-5 is not prepared for RC but can be customized with an RC carburetor and throttle. Please write for an estimate on this optional offer.*

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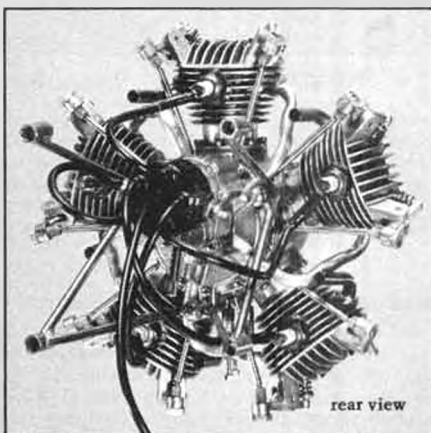
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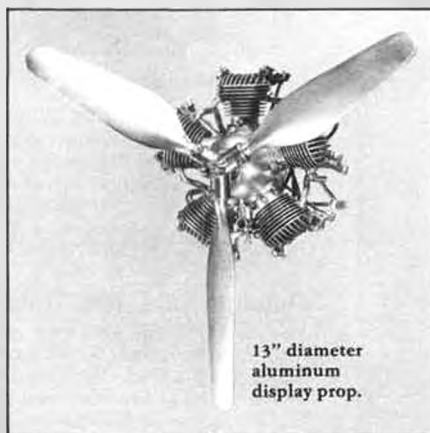
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rear view



13" diameter
aluminum
display prop.



New MiG-15 . . .

For years, you and thousands of other modelers the world over have raved about how great an airplane the Byron Originals MiG-15 is. You appreciated its simple construction and operation, reliability, scale appeal, unmatched performance and above all, its top value. Well, now you can find a lot more of the same in our

new and improved MiG-15. Since its first unveiling in 1979, our ducted fan line-up

has grown and matured considerably. Years of testing and product refinement have produced numerous state-of-the-art features that have since made our F-16, A-4 and F-86 kits world famous. These same features can now be found in our so-called "Hybrid MiG". Things like fuselage panel line detailing...retract ready plug-in wings, upright fueling and starting...improved aileron design...and lots more. Features that mean even better performance and reliability, enhanced scale realism, easier and faster construction and more convenient storage and transportation. But, best of all, it's available now for immediate delivery right to your doorstep at factory direct prices!

New Product!

1/7 Scale



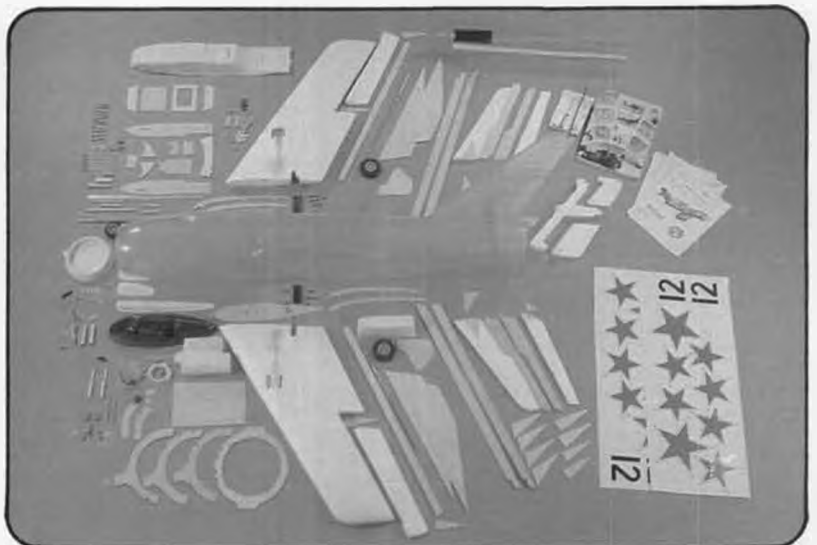
Specifications

Wing Span	57"	Recommended power	suitable
Wing Area	600 sq. in.	Schnuerle ported .60 or Rossi .81	
Length	55"	Channels required	4 (5 w/retracts)
Ready-to-fly-weight (w/Rossi .81 and retracts)	10 1/2 lbs.	Servos	No less than 32 oz./in torque



Quick & Easy Transportation And Storage!

An improved plug-in wing system makes transporting and storing the new MiG a snap...even for those with the smallest of compact cars and workshops. Wing construction has also been greatly simplified by eliminating the old fashioned built-up wooden spar. A factory-installed aluminum spar has taken its place. Both wings remove by simply loosening four socket head screws. With wing panels removed, the MiG requires no more space than most .40 or .60 size models.



No Manufacturer Offers You More Kit Value For Your Money!

Byron Originals is no doubt known for offering you both quality and quantity for money spent. When you open our shipping cartons, you find a whole lot more than just a fuselage and a BIG roll of plans. Instead, you'll find a whole array of all the necessary items for assembly, except of course, the engine, glue, paint, etc. These are also available from us at super prices. So when you begin inspecting your new MiG purchase, look forward to a unique jet package that's loaded with extras and surprises...pleasant ones, that is.



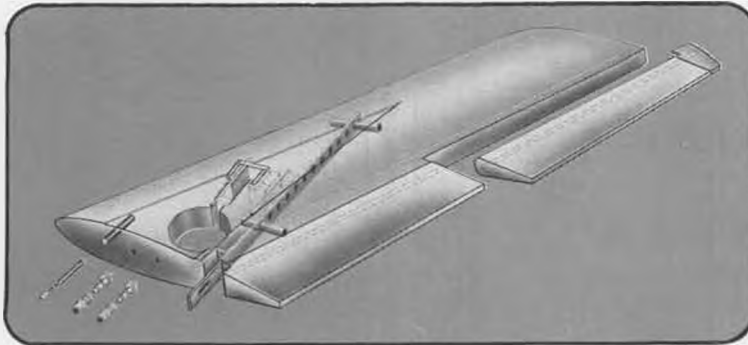
Quick Connectors
60% Off

Optional Pneumatic Quick Connectors For Added Convenience!

The new MiG has also been redesigned to accept our optional Quick Connectors to further facilitate wing removal and attachment when retracts are used. Simply loosen two socket head screws, air lines automatically disengage. Precision double O-ring seals assure positive, leak-free connections. New guide pin at leading edge of wing root provides proper wing alignment and stability. Canopy easily removes for quick access to radio gear. Also note convenient location of fuel selector and refueling probe. (See details opposite page.)

Back by Popular Demand!

The New Byron MiG-15 . . . Better in Every Respect!



Retract-Ready Wings...Another Byron Exclusive!

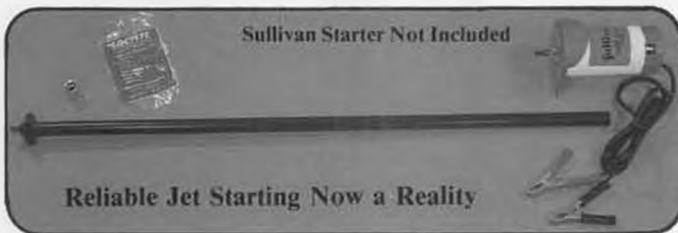
Already a proven concept in our A-4, F-86, Baron 58 and P-47, retract ready wings are standard equipment in our new MiG. Light, yet durable aluminum mounting brackets are drilled, tapped and then precisely fused into the wing during the molding process. Landing gear pockets and wheel wells are also formed at the same time. This exclusive feature makes precise and sturdy retract installation a quick and simple bolt-in process. The MiG is designed for the well-known Rhom Air retracts—also available from Byron Originals at super competitive prices.



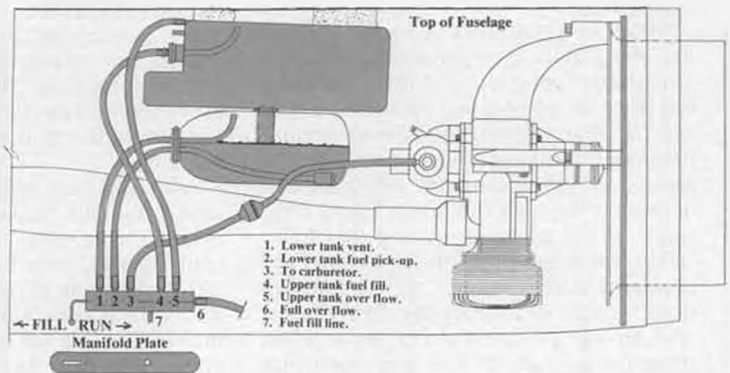
For those who prefer fixed gear, we have an optional landing gear kit consisting of pre-bent nose and main gear, aluminum mounting plates, steering cable, wheel collars and all necessary wood and fasteners. It's been designed especially for quick and easy incorporation in the retract-ready wing. Wheels and tires are of course included in the MiG kit.

New & Improved Aileron Linkage System

The new MiG also features a new torque rod bushing and repositioned bell-crank for improved aileron stability. These new features, coupled with improved construction methods and materials, result in a positive linkage system you can trust at any speed.



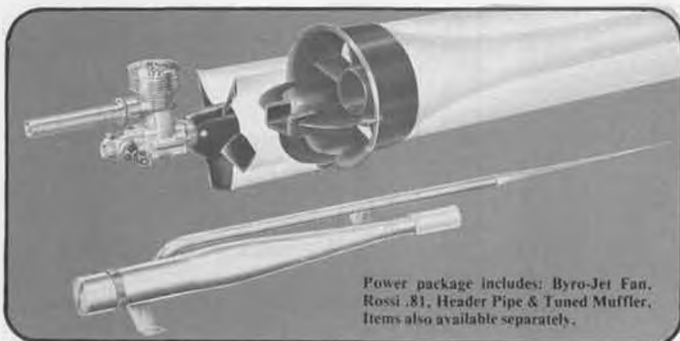
The new "Magic Wand" from Byron Originals' makes Byro-Jet starting easier, faster and more reliable than ever. Eliminates two-man starting and slippage problems associated with the conventional friction cup approach. It easily threads onto the well-known Sullivan Starter. A guide cone positions and firmly seats a socket over the prop nut. Once the engine starts, the special one-way locking bearing allows the socket to freely spin along with the fan blade, permitting you to simply pull the starter extension away from the spinning blade. The "Magic Wand" also features an exclusive sealed bearing that keeps out dirt and other abrasives. This means years of easy and reliable starting convenience.



Even Better Performance and Engine Reliability With Byron Originals' Sure-Flow Fuel Tank and Manifold.

- Convenient upright fueling and starting that eliminates fuel leakage into canopy.
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- Helps achieve maximum power boost from tuned muffler.
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- Helps to reduce foaming fuel reaching carburetor.
- Allows utilization of a full 20 oz. of fuel for longer flight times.
- Positive fuel shutoff helps prevent hydraulic fuel locks that can damage cranks during engine starting.
- Fuel shutoff feature also helps prevent engine flooding by permitting you to effectively burn off excessive fuel that normally accumulates in engine during shutdowns.

MiG Info Pack: \$2.00. Complete Catalog: \$3.00.



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Order No.	Item	Factory Price	Shipping
6130010	MiG-15 Kit	\$220.00	\$8.00
6130071	Byro-Jet Performance Package w/Rossi .81	239.95	3.00
6030340	Fixed Gear Kit	16.00	•
6030202	Upright Fuel Manifold	26.05	•
6130075	"Magic Wand" Starter Extension	29.95	•
2630041	Rhom Air 1000 BM Retracts	85.75	•
6030203	Pneumatic Quick Connectors (1 pair)	8.50	•

*When shipped with MiG, no shipping charges. Ordered separately, \$3.00 per item. (Alaska, Hawaii & overseas-call for shipping charges.)



from
Bill
Northrop's
workbench . .

• Although we don't have enough reliable and authoritative information at this time to make any positive statements, it seems that a tentative warning is in order regarding the use of Boron filament. If you don't know what this material is, it's probably just as well. If you do know what it is and/or you've been thinking about using it, read the following very carefully. It was written by Bill Warner, of the Flightmasters, and has appeared in a couple of newsletters.

"BORON FILAMENT is to be avoided like the plague. Sure, it stiffens up your model and lets you build nice and light, but what are you risking? At Sikorsky, they call the Boron Room the "Death Room." Protective clothing, masks, and all the good stuff. When someone gets a bit of it in them, they cut it out immediately. Neat stuff. I tried using it, figuring that I certainly was smart enough not to have any problems. Well, despite all my precautions, which included protective glasses, and taping all unused bits to a white paper so as not to lose any, some got away. When it gets away, it just disappears. It has the thickness of a human hair. It is non-magnetic, so you can't pick it up that way. It gets lost in the carpet. It goes into the flesh easily and accidentally. I found I'd get a bit into a finger despite my best efforts. Finally, I began feeling a pain in my right foot. Somehow I had picked up a piece while barefoot (the bed is only three feet from my work space). I called Kaiser Permanente about it and they did not know a damn thing, except that an X-Ray would be useless with something that size. Los Angeles County and UCLA Medical Center were also ignorant of what could be done. Finally, an end about .005" long worked itself out and my dear wife, Phyllis, performed surgery and got out the offending bit, a piece about 1/16" long. Even then, it broke off several times during the extraction process with tweezers, plus it keeps going deeper in when you try to get it out.

"Since then, we have repeated the operation several times for other bits, and it is not fun. Also my foot still is hurting, with the boron filament somewhere inside. The articles sound the alarm that when it gets in the bloodstream, look out. Great! the

Worry alone and the ignorance of the medical profession regarding it makes for something less than mental tranquility. I'll keep you posted. In the meantime, I suggest you do not get yourself into a similar predicament."

At the time this issue was being prepared, we couldn't get in touch with Bill for a follow up. We'll do that as soon as possible. In the meantime, it seems like a good idea to back off until we know more.

PETER WESTBURG

It is with a special sadness that we announce the passing of Pete Westburg, on Thanksgiving Day, 1984, at the age of 70. He is survived by his wife, Madeline, and a daughter living in the Seattle, Washington area.

Pete was best known in the aviation world for his superbly accurate and detailed scale views of many military and civil aircraft from the Golden Era, the 1930's. Working closely with Pete, *Model Builder* magazine has presented all of his drawings, each accompanied by photographs and brief histories of the aircraft, over the past ten years. Because of eye problems, resulting in lens transplants,



Aeroplane Monthly, a vintage aviation journal from England, is making a special bid for readers in the U.S. More information in text.



MB's editor with the delta free flight flying wing that he crash-built for the Northrop Flying Wing event (and crashed) held at Mile Square in November. For rest of story, see Hannan's Hangar column in this issue.

Pete had to discontinue production of these classic plans several years ago. Although he could see better after the operations, the strain of depicting the fine detail he was so well known for could no longer be endured. In his last years, he had been attempting to sell western adventure novels through major book publishers.

Pete was raised in Michigan City, Indiana, and came to the Santa Monica area of California to work for Douglas, just before World War II, as an aeronautical engineer. He held several patents, including one on a flap mechanism developed for the DC-8. Except for a period when he was "loaned" by Douglas to the Davis Motorcar Company (Remember their three-wheel passenger car?), he stayed with Douglas until his retirement, still living in Santa Monica.

The aircraft that Peter Westburg accurately recorded in ink on mylar will live on forever, and his memory will be just as well preserved, for having made that contribution to the history of aviation.

SAM ACROSS THE OCEAN

Those who are active in the old timer movement are probably aware that the Society of Antique Modelers has spread to countries other than the U.S., where it was founded. Although the interest is common to enthusiasts all over the world, the rules by which each country's SAM organization operates vary to some degree. Even in this country, where some local variation from the national rules is a normal procedure, there are strong differences of opinion about certain basic requirements: engine specifications, and scaling up or down are two good examples.

As for differences of opinion between

countries, the primary variance seems to be in the cut-off dates specified for the "birth" of competition-legal models. In the U.S., the cut-off dates are Dec. 31, 1938 for Antiques, and Dec. 31, 1942 for Old Timers. In England, the antique is referred to as "Vintage," and the cut-off year is 1942. This is quite understandable, as Britain was a little bit too otherwise occupied between 1938 and 1942 to be concerned with model airplane development. By the same token, their cut-off date for Old Timers is 1952 (Dates may not be exact. These were approximated by John Pond over the phone).

So now what happens at a contest? Currently, in the U.S., if you want to use a British design, you must use our cut-off, not theirs. In England, they can use U.S. models up to their cut-off dates, which in effect, means that they can compete with models equal to our Nostalgia class in their Old Timer events! The logic doesn't compute.

Why not this way... In both the U.S. and England, fly U.S. designs per our age specifications, and fly British designs per their age specifications. What the heck... the same U.S. designs; Playboy, Lanzo, Dallaire, Bomber, MG, etc. will still probably do all the winning!

What brought all this about? Just recently, we decided to take a look at a couple of the British-made Ben Buckle kits being marketed in this country by Hobby Enterprises, Fruitland, Florida. The two designs that caught our fancy were the "Super Scorpion" and "Majestic Major." The Scorpion is a scaled up "Topper," which in turn, was the Bay Ridge kit version of "Scotty" Murray's "The Answer" (Aug. '84 MB), making it U.S. SAM legal. The "Majestic Major," however, is a scaled up "Junior 60," a 1946 British model by Albert Hatfull. It's design is about on a par with the old Buccaneer Standard and Tai-bi's "Powerhouse," and about as equal a competition threat.

To many old timer enthusiasts, half the fun is coming up with a rare or unusual bird from the past and to see how it fares against other designs, especially with the use of new materials, modern engines, and best of all, radio assist. Why not allow a fair mix of models from other countries of the world?

Incidentally, the two Buckle kits we received appear to be excellent. High quality wood, machine cut ribs and blocks, nicely done drawings, etc. Jim Adams, SAM SPEAKS editor, is building the "Super Scorpion," and the "Majestic Major" is a little further downstream.

THINGS TO DO

Larry Snedeker sends information on the Second Annual Hamilton Four-Stroke Fun Fly and Rally, June 29-30, 1985. Three events, plus Stand-Off Scale Competition - Multi-Wing - Sportsman. Any model powered by four-stroke engine(s) up to a maximum of 50 pounds flying weight. Motels are within ten minutes of the flying field, first prize in the raffle is a six-channel radio. For more information, con-

Continued on page 95



On Dec. 1, four crewmen from the FFG Class Guided Missile Frigate HMAS Darwin, of the Royal Australian Navy, shown above, came to pay a visit to Model Builder's office. The four Australians; Seamen Jeff Ryan, Dale Simpson, Graham Coles, and Sean Millington, are all electronic technicians, and serve aboard the Darwin, which was built in Seattle, Washington, and had put in to the U.S. Naval Ship Weapon Systems Engineering Station, Port Hueneme, Calif., before completing its shakedown cruise back to Seattle. Because the four seamen are modelers, contributing editor Fred Lehmborg, with the assistance of Ed Reyes, brought them to our office for the visit (and a fun-filled lunch of beer and pizza at Luigi's, just around the corner!)



Advice for the Propworn

Dear Jake:

Our flying field has one large tree located at one end of the flying area. It seems to attract model planes like a magnet no matter how good the pilot(s). I wrote to the Federal Government regarding this problem and the U.S. Department of Agriculture responded as follows: We should plant a similar tree at the opposite end of the field so that the magnetic attraction of the two trees would cancel each other out. This would enable all models to sort of land in the neutral zone in between. What do you advise??

Bob in Panama City

Dear Bob:

Never argue with the Federal Government. Their advice sounds perfectly good to me, and with a tree at each end of the field you'll be able to practice pylon racing as well as wing repairing.

Jake

★ ★ ★

Dear Jake:

I live in Florida and I'd like to know what the ideal wing loading for an R/C sailplane is.

Soarer in Sarasota

Dear Soarer:

I don't live in Florida, but I'd like to know that too.

Jake

★ ★ ★

Dear Jake:

Why don't you write a book? I could always use a good book on a cold winter's night, especially if I need something to get the fire started.

Bookworm in Beckridge

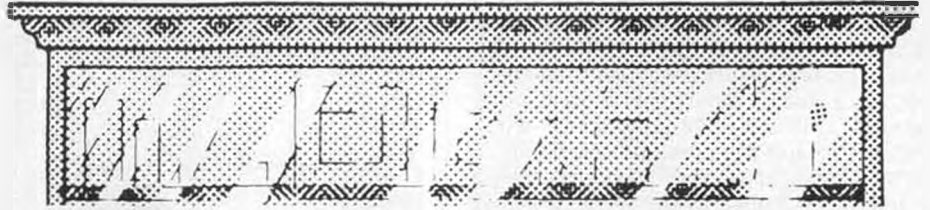
Dear Bookworm:

I've tried my hand at writing. I sent a "Most Unforgettable Character" story about

Continued on page 106

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.



D.G.A. Designs, 135 East Main St., Phelps, N.Y. 14532, 315-548-3779, is now offering two-inch scale plans for its Davis D-1K and Kinner Sportster K. The company has photographically reduced its quarter-scale plans for these two aircraft, making them great subjects for the popular four-cycle engines now available. Of course, two-cycle and diesel engines would also be appropriate.

In two-inch scale, the Davis spans 60.3 inches and the Kinner Sportster spans 78 inches. Price of either two-inch scale plan is \$15 postpaid in the USA or Canada, shipped rolled, in a sturdy cardboard tube.

Photo documentation packs, consisting of twelve 35mm color prints, are available at \$7.25 postpaid for each model. New York residents add 7% sales tax on all orders.



Radio Control Models (RAM) Big Boat, comes with Astro Flight motor.



Aerofax Miniograph 5

**McDonnell
F-101B/F**

by Kevin Kavaney



Block No. 0005

Current release from Zenith Aviation Books.



Robbe "Parat", for glo power or with electric drive system.

★ ★ ★

The O.S. FT-160 Gemini Twin four-stroke engine is now available, through World Engines, 8960 Rossash Ave., Cincinnati, OH 45236, 513-793-5900. The FT-160 is a completely new engine, not just a bored-out FT-120 Gemini. Displacing 1.62 cubic inches, the FT-160 weighs 38 ounces without the radial mount. Physical dim-

ensions are slightly less than the lower displacement FT-120, but the radial mount has been designed so that the FT-160 can be mounted using the same bolt holes for the FT-120.

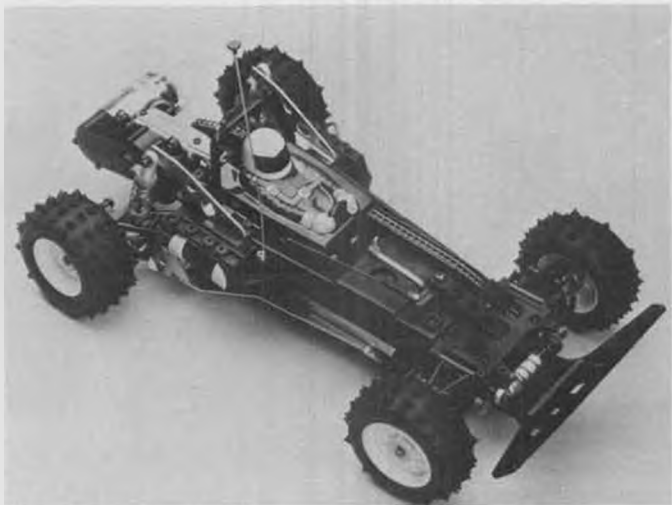
The FT-160 comes equipped with a radial mount, glow plug lead wires, needle valve and choke extension rods, feeler gauges, and a complete wrench set. Car-



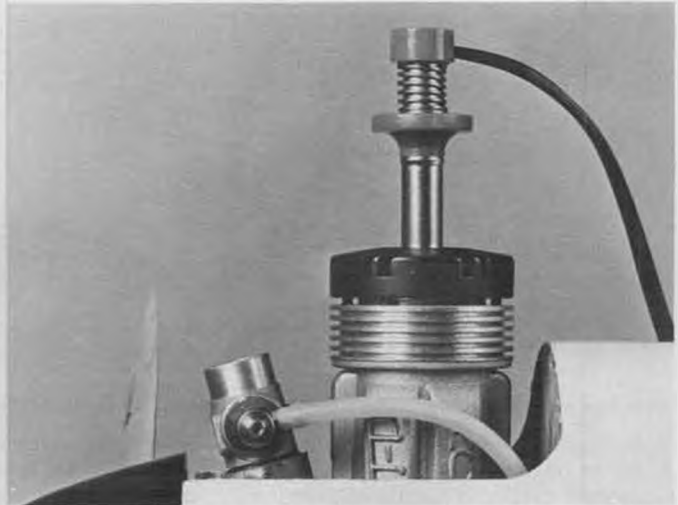
The O.S. FT-160, available through World Engines.



Robbe "Geier" is glider or with electric drive system.



The "Progress 4wdS" 1/10-scale off-road car from Cox.



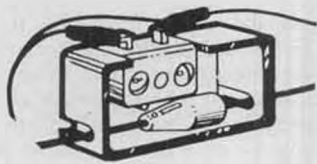
Du-Bro "Kwik-Klip II"



Progress 4-wdS with body mounted.



Racing Wings stunt glider.



Ace servo-operated switch unit.

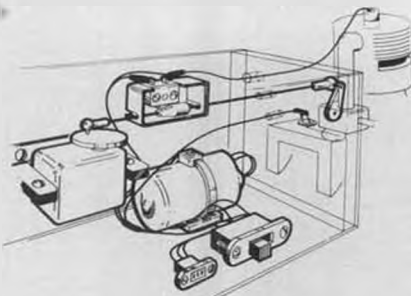
buret is reversible for convenient placement of choke and needle valve. Suggested prop sizes, depending on the aircraft, include 16 x 6, 16 x 8 and 20 x 6. Price is \$599.95.

★ ★ ★

Also from World Engines is the new Blue Bird line of engine accessories; a solid maple engine test stand, field box power panel, and electric fuel pump.

The power panel is a 12-volt unit with outputs for starter, fuel pump, and glow plug. Plug voltage is adjustable, and meter is scaled to read both volts and amps. Reversing and cut-off switches control the pump. Battery leads, banana plugs, and alligator clips are included.

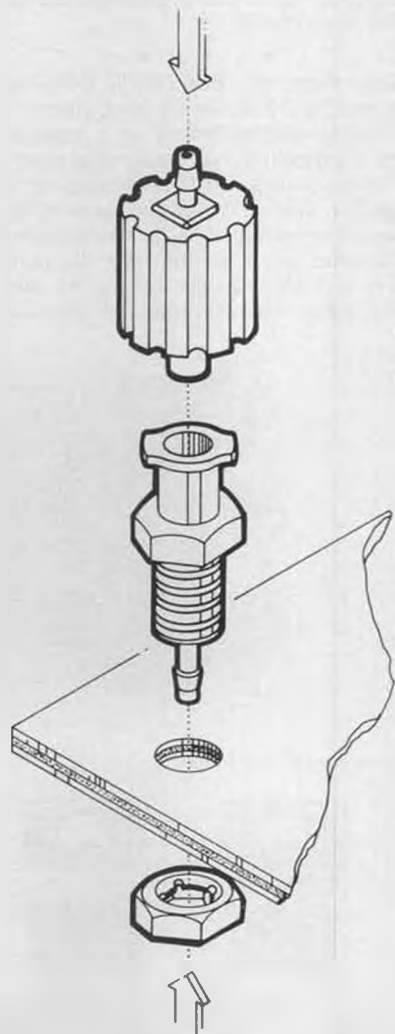
The pump, for glow fuel only, has a



Ace Nilite III on-board glow plug lighter.



Ace metered Nilite II.



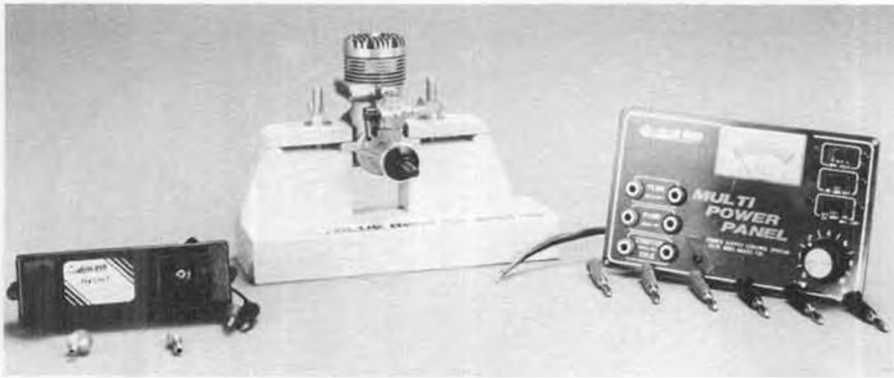
Pneumatic Quick Disconnect, from Ace.



Two-inch scale plans for Davis D-1K from D.G.A.



Two-inch scale plans for Kinner Sportster K from D.G.A.



Blue Bird engine accessory items from World Engines; fuel pump, test stand, and power panel.

three position switch to control fuel flow in either direction.

The test stand will handle engines from .19 to 1.2 cubic inches in size. Prices of the above items are \$19.95, \$12.95, and \$6.95 respectively.

★ ★ ★

Grish Bros., Inc., Box 248, St. John, Indiana 46373, 219-365-4061, long famous in the model aircraft hobby as a manufacturer of propellers, has been in the process of redesigning and repackaging its propeller line, and now announces four different series for style and performance. Each series is in a different and distinctive color, and all have tip striping for additional safety when running. All props are

either glass reinforced or non-reinforced polyester. The "Tempest" series is white in color, non-reinforced, and most durable and impact resistant. The "Falcon" series is gold in color, reinforced, stiffer blades, less tip flutter, better performance and thrust, but not quite as impact resistant.

The "Magnum" series is black, reinforced, the stiffest blade, with highest thrust and performance, less impact resistant than the Falcon series. The "Voyager" series is aluminum color, non-reinforced, truer in scale effect, blade stiffness equal to the Tempest series, and recommended for four-cycle engines. Sizes, two or three-blade styles, and right or left-hand rotation choices vary with the different series.



Shrink covering for heli blades from Circus.

Check with your hobby dealer, or contact Steve Grzych for more information. Tell him you read about the props in *Model Builder*.

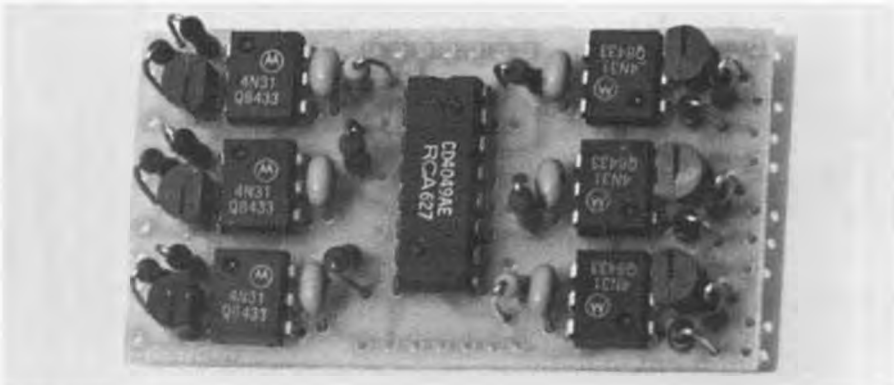
★ ★ ★

Would you believe four-wheel steering? In addition to four-wheel drive through a guided ladder chain system, the new 1/10-scale R/C electric powered off-road "Progress 4wds" from Cox Hobbies, Inc., 1525 East Warner Ave., Santa Ana, CA 92705, 714-546-2551, also has four-wheel steering that will really give your quick reflexes a workout. For road holding, the car features torsion bar front suspension and twin trailing arms at the rear. A Mabuchi RS-5405 electric motor transmits its power through the chain drive to all four knobby-tired wheels. Best of all, Cox will have all service parts available to keep your progress in action whenever you're ready to go.

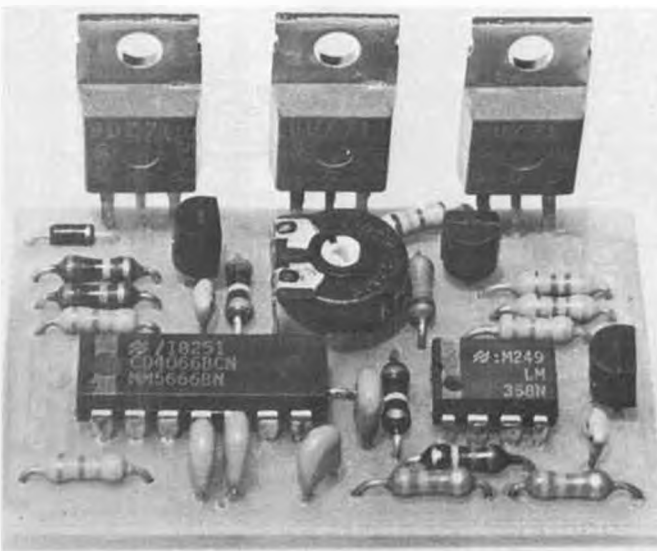
★ ★ ★

Strengthen and provide protection for your helicopter main and tail rotor blades with colorful shrink material, available from Circus Hobbies, 3132 So. Highland Dr., Las Vegas, Nevada 89109, (702)

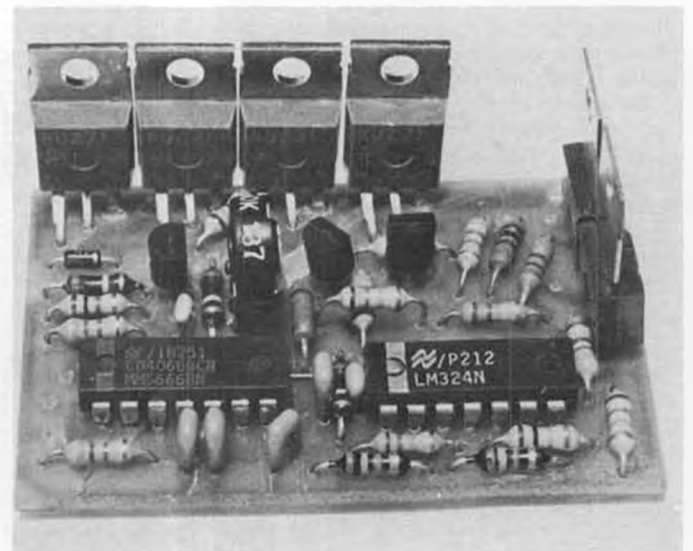
Continued on page 79



"Glitch Buster" by Jomar.



Jomar SC-1 speed control for 02 to 15 size electric motors.



Jomar SC-2 speed control for 05 to 40 size electric motors.



Overview of the pits at the 1984 T.O.C. The biplanes added a lot of sparkle and interest to the competition. We'll no doubt see more of them next time!



Left to right, 'Sam' Bennett, wife of T.O.C. sponsor, Bill Bennett, Tony Bonetti, Circus Hobbies Pres., big winner Steve Rojecki, and Miss T.O.C., Terry Lehman.

The 1984 CIRCUS CIRCUS TOURNAMENT OF CHAMPIONS

By ELOY MAREZ . . . The trend setter for radio controlled aerobatic competition has made the event even better by originating credibility for biplanes, thus bringing it even closer to the real thing.

• The city that never sleeps, Las Vegas, Nevada, found itself even busier than ever during the first days of November, as entrants, crews, and fans arrived for three major sports events taking place more or



Canada's Ivan Kristensen "flies along" with another pilot, using model "Spirit of St. Louis".

less simultaneously. Caesars Palace Hotel/Casino was holding its annual auto races November 9 to 11. They include the \$10 million Grand Prix which decides the national championship; the Coors/Howard Hughes "Super Vee; and the Motorcraft/7-11 "Trans Am." All the internationally known big names of motor car racing were there.

Over at the Riviera, boxing aficionados gathered for the World Heavyweight Championship bout between Larry Holmes and James "Bonecrusher" Smith, to take place November 9th.

And last but definitely not least was the \$125,000 Circus Circus "Tournament of Champions" November 7 to 11, an event which might not have drawn the same number of spectators as did the others, but which certainly drew them from as many states, countries, and from just as far away. Radio Control modelers from near and far gathered for one of the most interesting and significant events in the hobby and many planned their vacations to this coun-

try specifically to be in Las Vegas in early November. The Tournament of Champions was co-founded by Walt Schroder, former



Maryland's Steve Stricker flew his Stearman with realistic-sounding Sachs-Dolmar to 2nd.



Jeff Tracy, Shepparton, Australia, with his Kioritz Twin powered Steen Skybolt, using JR radio. Hang one, Jeff!



Co-builder Lash restrains Strickers Stearman. The Sachs-Dolmar engine alternately roared and puttied, adding to realism of Steve's flying.



Steve Helms and his King 60 powered Laser 200 by Ulery. Futaba PCM radio, as used by about half of contestants.



Doug Ferguson, and his Laser. Was dogged by engine problems for this, his first time at the T.O.C.



Giichi Naruke, Japan, and his Super Chipmunk, which was winner of Best Aircraft Award, and \$5,000!



This close-up photo of Naruke's Chipmunk will help you to understand why he won the Best Aircraft award.

editor of M.A.N., and Mr. William G. Bennett, Chairman of the Board of Circus Circus Enterprises, himself a radio control flyer, and sponsor of the tournament. Now ten years old, the Tournament started in 1974 with a then modest purse of \$11,000 and was intended to present a challenge to radio control aerobatic flyers the world over. A then relatively unknown young

man from Austria named Hanno Prettner was the first winner. He won \$500 for his efforts. Through the years, the requirements for aircraft design and flight have changed to keep this challenge fresh and exciting. The formula has been successful; many innovations in engines, radio equipment and aircraft designs were first seen and used at the Las Vegas Tournament of Champions. It is truly the Indianapolis 500 or radio control modeling! As the Tournament developed, so did the skills of Mr. Prettner, who won every time in the past.

The 1984 Tournament of Champions

was the largest such event yet, with a total of \$125,000 in prize money to be divided amongst the contestants. This prize money was broken down as follows:

- First Place — \$30,000
- Second Place — \$10,000
- Third Place — \$10,000



John Britt wanted to make sure everyone knew when his Skybolt was upside-down!



Donna checks the shopping list while Tony Bonetti puts in a flight with his Skybolt.



Kalt helicopter team from Japan put on thrilling demonstrations. This was tricky!



The perennial aerobic competition duo, Sally and Dave Brown, wait for the engine to warm up in his Laser.



Gunter Hoppe, West Germany, prepares for a flight with his Webra Bully powered Super Star, from Topp kit.



Benito Bertolani, Lucca, Italy, thrilled spectators, and contestants(!), with barnstorming demo flights after finish of contest.



The only Quadra at meet was in alternate flier Mike McConville's Laser 200. He didn't fly.



Dave Wilson props the Webra Bully in his Brighella designed Steen Skybolt.

Fourth Place — \$6,500

Fifth Place — \$6,000

Sixth Place — \$5500

Seventh Place — \$5000

Eighth Place — \$4500

Ninth Place — \$4000

Tenth Place — \$3500

Eleventh through Twentieth Places —

\$3000.

In addition, the following supplementary awards were to be made:

Best Model Aircraft — \$5000

Highest Placing Biplane — \$5000

This year's event was unique in that for the first time the flight scores of contestants flying biplanes was to be increased

by a factor of ten percent.

This competition is limited to twenty contestants, ten from the United States, and ten international flyers. The contestants from the US are invited based on their individual combined placement in both the 1983 National Masters R/C Pattern contest, and the 1983 R/C Aerobatics Team selection. International competitors are invited from among the top finishers in the 1983 FAI World R/C Aerobatic Championships and at the discretion of the contest management. The 1984 invitees were:

Yoichiro Akiba, Japan
Benito Bertolani, Italy
Tony Bonetti, USA
John Britt, USA



Slick looking Yak 55 by Werner Schweiker, West Germany, shows strong Laser and/or Super Star influence. Model design by G. Mätterhausen.

Continued on page 96



Alternate flier, Franz Mayr, with his Webra Bully powered Super Star, was brought into action when Prettner was disqualified.



Diabolo, by Tsugutaka Yoshioka, Japan, former World Champion. OS 108 FSR Twin power, JR PCM-9 radio.

QSAA'S '84 FLY-IN

By ELOY MAREZ



• Well, they did it again...for the eighth time! "They" are QSAA, the Quarter Scale Association of America, and what they did was to host one of the best organized and best attended West Coast R/C events of the year! One could say that this comes with experience and this is true to some degree. But as the size of the event grows with each year, the logistics of putting on such a show also grow! QSAA officials took it all in stride, expertly handling all the polyglot multitude... 181 entries strong... that descended upon them, and provided us with a perfect "10 Point" weekend of large and larger R/C "Fly and Tell." They were even able to deliver the perfect flying weather they had promised, this year's certainly being the best we have had out at Dorado Dry Lake, the established home of QSAA's annual gathering.

As in past years, the Eighth Annual Fly-In started with registration and model display in one of the spacious convention rooms of the "Showboat" Hotel/Casino, which certainly goes out of its way to

make us feel at home. Upon remembering the unpleasant experiences many of us have had in traveling with R/C airplanes, it is refreshing to come to a place like this. The Fly-In is listed in the hotel's various publications and event boards, there is a sign in the casino area in front of the escalator that leads to the model display area, and after the flying starts, directions to the field are posted in the same place. Equally impressive, and welcome, is the preparation and serving of the meal at the Saturday night banquet, where everyone gets served at almost the same time, the food is warm when it arrives, and the tables are cleared promptly so that we can get on with the program.

And as in past years, flyers and their magnificent machines arrived from all corners of the country... and the world. In total, eleven states were represented, from as far away as Florida and Arkansas. Flyers from the countries of Canada, France, Germany, Panama, and South Africa were there, as were model press

representatives from France, Germany, Spain, and of course our own country.

Both the model display and the activities at the flying field are similar to other Las Vegas type attractions, the extravagant shows always being staged all up and down the Strip. They both include so much action you don't know where to look first, and you constantly have the feeling that you will miss something. Some of the Fly-In attractions are rather hard to miss though, such as the 147-inch wingspan "Super Constellation" L-1029 by yearly attendee Alex Obolonsky, of Eperthausen, West Germany. As stable as a Senior Falcon, the "Connie" was powered by Webra Longstroke .61's, swinging 12-8 three-bladed propellers. Alex and crew must have used all of the weight saving techniques available; as the total weight is only forty-four pounds. It's realistic flight certainly brought back pleasant memories, in the days of prop driven airliners, this airplane was certainly one of the best looking.



Do you recognize scale champion Bob Nelitz, of Canada, without his Cub? Here's his new Clipped Wing Taylorcraft, Best Civilian Aircraft.



Best Biplane award to Noel Hess, Salt Lake City. The Curtiss F11C-2 is Kioritz powered, weighs 30 pounds, span is 96 inches.



Another always winner, Forest Edwards, with his Best Mechanical Achievement trophy, for five-cylinder radial that powers his Fleet.



Best Scale winner, George Harlan, Irvine, Calif., with his Monocoupe. Weighs six pounds, 96-inch span, powered by Webra 91.



Alex Oblonsky, center, and teammates, West Germany, won Best Multi Engine Award with this 147-inch span Super Constellation.



The Super Connie on a landing approach, looking about as realistic as you can get. A magnificent achievement!



More and more ladies gracing the QSAA Fun Fly. "Susana's Cub", with Susana "CB Associates" Seigelkoff herself.



Powder Puff winner, Connie Vaughn with her Pitts S-1. Quadra 50, Futaba radio, black, yellow, and orange finish. Beautiful job.



Jerry Gardner's half-size Pitts had to win something! Best Static Display award.

Another of the hard to miss models did not have to travel quite so far to attend, having to come only from nearby Tucson, Arizona, accompanied by builder Jerry Kikkert and pilot Billy Hempel. This one was a thirteen-foot model of Col. Bob Thacker's record-setting "Betty Jo" F-82 Twin Mustang. Also a stable flyer, though later grounded by landing gear problems, this Twin Roper 3.7 cu. in., powered biggie weighs around one hundred pounds. In spite of the weight, Jerry's twin took to the air as easily as its namesake, and did not seem to lack anything in the thrust or control department. This model uses a dual airborne system, based on the information in our April 1983 issue.

Not to be missed either was a 14-1/3 foot Northrop YB-35 Flying Wing, the "X" model of which first flew in 1946. The "Y" prefix is that assigned to aircraft in a developmental stage, one step up from the purely experimental "X" types. This



A Barbie Doll accessory you won't find in toy stores! On Chuck Fuller's Jungmann.

model is the handiwork of Darrell and Merle Meyer, the team that brought you the much publicized model of the Howard Hughes "Spruce Goose" Flying Boat. This latest effort is just as exciting and complex, using prop gearing and electric-pump circulated liquid cooling on its four K&B pumper-equipped .61's. It too suffered some landing gear problems, though when it did take to the air it did so with perfect appearing stability and control. Total weight of the Wing is fifty-four pounds.

And if Quarter or Third Scale doesn't impress you, how about Half-Scale? That's right, fifty percent size! And expertly done right down to rivets and cockpit operated control surfaces. In this case, the model is a Pitts Biplane, the results of months of labor of love on the part of Jerry Gardner



Winner of Best Glider award, the LS-4 was flown by Roland Sommer, of West Germany, seen here holding left wingtip. Engine can be retracted by radio.



Popular Jorg Vogelsang, West Germany, with helper Manfred Topp, left, and his Best WW-I winner, Fokker D-VIII. Weighs 45 pounds.



How's this for scale documentation!? Full size Bravo by designer Morrisey, model Bravo by Sig's Maxey Hester. Real look-alikes!



So this is a "Sonerai"! Built by Bruce Schamber, Naples, Florida, who also built and flies full size one. Both excellent fliers.



Best Sport Scale award went to Jerry Kikkert, Tucson, Arizona. His P-82 spans 13 feet, weighs 100 pounds, flies on 3.7 Ropers.

and some equally dedicated and talented friends. First seen in an X-rated (uncovered) version at Toledo last year, where it flew away with the Director's Achievement Award, the Pitts is now fit for family viewing, radiant in authentic red paint with all the markings. It spans 104 inches, weighs eighty pounds, and is powered by a 22 horsepower "Limbach" engine, swinging an also scale 36-12 propeller. This model was not flown at this time, being entered in the Static Display category. Jerry stated that a lot of midnight oil had been burned getting the model to its present state in order to show it here, and a lot of testing and checking had to be done prior to the first flight attempts. If looks mean anything, when the fateful day comes, this bird will take to the air just like the Space Shuttle on its way to orbit. Good Luck to Jerry and his friends!

The Marathon of Flight, flown for time and distance over an established 200 mile course, was won this year by Harry Dickinson and his able crew. Flying a 123-inch Piper Tri-Pacer, pilot's Ron Meyer and Calvin Orr logged 8.2 hours and 360.5 miles before a gas leak forced them to land earlier than previously planned. The model is Quadra powered; Harry estimates that they burned 3-3/4 gallons of the 4-1/2 carried aloft at take-off. The radio system was by Airtronics.

I certainly don't mean to ignore any models or to belittle anyone's efforts, space simply does not permit a fuller description of all of the great models seen and flown this weekend. For example, there is Forest Edwards' Fleet Model 2, powered by a five-cylinder four-cycle radial engine of his own design and construction. The prolific Bruce Schamber came

all the way from Naples (Florida) to share his "Sonerai" with us. This is his second one, the first one he built is in twelve inches to the foot scale; and he flies that one also. In the same vein, there was Maxey Hester's Morrisey "Bravo," a beautifully executed model of another home-built lightplane. An extra treat in this case was the appearance of the full size article at the field, flown in by the owner/builder, who later shared some of his interesting aviation experiences with us at the banquet.

Mustapha Hadjab was back with us again this year, all the way from Paris, France. His entry was a seldom-modeled Stolp "Starlet," sister ship of the more popular "Starduster." Excellent in every respect, an additional interesting detail was the pilot, an exact quarter-scale duplicate of Mustapha himself, complete with



Addie Naccarato and her Astro Flight powered J-3 won Best Electric trophy for third year in a row. Span 105 inches, weighs 9.9 pounds.



South African, Mel Barber, appears every year to take home trophy for travelling longest distance. DC-3 flies extremely well.



Erich Darn, from Panama, with his Best Ultralight, a Pioneer "Flight-star". Span is 10 feet, weighs 36 pounds (Light?), Quadra 50 power.



Best of Show Northrop YB-35 Flying Wing, by Merle and Darrell Myer, flanking pilot, John Elliot. Span 14-1/3 ft., 54.5 lbs, K&B's.



A beautiful Stolp Starlet, in red and white, won Best Scratch Built award for builder/flier Mustapha Hadjab, from France.



Take another look at the photo to the left. It's the pilot of the Stolp! Model uses a Kavan FK-50, with on-board electric starter.

curly hair and a neatly trimmed mustache. Addie Naccarato, from Burbank, California was also back again, with her Astro Flight powered J-3 Cub, to fly off with Best Electric model . . . for the third year! Many times previous attendee Jorg Vogelsang, from West Germany, was here again with his big one, this year being a forty-five pound, 126-inch Fokker D-VIII. It uses an all tubular steel fuselage, and is authentic in all respects, with the possible exception that some of Jorg's maneuvers would probably have torn the wings off the full sized one! Ah yes, it was truly a modeler's real life wish-book of projects to admire and to dream about!

Except for a very efficient frequency control system, and the establishment of a take-off direction and traffic pattern, flying at QSAA's Fly-In is not controlled or judged. Each registered flyer is given a ballot card upon which he enters his choice in nineteen categories, for which

perpetual and annual trophies are presented. Such decisions must be difficult to make, as many of the prize winners certainly seemed to me to qualify for more than one category; for classes such as WWI, Civilian, etc., and then also for Best Finish, or one of the other awards of that type. Obviously, the voting was done with great care, as we all agreed that the models so honored were certainly prize winners . . . and too, this year no one voted for QSAA President Rex Perkins for the Powder Puff Award!

Anyway, at the Saturday Night Banquet, the following awards were presented. The parentheses enclose the donor of each trophy.

Multi-Engine (Joe Bridi—Model Aircraft Designs)—Alex Obolonsky, Epperthausen, West Germany; Super Constellation.

Best Biplane (Coverite)—Noel Hess, Salt Lake City Utah, Curtis F II-2.

Best WWI (Goldberg Models)—Jorg

Volgelsang, West Germany, Fokker D-VIII.

Best Finish (K&B)—Bob Francis, Aptos, CA, CAP-21.

Best Scale (Kraft Systems)—George Harlan, Irvine, CA, Monocoupe.

Best Military (George Kileen)—Dwight Cathcart, Ceres, CA, FW-190-A4.

Best Stand-Off Scale (Model Airplane News)—Jerry Kikkert, Tucson, Arizona, F-82.

Best Mechanical Achievement (Larry Vance)—Forest Edwards, San Pedro, CA, Radial Engine.

Powder Puff (Anheuser Busch)—Connie Vaughn, South Gate, CA, Pitts S-1.

Junior Achievement (Suma Corp.)—Edmund Root, Las Vegas, NV, Laser 200.

Best Scratch Built (Billy Root)—Mustapha Hadjab, Paris, France, Starlet.

Best of Show (Radio Control Modeler)—Darrel & Merle Meyer, YB-35.

Continued on page 104



Marathon of Flight winners (kneeling l to r): Ron Meyer, Calvin Orr, Ralph Perkins. Standing (l to r): Bill Comstock, Harry Dickenson, Keven Comstock, and Jeff Dickenson.



A Clipped Wing Cub and Morrissy Bravo use pieces of cord to push Hazel and Maxey out to the flight line. Rex Perkins sets the pace.



BY CEES KAIJIM

European Scene



Jan van Agteren's Laser 2000 came in "Extra Large" scale!

• At this side of that big pond that's known as the Atlantic Ocean, there is a lot of interest in large model airplanes. Like everywhere else, it started out with larger than usual models of the Piper Cub type, at first underpowered by what was available on the glow-plug engine market. Later on, it moved up to more suitable engines like the Quadra, and the access to better engines made modelers think of other planes than the high wing, lightly loaded types. If you visited a model airshow in Europe this summer, you would see not only a respectable number of Big Birds, but a large diversity of subjects too.

Legislation has been adjusted to the interest in larger models as well. Model airplanes used to be restricted to a maximum

allowed weight of 5 kg (11 lbs), but now in Holland as well as in Germany, the maximum allowed all-up weight is 20 kg (44 lbs). There are no restrictions regarding engine displacement and/or power. **If you want to fly an overweight model, you need a special permit, as such a model is, legally spoken, no longer considered to be a model airplane, but a "real" airplane. Such a permit is a sort of an airworthiness certificate, to be issued by the civil aviation authorities.** (The bold type in the copy above was done at my request. This is exactly what I have been trying to convince our AMA to do. Refer back to my "Workbench" column in January '85 MB. It's nice to know that at least some organizations are seeing the light.

wcn) Personally, I think that restrictions like this are not unreasonable. For most modelers, 20 kg or 44 lbs is a limit they will never pass anyway, and if one decides to build bigger, it's not a bad idea that somebody competent checks whether the creature is airworthy!

Of course, the latter remark goes for under 44 lb. ships too. It does not make a difference whether you are hit by an out-of-control 50 lb. model, or by a wild 30 lb. ship; I bet you won't be able to tell the difference!

I would like to present you one of those large models, in this case one that tips the scale at 42 lbs. It is a stand-off scale (well, sort of, at least) model of the well-known Laser 200. This huge model has a wingspan of no less than 12'8" (3.80 m)! As one of the pictures shows, construction is quite conventional. The two-piece wing is of the built up type, with ribs cut from a dense polyurethane foam, the blue variety which we know as "Roofmate." The ribs are cap-stripped with balsa for added strength, and the remainder of the wing consists of spruce longerons and 1/8-inch balsa. Both wing halves slide on large diameter aluminum tubes, fitted permanently to the fuselage. The fuselage construction features plywood formers and spruce and balsa longerons, where necessary covered with 1/8-inch balsa. The amount of Top Flite's Fabrikote that was necessary to cover this ship, was alarming. At the current rate of the U.S. dollar, the price of the covering alone would buy a very nice model airplane kit!

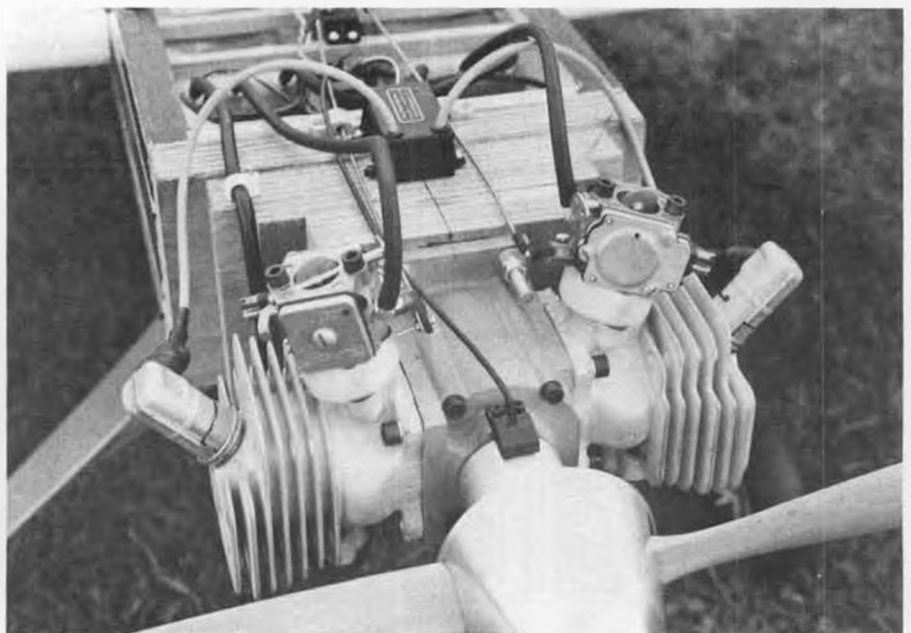
Radio installation is conventional; each huge elevator half has its own servo, as did the ailerons. The radio used is a German Simprop, the same brand that is used by Hanno Prettner.

Somewhat less conventional is the engine, fitted to this giant. It's an interesting one, namely a German "AMT KING 100," a 100 cm³ or 6.1 cu-inch twin-cylinder

Continued on page 81



If you had any doubts about the size of Jan's Laser from the above photo, this picture will confirm it without question!



The Laser's powerhouse! This is the AMT King 100, a 6.1 cu. in. engine. Tiny black box on top of mounting block contains Becker electronic ignition system, working from 4.8 V battery.

GOSSOMER SLOWPOKE

By FRANCIS REYNOLDS . . . First installment of a two-part article about experiments in ultra-slow, radio controlled flight. Nothing here to build, but the author's trials and tribulations may spark some ideas.

• Variety is the spice of life, and it also adds interest to the hobby of model building. For variety, we may build a very small model, a very large model, a very simple model, a very complex model, or a very fast model. This article proposes a new challenge, very *slow* flying RC airplanes.

Incidentally, this is *not* a construction article, and no plans are provided. If you are looking for another "best ever" trainer or pattern ship, you won't find it here; but if you are a bit technically inclined, and your mind is open to new ideas and different goals, you will find this interesting.

Many years ago I watched a friend, Don Mygatt, fly his *Antic* at the local field on several occasions. Lou Proctor's *Antic*, as you know, has a light wing loading and was considered a big RC model before the 1/4-scale jobs came along. Don had built his *Antic* especially light and had a .30 in the nose. His mode of flying this aircraft was to throttle down and cruise around the field, close, low, and impressively *slow*. The rest of us were ripping holes in the sky with screaming pattern ships and pylon racers. Don's put-putting slowly around was very appealing.

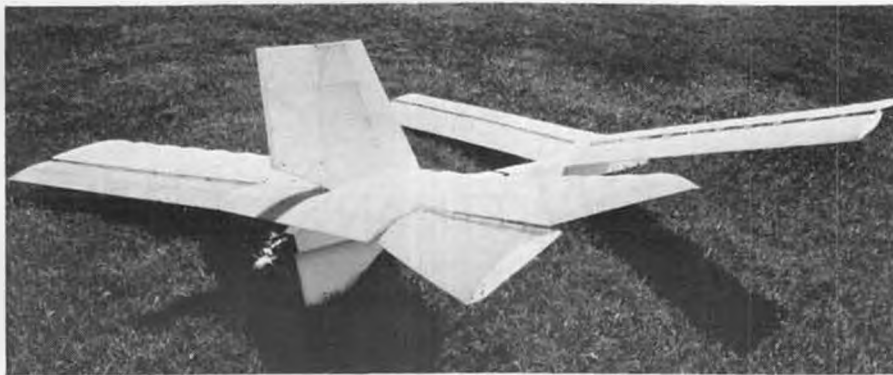
I also once watched Chuck Clemans fly his light, scale *Demoiselle* at about 10 mph into a 10 mph wind. Fascinating! That is one way to make vertical landings. Now some of the 1/4-scale models are also being flown impressively low, slowly and quietly.

My studies and resulting "Gossamer Slow Poke" models are an attempt to carry slow RC to extremes. I've had a ball jogging alongside *GSP II* while it is in full flight, hedgehopping over fences (fence hopping over fences?), flying it in tight circles around myself with the plane three or four feet off the ground, and flying it in my yard (with a well-muffled and throttled .10).

If you can fly an ordinary model, flying a slow model is a breeze (except if there is much of a breeze, then flying a slow model is no longer a breeze). Flying backwards in gusts is fun, but to fly in a steady wind which exceeds the model's airspeed means recovering the model by techniques best known to free-flight modelers.

Some RC sailplanes can fly fairly slowly, and RC helicopters can hover, but ultra-slow, RC power planes fly more like dirigibles than anything else, including their sensitivity to wind, their slow but sure response to controls, and their very low fuel consumption.

Beside the novelty of flying slowly, and the challenge of seeing just how



Slotted rear "wing" on Gossamer Slow Poke I, as described in text.



Slotted forward wings on Gossamer Slow Poke I.

slow we can fly an RC plane, there are some good practical arguments in favor of flying slowly. Perhaps the most important of these is safety. If you fly models alone on a large vacant field, and can avoid hitting yourself or your car, you have no safety problem, but most of us have to fly where there are other people.

The damage that an RC plane can cause on impact is proportional to the kinetic energy the plane has in flight. Kinetic energy, you may remember, is in turn proportional to the weight and the square of the velocity. If we have an eight-pound pattern ship flying at 75 mph, its kinetic energy is over 1500 foot pounds, enough to kill a person if the blow is in the right place.

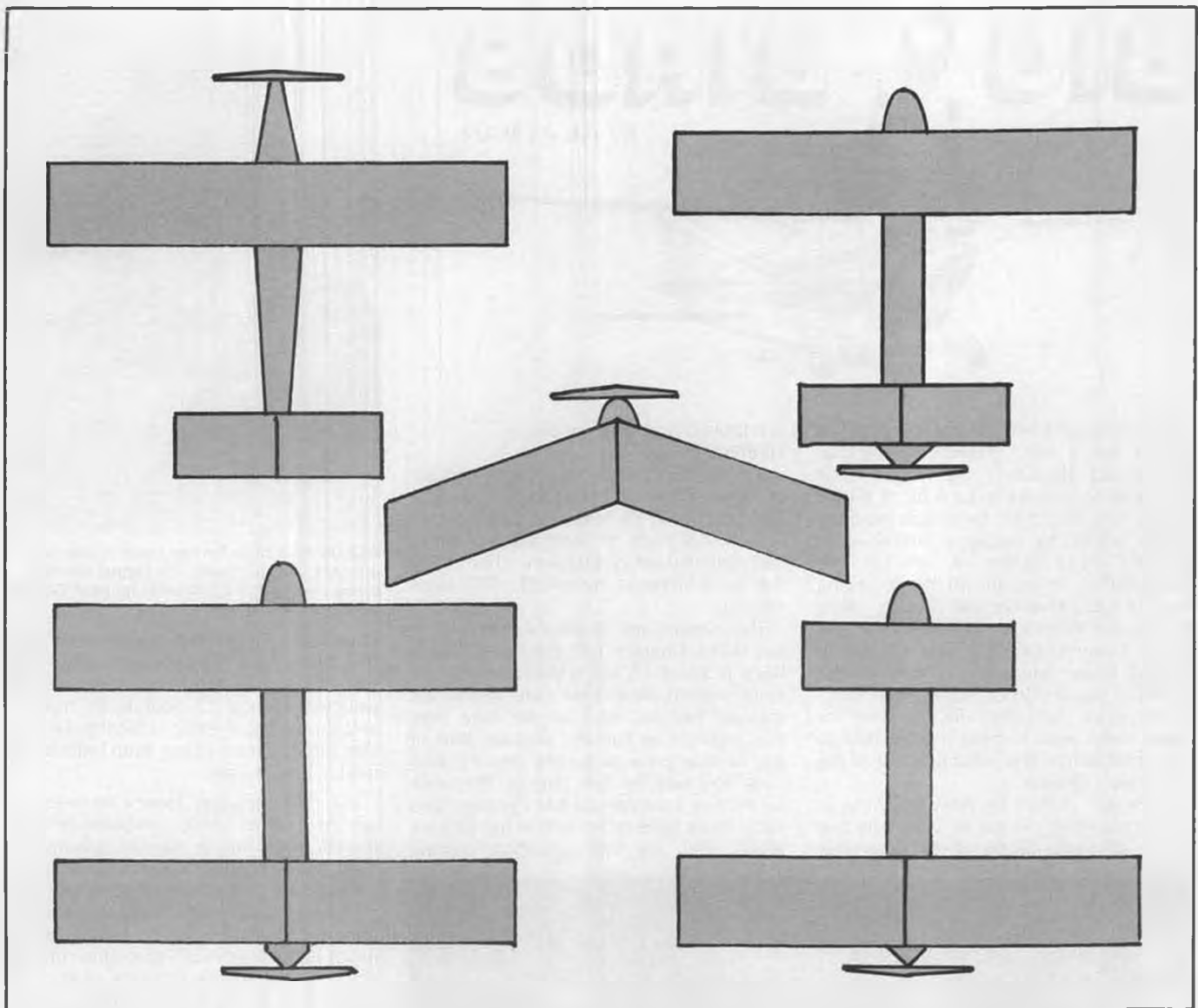
If you want to think about a still more frightening situation, assume a little four-pound pylon racer flying at 150 mph. It is half the weight, but twice the speed of our pattern ship. Because of the V^2 factor, the pylon racer will have *twice* the flight kinetic energy of the heavier pattern model. To make it worse, with the higher speed of the pylon racer, getting out of the way becomes much harder. It is difficult to dodge a bullet. Unfortunately, pilot errors and equipment failures do cause accidents. Even non-injury accidents give us bad public-



Nine-inch prop on Gossamer Slow Poke I was turned by geared G-Mark .03 engine. All photos taken in May of 1983.

ity and can lead to loss of flying fields.

However, what if we are flying a two-pound airplane at 7-1/2 miles per hour? The kinetic energy in this case is only 3-3/4 foot-pounds, 1/400th the energy of the pattern ship, and 1/800th the energy of the pylon racer! How can there be such a huge drop from the 3000 foot pounds of the pylon racer? We reduced the weight by a factor of two, which divides the kinetic energy by two, but the *big* reduction in energy results



from reducing the velocity by a factor of 20, which lowers the velocity-squared term by a factor of 400! That, times the factor of two on weight, gives us 1/800th the energy of the pylon racer model. It would be very difficult to kill someone or even injure them with only 3-3/4 foot-pounds of impact energy.

Another reason for building ultra-slow models is lower cost. Ultra-slow airplanes have to be ultra-light and need little power. Although we usually don't think in these terms, model material costs are roughly proportional to the *weight* of material we must buy. One-sixteenth balsa is cheaper than 1/4 balsa, .10 engines are cheaper than .60 engines, etc. Last but not least, little engines burn much less fuel than big engines. The one place where the cost of an ultra-slow RC plane may hurt a little is in buying the covering material. Ultra-slow planes need lots of area.

We know that to fly fast we need to minimize the drag and maximize the power; but what should we do fly as *slowly* as possible, maximize the drag and minimize the power? Not quite; we still have to keep the plane in the air. The name of the game is to develop enough

lift to support the airplane at the lowest possible velocity.

The equation for lift (at sea level on an average day) is $L = C_l S V^2$ divided by 391, where L is lift in pounds, C_l is coefficient of lift, S is lifting area in square feet, and V is the flight velocity in miles per hour. Therefore, to fly as slowly as possible, we need to maximize the lift coefficient, maximize the lifting area, and minimize the weight.

Drag has a secondary influence on how slowly we can fly. The less drag we have, the less thrust and power we will need, the smaller the engine we can use, the lighter our airplane will be, and therefore the slower it will fly. Antique aeroplanes were poorly streamlined and had lots of high-drag rigging. Interestingly, they were able to fly fairly slowly in spite of their high drag, not because of it; yet they were not able to fly very fast *because* of their high drag (and their low power). Such planes have a poor speed range. Their top speed isn't much greater than their stall speed. The lighter the plane, the lower the drag and the greater the power, the greater the velocity range.

Let's examine how we go about de-

signing an ultra-slow RC model. What configuration shall we select, for instance? Before we make that selection we first need to look at what makes an airplane longitudinally stable (stable in pitch).

The longitudinal stability of an airplane is a bit complex to understand, involving pitching moment coefficients and curves, and calculations that we don't need to get involved with here. I think we can understand it in very general terms, however.

All normally-cambered airfoils are unstable (symmetrical airfoils are neutrally stable). By unstable we mean, if a cambered wing alone was flying in a balanced condition, and a gust pitched it down (decreased the angle of attack), the center of pressure or center of lift of the wing would move back and it would continue to pitch into a progressively steeper dive or "tuck." Conversely, if the angle of attack were to be increased for any reason, the lift would move forward and rotate the wing to progressively higher angles of attack until the wing stalled.

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BIG BIRDS

By AL ALMAN



Sorry I missed being with you guys last month, but a most magnificent inguinal hernia had absolutely top priority. The operation turned out to be a bit of a bear because I'd put it off for much too long (gotta admit to being a professional coward). As a matter of fact I'm still recuperating, so except for the following note of caution about yet another safety hazard and the product reviews at the end of the column, GOFB (Good Ol' Flying Buddy) Bruce Edwards did most of the work this month. Bruce, who's a very competent pilot, has been BIG Birding for about seven years and has learned how to get performance and reliability out of the ubiquitous Quadra.

However...before he does his thing as guest columnist, I've got to make sure that you're all made aware of the heretofore

overlooked and very insidious...

HERNIA HAZARD

It's true that people of all ages can get all kinds of hernias, but as the average BIG Bird Lover is in his mid-forties, he's got an over-the-hill body to safeguard and a very real potential safety problem...herniating due to schlepping overweight BIG Birds around.

The average age of the 24 members in our IMAA Chapter 108, the Puget Sound Rocs, is about 47, and within one year six clubmembers developed right and/or left inguinal hernias. And let me state here that none of us had the slightest hint of any hernias prior to getting into the BIG stuff. This was the first time on the table for my five comrades, while I've been this same route three times within the past six years...with my first operation coming



Al's OS FS-120 in Tatone's new engine test unit. Of cast aluminum, it's rugged and fuel proof. OS has CH Electronics Ignition Conversion, runs beautifully.

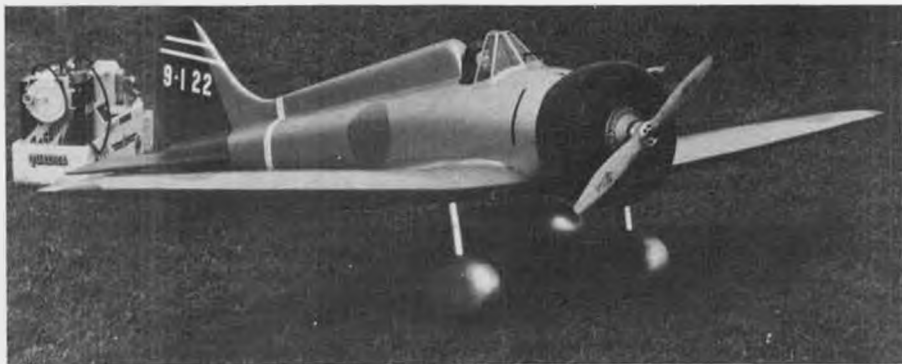
three years after I first got involved with BIG Birds. Like most everyone else back then, I also had heavy airplanes; they all weighed a good 25 pounds, or more... and during those early, tinkering days we also brought most of our shop tools to the field...just in case.

But don't despair! There's no need for you to have to sweat a rupture because there's hope and a way to salvation... Nay! Make that two ways to salvation!

First, take advantage of, and use, the new breed of large two and four-strokers that are available. We're talking about much lighter and much smoother running engines...so that a properly built 10-12 pound, 8-9 footer is very much a reality. And even if you really screw up and turn out an obese 15 pound toad, a mere 3-1/2 pound engine like the ST-2500 will save the day.

The second way to salvation and perennial bliss? Simply don't exploit your bod! Had I known that I was going to live this long, you can bet that I would have taken better care of myself.

And now to Bruce...



This great-looking Japanese "Claude" was built by Dwight Ballard, weighs 25 pounds, with Kawasaki 2.2 and has flaps. Seen at Double Nickel Squadron's 3rd Annual Fly-In last Sept.



Bill Johnson and his new Flybaby. Powered by a small Quadra and weighs 21 pounds. Flies great but not too aerobatic.



Del Bowers, of the Puget Sound Rocs, with his 92-inch span, Saito 45 powered Cavalier. A fine trainer combination.

Greetings, BIG Bird fans. Here we are almost on the verge of spring, and if you're lucky you'll get a nice day for test-hopping that brand-new flying machine. How well that first flight goes depends on what you did, or didn't do, back in your shop.

No doubt you've cycled those Ni-Cds through a few times during your hibernation, so that they're in good shape and ready for the new flying season. If not, don't put it off any longer; get 'em up to snuff!

Are you gonna be starting the season with a new engine? Then don't wait till it's too late; bench-run the animal so that you become familiar with it and get the needle valves set right. Messing with a new engine that's installed in an airplane puts unnecessary wear and tear on the bird... and it's not safe; so do mount it first on that strong, heavy test-stand for initial running. Also, use fresh/good fuel. Bad, stale or contaminated fuel can and will give you fits because that engine is going to run ragged and rough...with low power and a very unreliable idle.

Okay, now that you've got the engine running well and the radio system in the green, install everything in that shiny, new BIG Bird and secure it to your BIG Bird Stooge...

What's that? You say you never got around to building a BBS? Well, now's a good time to do it. Believe me, this stooge is easy to put together and it's going to protect you from becoming a free lunch for any errant 18x8 or 20x10. I never crank up any biggie without it being safely tied down to my stooge... which in turn is anchored to the ground with six inch spikes.

Now that your bird is safely restrained, fire her up and check out all the control surfaces and attachments/wires/braces for excessive vibration. After making sure that no controls are hooked up backwards, it's time to fine tune the engine in its new environment...and a few taxi tests to make sure all your wheels are aligned and running true (with two-three degrees of toe-in on the mains). When everything checks out okay and you're sure she's ready for that maiden flight...set her aside...and get out an old, faithful bird and go through the same patient checkout and preflight.

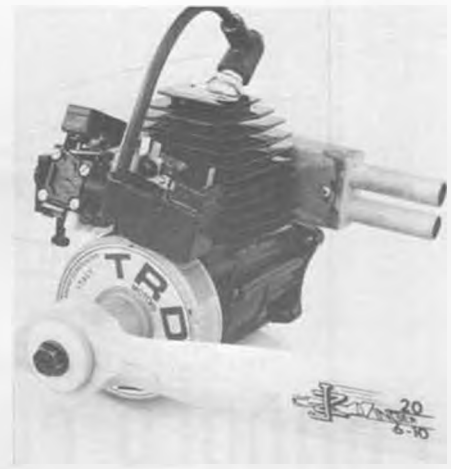
Sounds like extra work, doesn't it? Well, the idea is to arrive at the field with two aircraft that are fully prepared for flight; and since you haven't flown for a number of months, twenty to thirty minutes of stick time with "old faithful" should clear away the cobwebs and get you prepared for the test hop...which, hopefully, will then be a piece of cake. And whoever shares your frequency will appreciate the fact that you did all your homework and won't have to tie up the airwaves tinkering with a balky engine or a flaky radio.

Also, you should consider using a checklist. It's an invaluable aid and will keep you from leaving tools, fuel, or your transmitter at home. It'll also prevent taking off with either your transmitter or receiver switch off. You can probably make up a good checklist during the Monday night football game commercials. I attend-

ed the International Miniature Aircraft Association's Fly-In Festival in L.A. this past summer and didn't forget anything... thanks only to my checklist. Finding out you've forgotten something when you're 1200 miles from home can lead to a temper tantrum....

And by the way I had a great time at the festival. Both the picnic and the banquet featured good food and entertainment... and what a surprise to hear IMAA prez Don Godfrey play lead saxophone so well. We had four days of good flying, although the weather was somewhat mixed. It was the first time I've ever gotten sunburned on a cloudy, rainy day. Up here in the Northwest, rain just makes the moss grow thicker between our webbed toes.

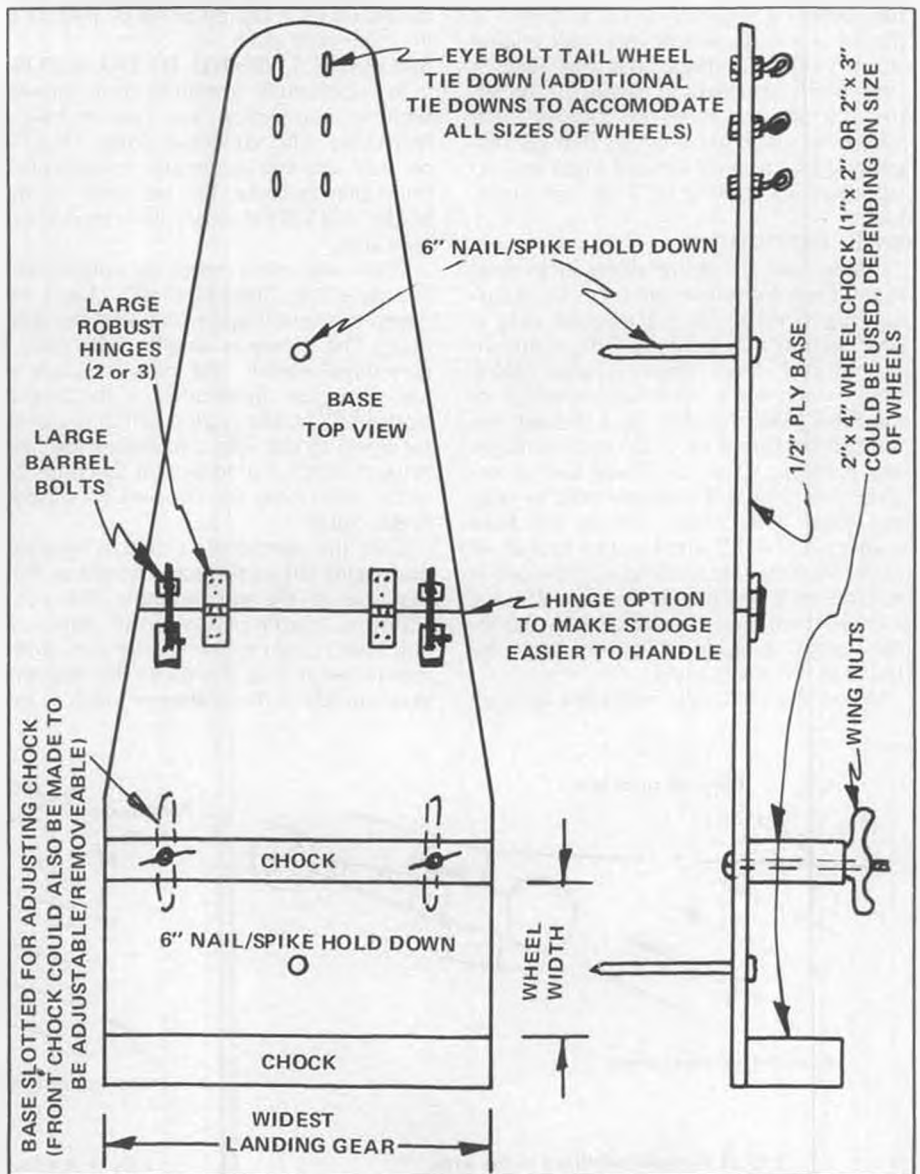
We've come a long way these past few years. Not only has the IMAA been recognized by AMA as a special interest group, which means that all BIG Bird Lovers will be well represented in AMA matters, but we also have a fantastic assortment of kits, engines and accessories, tailored just for our needs, on the market now. But it's going to take some effort from everybody to ensure that we keep on getting quality items...and the name of the game is to let the manufacturer know if you're unhappy



Altech Marketing's new import, Italian-made TRD 40. Initial running indicates this 2.44 cu. in. engine has lots of power and low vibration. Flight test results next month.

(if you're really pleased with a product, it certainly wouldn't hurt to send a "love-letter"). But don't rant and rave; do it calmly and clearly so that the guy who makes that particular item knows where you feel

Continued on page 81



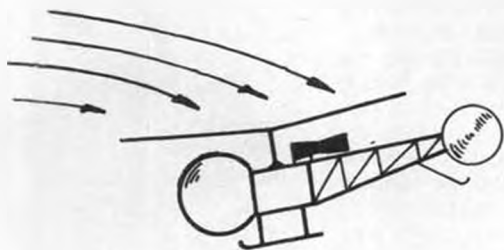


FIG. 1 Airflow in forward flight.

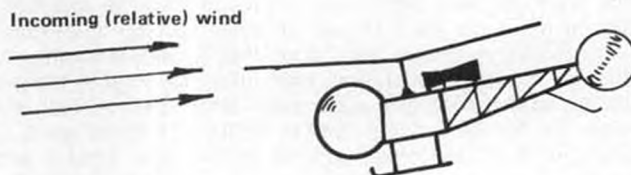


FIG. 2 Airflow transition as autorotation is entered.

CHOPPER CHATTER

By RAY HOSTETLER

• As promised, this month will be a complete overview of autorotations. First off, autorotation is one word, not auto rotation. Autorotation is what a helicopter does when it loses an engine, auto rotation is when you back your car over your helicopter by accident (or on purpose...)! (In other words, when your heli engine stops, you really ought to rotate. wcn)

Secondly, you want to "sneak up" on autos. Just like the series on forward flight where we made small circles that got bigger and bigger until forward flight was no surprise... that's what we'll do with autos, too.

BASIC DEFINITION

When you are flying along in forward flight, the rotor system produces lift to sustain flight. When lift is produced, drag is produced as a by-product. (This is known as induced drag.) There is also profile drag, which is the frictional resistance of the rotor blades as they pass through the air, and parasite drag of the rotor linkages and fuselage. When (or if) you lose an engine, this drag will instantly start to slow the rotor disk. Rotor rpm is the helicopter's staff of life and must be kept at all costs, so reducing pitch to a minimum 1) reduces drag on the rotor disk and 2) starts a descent which causes air to drive the rotor system. Altitude is lost so that rotor rpm can be maintained.

When the helicopter nears the ground,

a cyclic flare is initiated to decrease the rate of descent and reduce the forward speed. As a positive by-product, rotor rpm increases momentarily. At the end of the flare the ground is so close (hopefully!) that now the remaining rotor rpm can be traded off for a last bit of lift by pulling in the collective pitch.

MECHANICS NEEDED TO DO AUTOS

To successfully transition from forward flight to autorotation, you have to have a helicopter with collective pitch. *There is no way you can autorotate a fixed pitch helicopter because the set pitch in the blades will kill the rotor rpm when the engine dies.*

Then you must have an autorotation ("sprague" or "freewheeling") clutch between the centrifugal clutch and the rotor head. The theory is simple: With only a centrifugal clutch, the rotor engages at low rpm (just above idle). If the engine stops in flight, *the engine will drag the rotor down to this idle rpm before the centrifugal clutch disengages.* At this time the rotor rpm is too far decayed to support flight. Splat!

With the autorotation clutch installed, the engine drives the rotor system as normal, but if the engine quits, the autorotation clutch allows the rotor to continue to spin as the engine dies. Rotor rpm is lost as drag decays it. This happens very quickly if the collective pitch is not

reduced immediately!

Early autos were done without autorotation clutches by modifying the centrifugal clutch so it would engage around 1/4 to 1/2 throttle. Then when the centrifugal clutch released there was still enough rotor rpm to maintain flight and complete the auto.

RADIO NEEDED

To do a full down auto without first killing the engine, it is practically mandatory to have a radio with "throttle hold." Snapping this switch "on" holds the throttle at idle no matter where the stick is moved. This way, at the end of the auto the throttle remains at idle while the stick is advanced to give full collective pitch to cushion the touchdown. The primary advantage of the throttle hold is that it lets you monitor the progress of the auto on the way down. If it looks good, go for it. If not, release the throttle hold and go around for another try. (The throttle hold also avoids the necessity of an engine restart after every practice auto!)

Without throttle hold, the only way you can do a full down is by setting up the engine so it dies at low stick, low trim. Then when you enter the auto and pull the trim back, the engine dies and you are committed to a full down! The full downs with engine off are best left to those who have done quite a few full downs and have some experience.

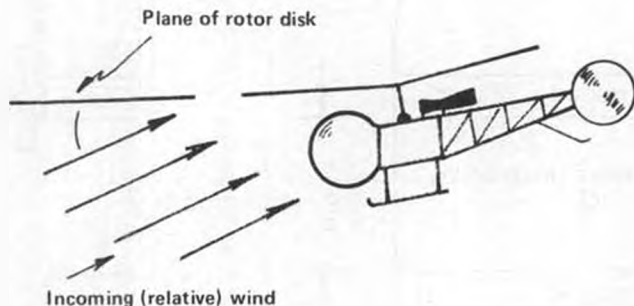


FIG. 3 Airflow stabilized in the auto.

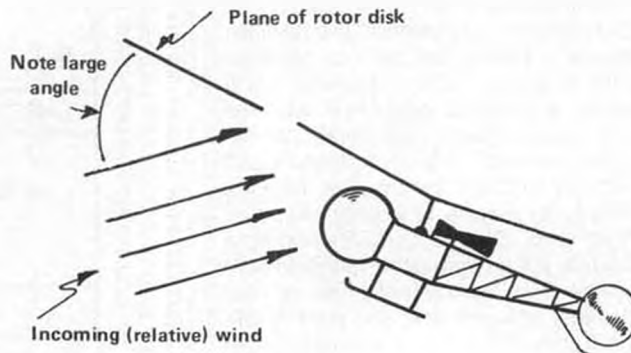


FIG. 4 Airflow in the flare momentarily increases rotor rpm.

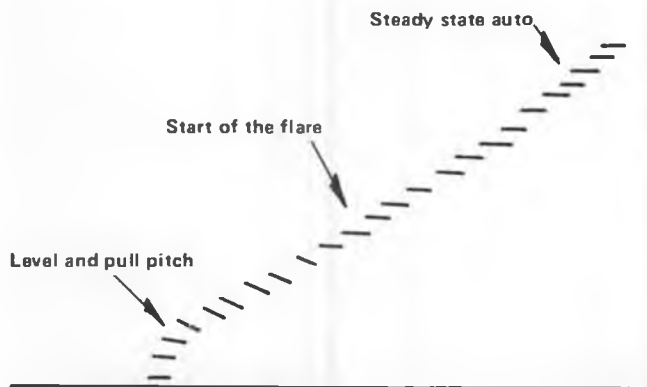


FIG. 5 Normal auto profile.

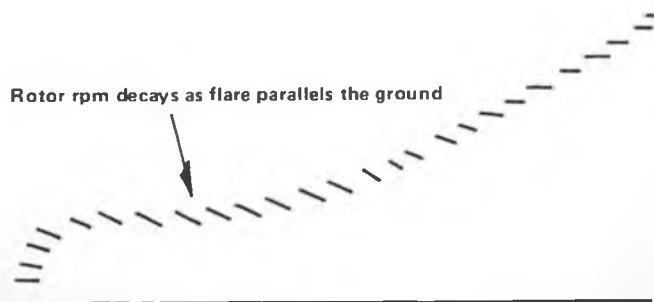


FIG. 6 Auto profile with high forward airspeed.

ELEMENTS OF THE AUTO

The autorotation can be broken down into three basic units. 1) The entry, 2) the descent, and 3) the flare and touchdown. Let me preface this section by stating that if the entry is not right, the descent will be erratic, which will blow the flare and touchdown. Likewise, if the entry is OK but the descent is not stable, the flare will not be timed right. And if the flare isn't timed right, you'll smack the ground...

THE ENTRY

The entry is critical because it determines more than anything else where the touchdown point will be. If you can't judge where to enter, forget about hitting a spot. The entry is initiated by smoothly reducing throttle/collective to full low. Too many people rush this step, which blows the entry. *The only time this should be done ASAP is if you actually lose the engine.* At the reduction of pitch, the pitch and roll attitudes should be straight and level. Entering the auto nose high or nose low should be avoided, because improper pitch attitude messes up the rate of descent right from the start.

Forward airspeed should be moderate, a nice smooth cruise is fine. Too fast can lead to pitch overcontrolling, while entering slow is OK as long as you have enough forward airspeed to keep the flare effective at the bottom. More on this later.

As the entry progresses, the airflow around the rotor disk changes. In powered flight the air is essentially sucked in from above. See Figure 1. In the transition to autorotation, the airflow changes from Figure 1 to straight on (Figure 2), to the airflow coming up through the disk from below (Figure 3). During the second or two that the airflow transitions at Figure 2, *the only thing that drives the rotor disk is the inertia of the blades.* (If you put a pinwheel out of the car window and hold it face to the ground, it won't turn.) In Figure 3 the relative (oncoming) wind has fully transitioned, the rate of descent is stabilized, and *the incoming relative wind drives the rotor disk.*

THE DESCENT

The descent looks simple, but it is a very subtle important point of the auto. During the descent the forward airspeed is set as desired, and most important, the rate of descent is judged to set up for the flare. Doing autos on very gusty days is bad news for models as well as full size birds. When the descent rate changes, it

makes it a guessing game as to whether the flare will be in a "downdraft" or an "updraft," each of which can give a hard landing.

To judge the rate of descent accurately means that everything has to be stabilized. Put another way, the helicopter must be in a "steady state autorotation." *For any combination of airspeed and collective pitch, the rotor rpm and rate of descent will stabilize.*

Full size birds are limited to approximately 10% above to 10% below normal operating rpm for autos because of rotor blade and hub structural limitations. On the other hand, models have no such limitations, so rotor rpm can vary much more, particularly on the high end. Since full size helicopters are limited on rotor rpm, varying the airspeed is the only other variable to help hit a spot. Now models can also vary airspeed to hit a spot, but consider a model that is set for -4 degrees of pitch. Advanced pilots can use -2 or -3 degrees at the start of the descent. Then if they see they're going to overshoot the spot, they can decrease pitch another degree or two, which will increase the rotor rpm, giving a higher rate of descent, and a shorter glide.

If you've seen experts shoot autos, most of them run this amount of negative pitch because the steep angle generated in the glide (like a brick) helps them hit the spot more accurately, and the high rotor rpm gives the ability to juggle the exact touchdown point. Because of the high rate of

Low forward airspeed makes flare less effective in breaking the rate of descent

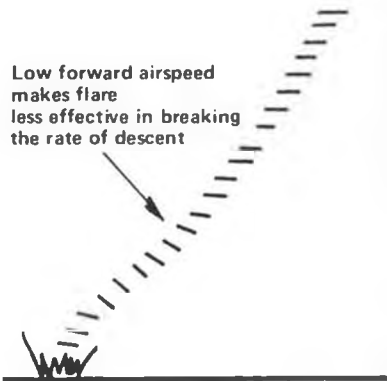


FIG. 7 Auto profile with low forward airspeed.

descent, the flare must be right on target. *Autos do not have to be done this way to be successful! As sport fliers, we are not concerned with hitting a three-foot diameter pad every time we do an auto.* In the autos I'll describe later, we'll shoot for a more realistic glide angle which makes the flare timing less critical. Let's look at this third part of the auto in greater depth.

THE FLARE

As we saw in the introduction, the flare serves to reduce the rate of descent and bleed off the forward airspeed. In a properly executed flare, the rotor rpm will be momentarily increased as the disk is

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Robert Gorham sticks another one on the pad during autorotation demonstrations at Merced. This is the Jet Ranger body on Cobra mechanics, as described last month.

EL PRIMERO ONE-DESIGN CONTEST

By BILL FORREY



Group photo taken at beginning of contest. Look at all those "El Primeros"!

• The Desert Union of Soaring Thermalists, who fly in the Palm Springs/Palm Desert area of Southern California, held a very fun, low-key contest for a single-design glider on December 2, 1984. The design chosen was a beginner's kit called the *El Primero*, which in Spanish means "the first." The purpose of this event was to involve as many new fliers as possible in club-related activities, foster an interest in R/C Soaring among local power fliers, gain some exposure for a really fine sailplane, and most importantly, to have some good old fashioned soaring enjoyment.

In spite of the fact that this event got very little "hype" in the various club newsletters and magazines (I gave it a mention in my October column), there was a big turnout. By count of the entries, there were 28 fliers present and 25 airplanes flown (obviously some were shared). This makes this event one of the largest single-design contests in the Southern California area in recent years. I would feel confident in saying that with little more exposure, there could have been 50 to 70 fliers present, easy! Perhaps next time there will be! Watch for the announcement of future one-design contests in this and other



The top six (l to r): Sam Niece, Dan Metz, George Ritter, Dave Johnson, Bill Forrey, and Dave Ingram. Use of one design tends to level competitive advantage.

magazines.

Before I go on with an account of what happened at this contest, perhaps it would be a good idea to go over the details concerning the design chosen for the event. The *El Primero* design was worked out by the manufacturer, Buzz Waltz, of Palm Springs, California. Buzz has been a commercial sailplane designer for years, working with Joe Bridi and others on many different designs. The *El Primero* was de-

veloped with the beginner in mind for ease of construction, durability, and stability. All of these qualities are well executed.

The *El Primero* is a two-piece wing, two-meter span, polyhedral floater. The wing rod "keepers" or tube receivers built into the wing roots are unique in my experience. They are hardwood strips, four per side for two rods, measuring $3/16 \times 1/2$ inch each and having an $1/8 \times 1/16$ -inch



Beauty event semi-finalists. Many more of those present could have been included!



And the beauty event winners (l to r): George Boss, Chris Ritter, and Rex Powell.



John Werries and Bob West, from the "strictly power" club, the Palm Springs R/C Fliers. Note the "Body English".



Designer and kitter of the El Primero, Buzz Waltz, launches his from the heavy-duty hi-start. No problem.



Buzz Waltzes El Primero on an overhead fly-by.

dadoed slot cut down the center. This slot is then drilled round with an 1/8-inch drill after the two halves of each keeper are joined with glue. I had my doubts as to whether this arrangement would hold in a severe load situation, but to my surprise, it does, and it is a whole lot simpler to install than any other wing rod joiner tube I've ever built. Yes, the two 1/8 music wire joiner rods are sufficient for most launching devices such as heavy duty hi-starts, and most of your common, club winches. They will bend under severe launches, however, as they are *intended* to do to prevent the destruction of the wing. This is a nice feature for beginners who may not know how much line tension is enough.

The ribs are made by the time-tested and preferred method of machine cutting and sanding. They are accurate and flawless. All spar notches are cut for the builder, and 1/8 x 3/8 spruce spars (I-beam) are provided. The airfoil is flat-bottomed and 11% thick.

The fuselage is also pre-cut for the builder and is the usual box-like structure. The 1/4-square stringers inside the fuselage allow for ample rounding of the cor-



Just in case you hadn't noticed! Buzz sponsored the contest, and the hosts were the DUST members.

ners for best appearance. All standard and mini radio receivers and servos will fit, and the nose will accept 500 mah battery packs.

The empennage is extremely simple. All surfaces are 3/16 balsa sheet and strip wood. If you spend more than 20 minutes on these surfaces, you aren't paying attention to your building!

To order your *El Primero*, send \$24.95 (Calif. residents add 6% for sales tax) to Buzz Waltz R/C Designs, 255 N. El Cielo, Suite 476, Palm Springs, CA 92262, (619) 325-5494. Fast turnaround is assured. End of commercial!

What I have just written may sound like some kind of mini product review, but I realize that many of you have never seen an *El Primero*, as it is a fairly new design. This will give you a better idea of what it is, and how it is constructed.

One more thing! If you prefer a plastic canopy over the stock balsa block canopy, then include another \$4.50 with your order (plus \$1.50 for postage if ordered separately). This really enhances the appearance of the plane. I recommend it!

So now that you know a little about the kit, you probably want to know how the one-design contest fliers did. Well, to a man (there were no female contestants), they all enjoyed the contest. There were many who had never flown a contest before, and quite a few others who were flying R/C aircraft for only the fourth or fifth time. About six of the fliers were "strictly" power fliers from the Pass Area R/C



Numero Uno El Primero piloto, Sam Niece receives the spoils of victory, a four-channel Airtronics radio, from "The Buzzer" himself.

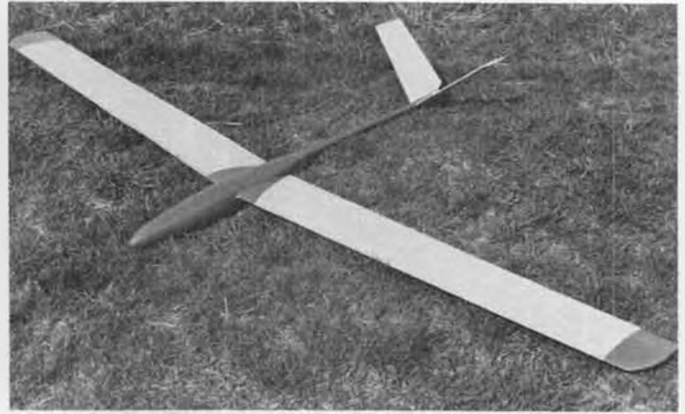
Modelers (Banning, Calif.) and Palm Springs R/C Fliers. The rest were sailplane pilots with at least some experience in flying gliders.

The contest got underway at about 9:00 a.m. with the beauty event. All of the *El Primero* models were lined up wing tip to wing tip along the crowd restraint rope, and judged (by Bill and Kathy Forrey). About ten semi-finalist models were selected and grouped together for a picture, and then the winners were announced. George Boss (San Pedro, Calif.) won first place with his beautifully painted and polished plane. The colors were primarily red with yellow, orange and black trim (flying surfaces were Monokote, naturally). Second place was Chris Ritter and his model which was done in blue, yellow, red, and white, to look like a PT-19 trainer. Third place was won by Rex Powell, with his black and red Mono-

Continued on page 101



Identical molded fiberglass two-meter ships, built and designed by Herbert Heil (left) and Ralf Markwort. See text.



Soon to be published in Flug & Modell Technik magazine, the Floh (Flea). See text for details.

By BILL FORREY

R/C SOARING

• This month we will continue with a real potpourri of soaring topics from the mailbag, all of which should prove interesting to glider types everywhere.

CHRIS ADAMS REPORTS

The name Chris Adams will ring bells and bring back memories in the minds of many R/C Soaring enthusiasts who have

been active since the early seventies. Chris was one of the first ten LSF Level V's (in 1979, I think), attended many SOAR Nats, Great Races, and in the Southern California area, scores of SC² contests. Well, he is still very active in model sailplane flying, but in a different country! Chris is now "Dr. Adams" and is very actively tracking down some sort of "target molecule" in the field of conductive, organic chemistry in the Federal Republic of Germany (West Germany).

Dr. Adams has sent in several letters from "over there" containing much good information about F3B and slope soaring, about construction techniques, and sailplane design. Perhaps I can fit most of it in this month.

The slope pictures were taken near Nieder-Ulm outside Mainz which I read is a "local" slope in Chris's letter. He is studying in Darmstadt. It is interesting to see so many F3B-like sailplanes being flown over the hillsides of Germany.

As you would expect, Chris is traveling all over Europe talking to the modelers, seeing the castles, and generally having a great time visiting foreign lands with his wife, Ellen. On one trip, he was in Babenhhausen to observe an F3B contest. This is

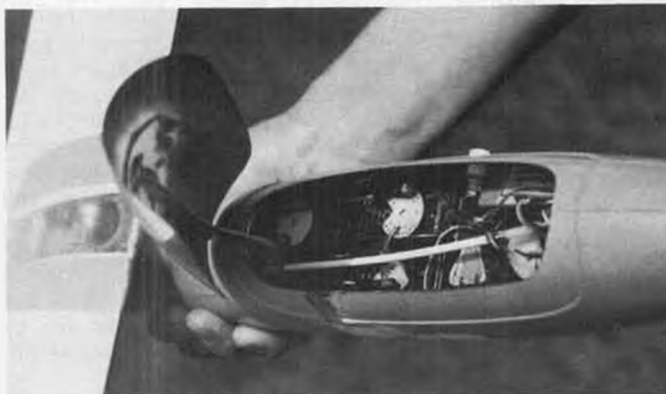
the town where Dr. Helmut Quabeck works, and as you might expect, he was able to meet and talk with Dr. Quabeck. Chris reports that all the German fliers are extremely nice, enthusiastic, and patient with his rough German. If you have ever attempted to read technical German, you can sympathize with both parties as they



The Floh joins another glider in flight over the West German town of Nieder-Ulm.



Dohle 84, designed by Dr. Helmut Quabeck, modified (T-tail) by Herbert Heil. See text.



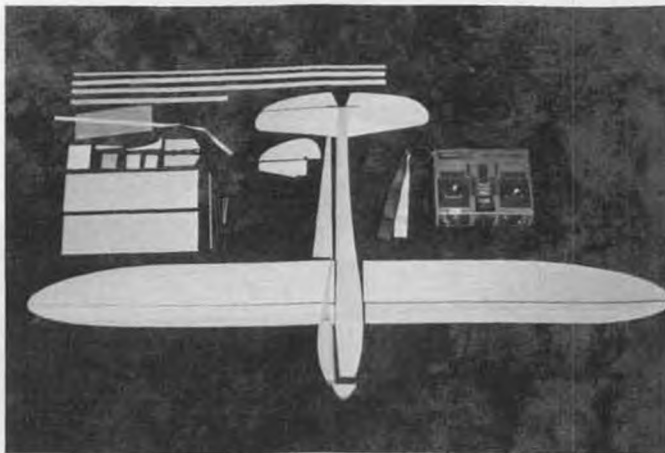
Inside of Ralf Markwort's and Herbert Heil's two-meter ships. Wing mounts atop molded pylon. See text.



Floh interior. Front two servos control V-tail from Tx mixer. Rear servos control mixed flap and aileron functions (flaperons).



Lewis Clark, of Lutmi Enterprises, and cross-country sailplane, the Vygeur prototype. See text.



All parts pre-cut, kit style, for Ted Stinson's little Dragonfly glider. Futaba transmitter gives idea of size.

try to communicate the details of the various models. The contest was a kind of semi-finals to determine who could fly against the Germans national F3B team in the "higher class." The goal, of course, to displace them. In Chris's words:

"The Germans were flying a modified F3B rule contest. Speed was two laps, of which the best here did 10 seconds. Quabeck says the team does 9 or less. Duration was six minutes as per the usual rules. Distance, however, was flown man-on-man, with a random draw to determine who you were to fly against, and that is how it remained for the rest of the contest. Distance was as many laps as possible in four minutes, normalized for the flight group. The highest was 17 (laps), and Quabeck quoted the best normally do about 20 (!). I truly believe this as I see how the planes perform. Most planes were a modified 'Dohle' with most having V-tails. The others had T-tails, and I'll drop you a sketch of how the T-tails are made strong for possible construction notes in the magazine. (See sketch herewith. wfr) Almost all were three meters or larger, wide chords, but no polyhedral designs. Most flew flaperons, but others had flaps and ailerons or switches to change functions.

"I saw Decker's model being flown by the chap who made the molds and most of the ship. That sailplane was quite light; a true piece of quality workmanship as you saw at the world championships in York. I was amazed at how little ballast everyone was using. Not more than a pound was added by the majority.

"I have a few radical ideas, as I normally have, and I'm trying to work out the design bugs on an F3B ship I'll build when I return. I'm also working on a computer program for storing airfoils, plotting coordinates, and viewing airfoils by overlapping them. It will be great for my library."

T-TAIL ARRANGEMENT ON MODIFIED DOHLE

The above mentioned sketch is described by Chris as follows: "Above is detailed the use of a carbon fiber rudder post as the structural support on some European T-tail F3B glider designs. The support shows good torsional rigidity as well

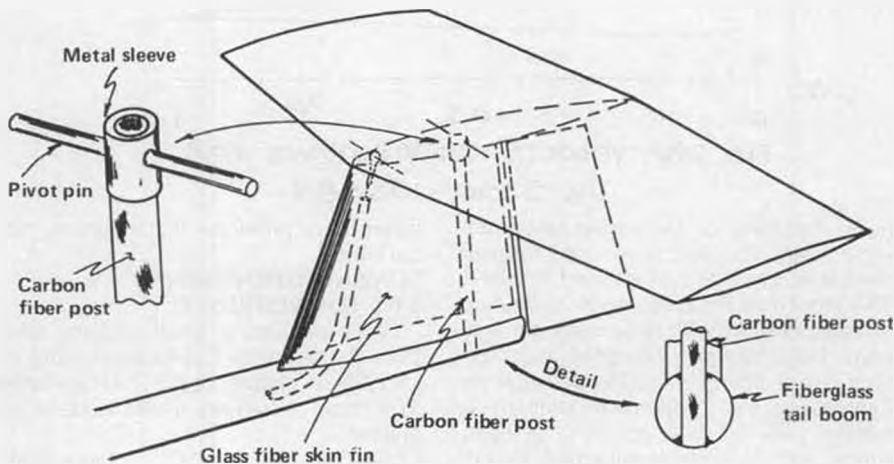


A large SB 11 at home on the equally large slopes of West Germany.

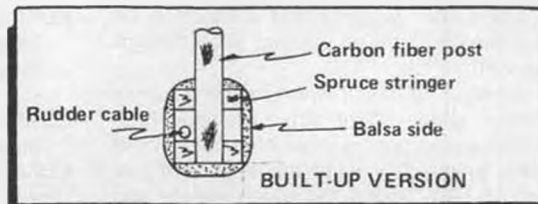


Bobby Gerbin, Anaheim, California, and his THREE 1st Place trophies won at the '84 Reno Nats. Recognition deserved and delivered!

as forgiveness in hard landings. An important design feature is the use of a metal sleeve on the outside of the post at the pivot point. This feature prevents the post



T-TAIL ARRANGEMENT on Herbert Heil's Modified Dohle Drawn by Chris Adams



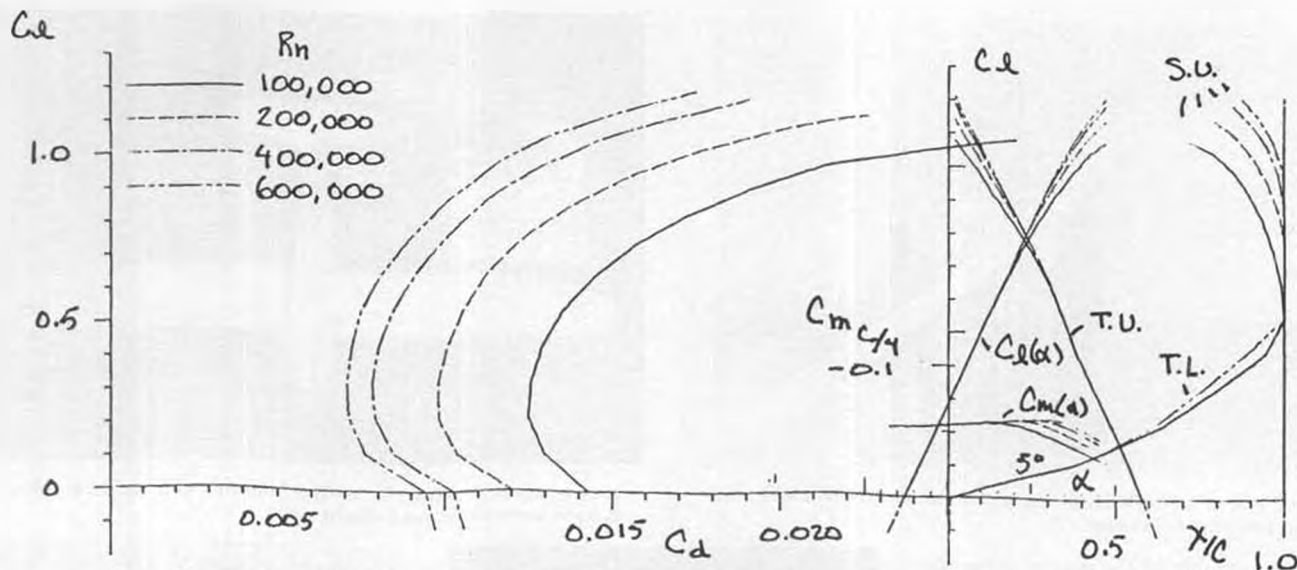


FIG. 29 - THEORETICAL SECTION CHARACTERISTICS FOR THE S3010-103-84.

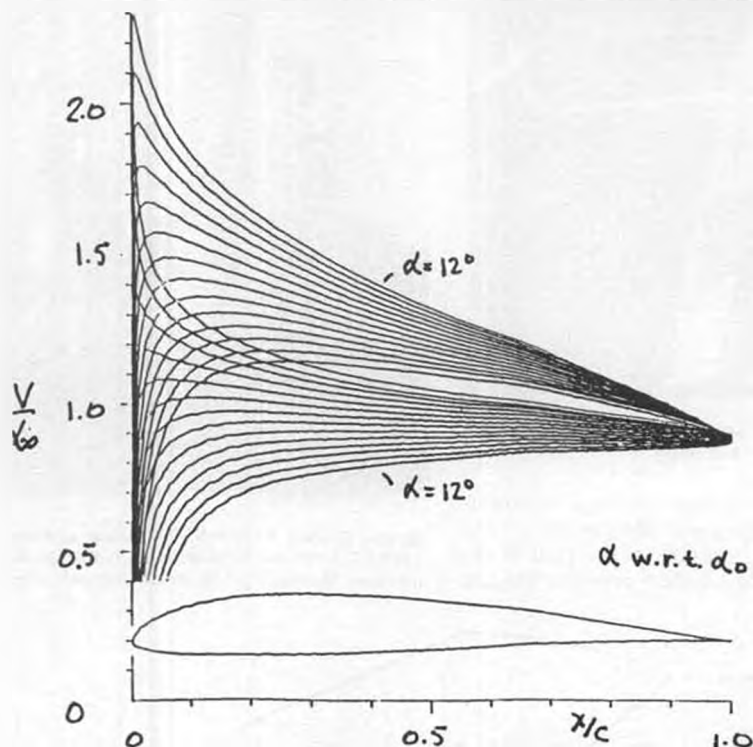


FIG. 28 - VELOCITY DISTRIBUTIONS FOR THE S3010-103-84.

x	y		
1.00000	-.00000	.00005	.00100
.99674	.00027	.00181	-.00543
.98708	.00118	.00932	-.01048
.97122	.00293	.02239	-.01506
.94959	.00564	.04061	-.01894
.92264	.00936	.06381	-.02203
.89090	.01405	.09180	-.02427
.85493	.01980	.12435	-.02567
.81531	.02585	.16119	-.02625
.77261	.03239	.20200	-.02610
.72739	.03858	.24635	-.02531
.68021	.04458	.29376	-.02399
.63158	.05037	.34371	-.02221
.58203	.05597	.39565	-.02009
.53204	.06141	.44899	-.01769
.48213	.06729	.50312	-.01514
.43275	.07422	.55743	-.01252
.38438	.07706	.61127	-.00994
.33750	.07870	.66399	-.00749
.29230	.07902	.71495	-.00526
.24970	.07798	.76350	-.00332
.20944	.07556	.80901	-.00172
.17208	.07184	.85087	-.00051
.13785	.06689	.88831	.00031
.10706	.06076	.92140	.00075
.07990	.05360	.94905	.00086
.05655	.04556	.97104	.00072
.03713	.03683	.98703	.00042
.02173	.02766	.99874	.00013
.01042	.01835	1.00000	-.00000
.00319	.00927		

- LENTICULARUS CUMULUS FAKUS** — Classic wave cloud formations formed by stable, low velocity air with insufficient vertical component; usually discovered at the cost of a high aero tow.
- BITUMINOUS CUMULUS** — Billowing clouds of smoke with strong lift but little oxygen.
- FRACTO CUMULUS** — Orographical cu's stuffed with rocks.
- CUMULUS TERRIFICUS** — Soaring a go-go.
- CUMULUS MAMMANTUS** — Soaring a no-no.
- ALTOSTRATUS OPACUS SQUELCHUS** — High, thin overcast which moves in and flattens those beautiful cu's when you are halfway to your goal.
- STRATUS SNEAKUS** — Stratus which slips in beneath you just as you locate the best part of the wave.

from shattering or splintering under adverse loads. The post is attached through the entire fuselage and epoxied in place. This procedure lends itself well to built-up fuselage designs with spruce stringer supports (see drawing). European modelers then use a fiberglass rudder-fin shell for lightness as no additional strength is needed. The overall result is a light, strong, and dependable tail group. Best of luck in designs... Chris Adams."

Chris later suggests that a variation on this theme could be used for V-tail designs as well.

By now he has finished building a two-meter glider using the Quabeck HQ-2.5/10 airfoil. Says it looks nice, and would have preferred a V-tail for looks, but that would have added too much weight and

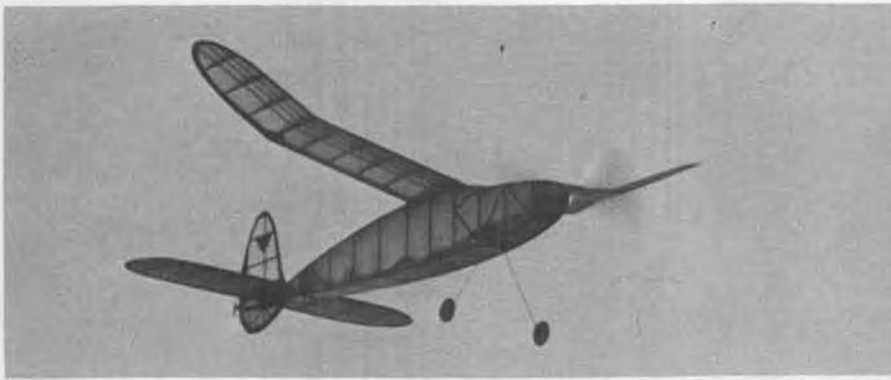
given him problems in mounting and packing.

**SOARING DEFINITIONS:
SAVE FOR REFERENCE**

Chris included a small clipping taken from the Southern California Soaring Association (a chapter of the SSA) newsletter, "Thermal," May-June, 1984. Have a few laughs!

- CUMULUS AGGRAVATUS** — Large, building cu's just beyond your reach.
- CUMULUS TEMPTATIOUS** — Large, well formed cu's which lure you from your intended course and have nothing but sink underneath.
- CUMULOFECES** — Similar to above, but brown in color.
- CUMULUS CONGESTUS** — Single cloud with two or more sailplanes below.

Continued on page 85



1. Gorgeous shot of Ken Sykora's "Miss Canada" gliding in for a landing. Photo by Mikkelson. Yes, it's very Korda-like.



3. Well built Scientific "Miss Worlds Fair" by Dick Siefried. Taken at SCAMPS Annual.



PLUG SPARKS

By JOHN POND

• No question about it, contests are the places to get the best photos, latest innovations, and the present state of the art in flying. Imagine going to Condor Field at Taft and finding no less than three different contests going on the same day: AMA F/F, Old Timers F/F, and O/T R/C, with all meets enjoying good attendances.

This writer ran out of film as there were so many good subjects. Later on, between discussions of meets, we'll get a bunch of them in.

The free flight old timer area was the first visited and this columnist was struck by the variety of rubber models entered. Thanks to R.J. Mikkelson we have Photo No. 1 showing SCIF Newsletter editor Ken Sykora's "Miss Canada" doing a beautiful fly-by. The design somewhat resembles Dick Korda's very successful Wakefield winner as kitted by Megow. The Miss Canada, of course, was originally kitted by a Canadian concern, Easi-Bilt. Quite a few of their designs are still available.

Also seen at the registration desk was

Jim Adams, the outstanding *SAM Speaks* Newsletter Editor, with a little seen English design called "Isis" (Photo No. 2). This was designed in 1939 by Houlberg, one of the outstanding British rubber men. No reports on how the model flew.

More rubber models were to be found between the cars. Got a real nice photo of Dick Siefried with a very well built Scientific Miss Worlds Fair (Photo No. 3). This design is one of the better flyers of the line that included All American, Oriole, Firefly, Flea, and Clarion. One of these days someone will stage a Scientific-Only Rubber Contest. There certainly are enough models (not all mentioned) to hold a full fledged meet.

It was a real pleasure to see Phil McCary back in harness at Taft. Phil has spent the last four or five years in the Reno-Carson City area. Originally from Beverly Hills, his line of business (Geology) took him to Nevada for mining and oil studies. However, when that petered out, Phil came back to the Golden State in search of that



4. Phil McCary with Smith Mulvihill Stick Winner, at Taft. Mikkelson photo.

"gold."

Photo No. 4, again taken by "Jasper" Mikkelson, shows McCary with a good flying Smith Mulvihill Winner. Examination of this model will show the wing has a close resemblance to the Baby Playboy outline. For that matter, you could say all the Cleveland Balsa Butchers designs were similar, as all used the multi-spar construction.

We didn't have time to get results, but we will list winners next month. Most photos were from the SCIF meet, but it is really hard to tell the difference between SCIF and SCAMP annuals as most all of the same modelers turn out for both meets.



2. "SAM Speaks" editor, Jim Adams, with his "Isis", a British design by Houlberg, well-known Wakefield man. Mikkelson photo.



5. Tom Vincent takes a ribbing from fellow SAM 20 members for using Eut Tileston's "discard"!



6. Eut Tileston with neatly constructed 1/2A Texaco version of Weathers' Westerner. Dowling photo.



8. A standard Cox .09 powered Strato Streak by Al Hellman. Flies well for a Class A.



7. The Lancer, by Eut Tileston. A sensational winning design. Has terrific climb. Eut has built them in all sizes.

SAM 49 FALL ANNUAL

Getting back to the other side of the field, the writer arrived just in time for the pilots' meeting where a multi-type entry was being opposed by the majority of flyers. Finally, on a vote, it was decided that no more than one model could be entered per event per contestant. The one exception to this was the allowance of a second model if the first broke up. However, all flying time on the first model was to be scrubbed and the second entry treated as entirely new.

It didn't take any great oddsmaker to figure out who was going to win this meet. After his spectacular wins at the SAM 30 Annual at Marysville, Eut Tileston

proceeded to show the boys how to win an event(s). One of the most startling climbs was to be seen on his OS 90 four-cycle powered Lancer, which actually climbed past vertical and practically out of sight!

Eut is a member of the Northern California A.M.A. Stunt Team, and as such, is a superlative flyer. With his background and the models powered as they are, Eut is invincible!

Photo No. 5 shows the boys poking fun at Tom Vincent, who inherited Eut Tileston's OS 90 four-cycle powered Westerner. Eut can be seen on the left, with Nick Nicholau and Bud Hadl fingering the "illegal" model. The last laugh

went to Tom Vincent, as he tied Eut Tileston and forced a flyoff in two events.

Photo No. 6 depicts Eut Tileston with his 1/2A Texaco entry, a scaled Weathers Westerner. Note that Eut has done about everything needed to win: good flying design, right size for engine, weight held to 16 ounces or less, engine cowled and best of all, a folding prop!

Eut has gone a step further in selecting the ideal model for the Antique Event, i.e., the New Cyclone Lancer of which we are again running another photo as seen in Photo No. 7.

Lancers were originally produced in 49 inch and 72 inch versions. Tileston has scaled the models both ways (up and down) with the initial success in Class A Limited Engine Run. The model shown here is for the Antique Event using an OS 90 four-cycle engine. The model performance leaves nothing to be desired, terrific climb and good floating glide.

Needless to say, Eut Tileston won the Texaco Event in a fantastic performance of two straight thirty minute flights. Eut is now the proud possessor of the Bent Prop Trophy. This trophy was conceived and given by Jack Jella quite a few years back when free flight and radio control both competed for the trophy. This was quite successful until the R/C boys finally won the trophy after several years of trying. After that, it was quite obvious the R/C boys could win, as the caliber of flying had improved to the point where half hour flights



10. Well built Lanzo Bomber by Gerald Martin, Hereford, Texas. Seen at the Rocky Mountain SAM Annual.



9. A Dick Tanis "Yankee Clipper" by Larrie Schaeffer, is a good performing model with an Anderson Spitfire up front.



13. The Allentown meet of August 1, 1937, showing the boys up bright and early to check their models out. Dig the running board luggage rack!



11. May 6, 1939, and Mickey De Angelis is rightfully proud of his two-year-old Kloud Queen having registered 150 flights.

were quite commonplace.

While on the subject of thermals, Al Hellman, as seen in Photo No. 8, flew in the afternoon into some rather ominous clouds. The lift was splendid for this fast flying small model. Hellman used a Cox 09 Medallion to power the model and appears to have the right combination.

One of the interesting features of this contest was the introduction of the Electric Texaco Event. This new event was held in conjunction with the standard electric 05 event, rules for this event having been published and presently being tested on a probationary basis.

The "gimmick" in the electric Texaco event was that one could turn his motor on and off as many times as the batteries would last. This encouraged August Fabian to bring out a Yates 10-Ft. Cabin with a Keller 50 motor utilizing 24 batteries! Wotta pack! You have to have some power to move that huge model.

In response to requests to feature model and engine combinations, the following results are presented:

CLASS A		
1. Al Hellman	(Sirato-Streak/Cox .09)	21:00
2. Ross Thomas	(Sunduster/K & B .19)	17:07
3. Eut Tileston	(Lancer/Elfin 2.49)	16:36
CLASS B		
1. Ross Thomas	(Sunduster/Johnson 29)	21:00
2. Eut Tileston	(Lancer/Enya 46 4C)	19:40
3. Don Carl	(Playboy/McCoy 29)	18:07
ANTIQUUE (GLOW)		
1. Eut Tileston	(Lancer/OS 90 4C)	30:00
2. Tom Vincent	(Westemer/OS 90 4C)	30:00
3. Bob Angel	(Lanzo R.B./OS 90 4C)	28:03



12. The Kloud Queen showing that it knew all about gaining altitude fast.



14. Gas powered version of the Jimmy Allen "Bluebird." Hot flier with an OS 40. Rumored to become a Hobby Horn kit.

CLASS C		
1. Eut Tileston	(Lancer/OS 90 4C)	21:00
2. Tom Vincent	(Westemer/OS 90 4C)	21:00
3. Don Hoyle	(Mite/Atwood 60)	21:00
ANTIQUUE (ORIGINAL IGNITION)		
1. Otto Bernhardt	(Lanzo R.B./McCoy 60)	27:53
2. Don Carl	(Dallaire/McCoy 60)	21:02
3. Al Hellman	(Lanzo Bomber/Spiritfire)	4:45
1/2A TEXACO		
1. Eut Tileston	(Westerner)	30:00
2. Tom Vincent	(Boehle)	29:37
3. Bud Hadl	(Shrimpo)	29:19
TEXACO		
1. Eut Tileston	(Lancer/OS 90 4C)	60:00
2. Ross Thomas	(Lanzo Bomber/O & R 60)	55:09
3. Tom Vincent	(Dallaire/OS 60 4C)	50:51
ELECTRIC 05		
1. August Fabian	(Playboy/Astro)	16:55
2. Roland Boucher	(Playboy/Leisure)	16:12
3. John Pond	(Playboy/Leisure)	6:14
ELECTRIC TEXACO		
1. Ross Thomas	(Playboy/Keller)	25:35
2. Bob Sliff	(Playboy Cabin/Astro)	18:01
3. August Fabian	(Yates/Keller 50)	16:01

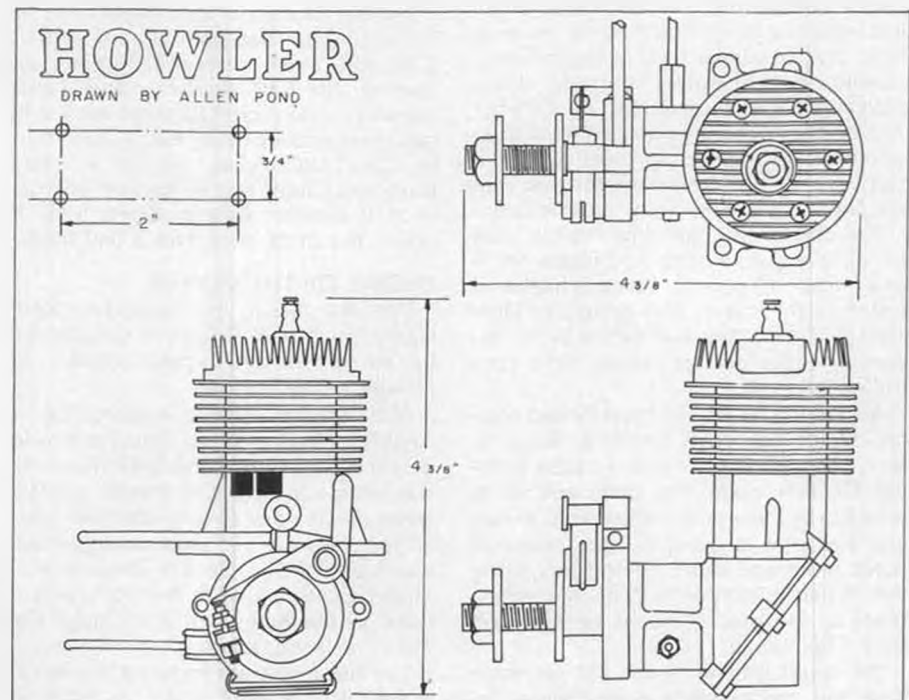
Needless to say, Eut Tileston was the star of the show. Those Lancer models of his are something else!

1985 SCHEDULE

Seeing this column is quite Pacific Coast oriented as far as contests go, Jack Albrecht, SAM Contest Coordinator has supplied the following schedule of major O/T R/C contests for 1985:

- Jan. 26-27 — Southwest Regionals, Buckeye, Az. SAM 31
- Feb. 24 — O/T Spring Annual, Alpine SAM 41
- Mar. 9-10 — O/T Spring Annual, Marysville SAM 30

- Apr. 27-38 — 49er Spring Annual, Taft SAM 49
- May 18-19 — SAM Champs Warmup, Madera SAM 21
- June 24-27 — SAM CHAMPS, Madera SAM
- Sep. 21-22 — Pond Commemorative,





15. R.B. McKenna sent this shot of his Cleveland F11C-2 Curtiss "Goshawk". A real colorful bird.



17. David Reynolds, Melbourne, Australia, won Beauty Event with this Taibi Powerhouse at Southwest Regionals, Victoria.

Vandenberg SAM 26

Oct. 5-6 — Marin County Annual, Olive SAM 27

Oct. 26-27 — Fall O/T Annual, Marysville SAM 30

Nov. 16-17 — 49er Fall Annual, Taft SAM 49

As can be noted when comparing to the 1983 schedule, the Salinas group will not be putting on their annual, instead running the SAM Champs. Also the "fly-for-Bucks" meet at Colusa held in July has not been firmed up. The foregoing list concerns only the major contests qualifying as two day meets or better. The list is provided so that local clubs may schedule their activities around the major meets. Hopefully, we will get a list of the scheduled meets of the East Coast (New Jersey, et al) area. All you have to do is to write!

FIRST ANNUAL ROCKY MOUNTAIN CHAMPS

After a considerable length of time, we have finally heard from SAM 1 (One of the original SAM chapters) regarding their Rocky Mountain Sam Championships. Larry Schaeffer has kindly sent the results and accompanying photos. Great Stuff!! Just what the doctor ordered to get away from that provincial look in the column.

Being the first Rocky Mountain championship staged by this club on October 7, the turnout was encouraging enough to warrant a championship meet for 1985. Larry says the tentative dates for next year are Sept. 7 and 8th. More on that later.

This columnist dearly loves to run photos of little seen models and Photo No. 9 of a Yankee Clipper by Larrie Schaeffer is just the right answer. This design, by Dick Tanis, of New Jersey, is powered by an Anderson Spitfire and, of course, radio controlled.

Also noted on the field was Gerald Martin, all the way from Hereford, Texas, as seen in Photo No. 10 with a Lanzo Bomber. Gerald's model flies quite well as attested to by the win in Limited Engine Run and a second in Antique. This columnist notes more and more competitors using this design. In response to many queries, plans to the model should be obtained from Chet Lanzo.

We could list the results but we don't have the model-power combination, so



16. SAM 29 member, Bruce Norman, at the O.T. R/C events, '84 Reno Nats. Lanzo Bomber is Ohlsson 60 powered. Schroeder photo.

we will simply acknowledge the big winners, such as Chuck Brannon winning first in Antique R/C, first in 1/2A Texaco, and second in L.E.R. Chuck and his son come down from Wyoming for the Denver meets.

The big winners in Free Flight were Les Payne (first in Class ABC Cabin, First in Class ABC Pylon, second in Towline, and second in .020 Replica) and Larrie Schaeffer, who picked up what was left by taking second in Class ABC Cabin, third in Class ABC Pylon, Second in Hand Launched Glider, first in Towline, and first in .020 Replica. Four modelers took 15 places out of 21 slots. Not a bad haul!

ENGINE OF THE MONTH

We are again indebted to "Red" Garlough, MECA District 2 Coordinator, for the use of this month's subject, the Howler racing engine.

Although Joe Wagner, in compiling his American Engine Index, lists the Howler in two versions, 1946 and 1947, this writer was unable to find it in Model Airplane News or Air Trails. Finally, after two hours of searching, a full page advertisement was found in the January 1946 issue of Model Craftsman, with the manufacturer listed as the Bone Tool and Gauge Co., 9910 Freeland, Detroit 27, Michigan.

The Howler we are featuring this month is the MK II or 1947 model. As usual, all



18. Paul Straney placed third with his veteran flier, "Jimp", a local design.

dimensions have been taken directly from the original engine. This particular model had an air induction hole drilled in the bottom of the shaft housing, the first model relying strictly on sub-induction for air.

Howler engines featured a patented fuel feed system. This fuel, metered by a needle valve, enters the crankcase by means of holes drilled in the crankshaft and crankcheck; the hole in the crankshaft registering with the hole in the bearing housing once every rotation.

Thus, a definite quantity of fuel is ejected from the crankcheck into the crankcase. The fuel supply is definitely disconnected from the mixing chamber (in this case, the crankcase) during the greater part of each revolution. The designers of the engine claimed this gave

Continued on page 36



SKY SCRAPER

OLD TIMER Model of the Month

Designed by: Carl Schmaedig
 Drawn by: Al Novotnik
 Text by: Bill Northrop

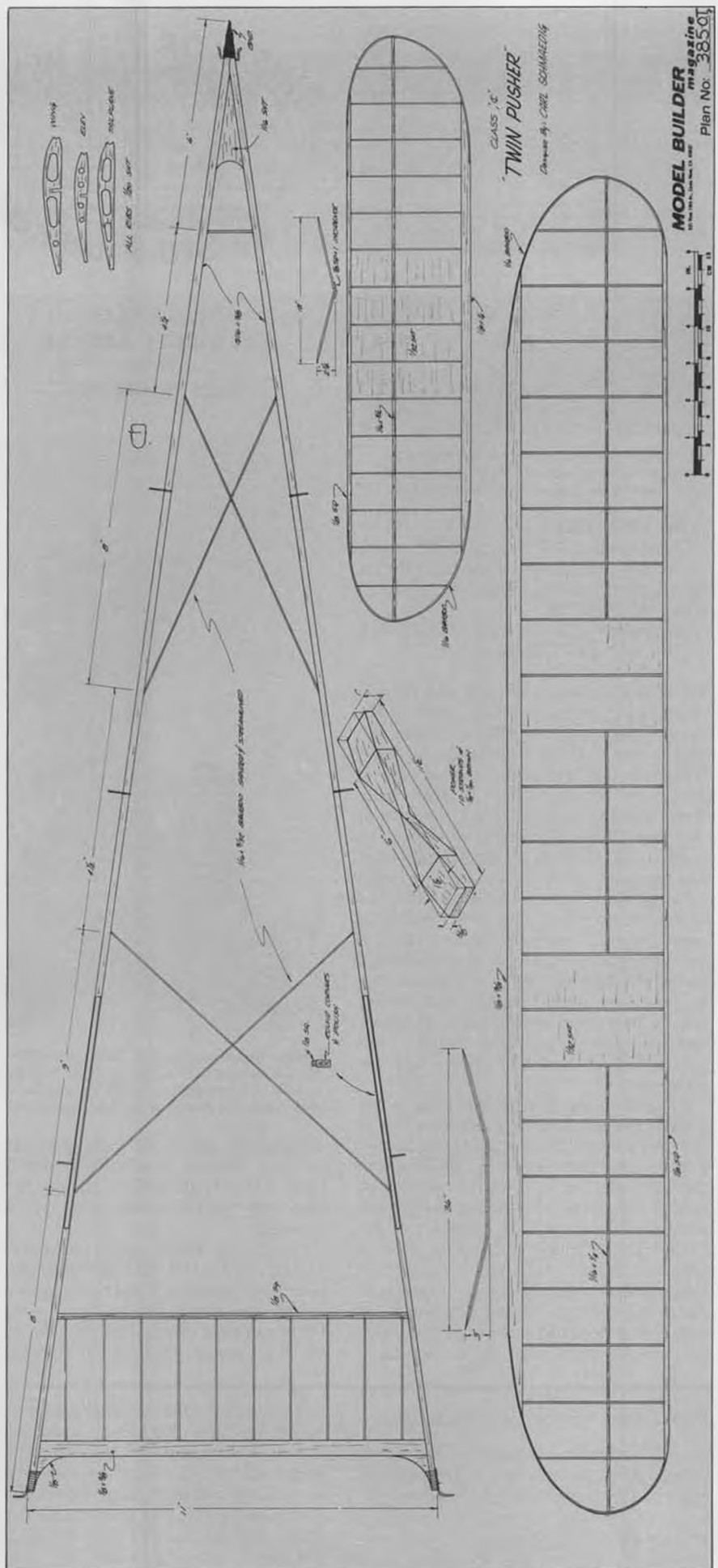
In the late 1920's and early 1930's there were only two kinds of model aircraft... those that were intended to fly, and those that were not. The flying types were simply divided into indoor and outdoor, and glider or rubber power...no gas engines, no radio control, no pylon racers, no control line, etc., etc. And the king of outdoor rubber power competition was a strange... almost awkward looking thing call a "twin pusher." With its long, twin rubber motors, light airframe, and almost stall-proof canard configuration, the twin pusher, although not a great soaring bird, could stay aloft for long flights just on the duration of its motor run alone.

A fine example of this type model is our Old Timer of the Month, Carl Schmaedig's "Sky Scrapper," as published in the July 1936 issue of *Model Aircraft Builder*, and also in Frank Zaic's 1935-1936 *Model Aeronautics Yearbook*. Carl, incidentally, was the designer of the "Miss Model Craftsman," which Frank acknowledges as being the inspiration for his famed "Miss America," originally kitted by Scientific, and now being kitted by several manufacturers as a popular old timer (see Beehive ad in this issue).

A model builder needs no special instructions to build this twin pusher. Note the wire "cans" which support the rubber in three places along each main motor stick. I wonder where the term "can" came from in naming these hangers?

The wing is mounted flat about midway on the eight-inch long, 1/8 square "elevation blocks," and the elevator is attached five inches from the nose. Test gliding without rubber and props was suggested. Move the elevator back if it stalls, move the wing forward if it dives (so it said). No mention was made of a balance point. Props (one left, one right handed) are mounted so that the top blade turns outward under power.

See how it was 50 to 60 years ago... try a twin pusher. You may like it, and think of the exercise you'll get chasing after it!



MODEL BUILDER magazine
 Plan No. 38501





Hitler used this engine in Nazi Germany to create air-mindedness in school-age children who would soon become Luftwaffe pilots.

VITAL STATISTICS

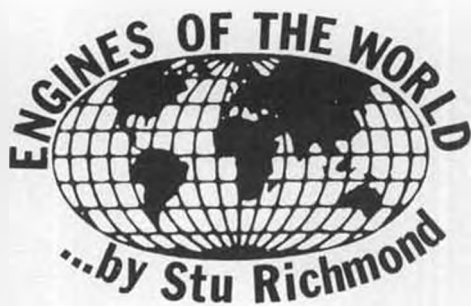
Dimensions: 6-1/8" long, 2-3/8" wide, 5-7/16" high to the top of the head fins; a moderate 19 ounces heavy.

UNIQUE FEATURE

Manufactured to EXPLOIT MODEL AVIATION IN NAZI GERMANY!

- Franklin Delano Roosevelt and Adolph Hitler both came to political power within three weeks of each other...during the depths of the Great Depression in 1932. Roosevelt and Hitler both died within three weeks of each other in April 1945. Both leaders were crippled throughout their adult lives. Roosevelt, weakened by polio at 21, lived in a wheelchair. Hitler was mentally weakened by virtue of being a manic-depressive. Hitler suffered bouts of depression alternating with periods of super-physical aggressive drive, stamina and determination. The similarity of these two world figures stops here. It was during a series of manic stages that Hitler planned his Third Reich, came to power, and ultimately directed his World War-II generals over their collectively sounder judgement.

So what does this history have to do with model airplane engines? Simple. Part of Hitler's overall planning was to conquer through the overpowering aerial assault of the Luftwaffe, his air force. In order to be sure of enough air-minded youth to fill the ranks...Hitler promoted heavily...or EXPLOITED MODEL AVIATION ON A GRAND SCALE to directly cause air-mindedness in young boys. I remember frequently seeing in *Model Airplane News* and *Flying Aces* pictures of young modelers with all-white gliders posing in



The 14.33 cc FELGIEBEL ENGINE from NAZI GERMANY



Engine had nearly square 26mm bore/27mm stroke, turned a 17 x 6 prop at up to 6,000 RPM's. Intake tube, cylinder bypass cover, and mounting flange all brazed together.

white shirts and funny looking emblems on their sleeves. I NEVER REMEMBER, NOR CAN I FIND TODAY pictures of that type where gasoline-engined models were pictured.

But during these years, industry was AUTHORIZED by the Reichsfuhrer to pump out gasoline miniature engines for model aircraft use. The July 1938 issue of MAN carried a feature article on the growing new German Air Force; the December



Felgiebel 14.3cc engine stands tall over Stu's ever-present nickel, the last one he owns, we understand!

1941 issue MAN carried a brilliant editorial by Charles Hampson Grant in which he said, "The German government was far more absorbed in its air-minded youth than in its labor battalions, and educated the former in such numbers that they became the world's foremost airpower."

And so, with strategic wartime material, Nazi Germany turned out significant numbers of two-cycle ignition engines such as the W. Kratzsch company's KRATMO F 30B in 1934, the Kratmo F-10-B in 1936-37-38, and then followed the Eisfelds, the Ortus, Argus, Ikarus-10, Thaler, Blankenmeister and others, including this month's topic engine...The FELGIEBEL 14.3cc engine produced from 1939 through late 1941 when most non-essential manufacturing ceased.

Pictured is a reproduction engine made behind the Iron Curtain in 1983...the original engines are scarce today, as the allies did such an effective job in destroying Nazi Germany from the air. Additionally, it was in violation of imposed civil law...for five years after WW-II...for Germans to own, buy or sell, or partake in items or activities related to model aviation. Under these conditions, it's little wonder that so few pre-WW-II German engines exist!

I've found an ORIGINAL late 1940 model Felgiebel 14.3 engine for sale in Vrane, Czechoslovakia, which I believe was the model for the repro pictured in this article...the repro is one of five pieces hand-made by Ladislav Davidovich...the repro is valued at \$150, which is far below the asking price for the 1940 original.

A smaller 7.6cc Felgiebel was also

Plug Sparks . . Continued from page 34

greater uniformity of power impulses. As noted before, the quantity of the fuel was regulated by a standard type needle valve.

Use of this system allows the modeler to quickly clear a flooded engine. As the system works, the normal amount of air is taken into the crankcase (through the sub-

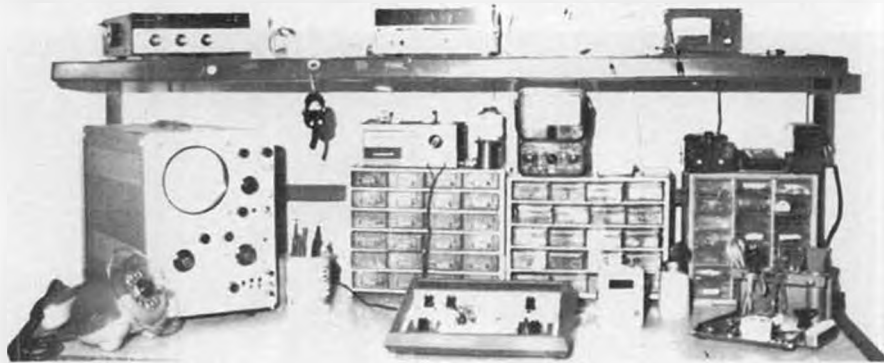
induction of the piston) but the fuel orifice opens only on the down stroke when turned backwards. Tricky system!! No additional fuel can enter the crankcase as long as the motor is flipped backwards.

As noted previously, the only air supply to the engine in the MK I model was from the piston passing above the exhaust ports. Later, it was found some additional

air was required, hence the hole in the bottom of the crankcase casting.

With a fuel system such as the one patented by the Bone Tool Co., the engine could be mounted in any position without fear of flooding and/or hydraulic lock.

For those interested in data and features of the Howler, the engine has a bore of .9375 in. and a stroke of .875 in. giving a



Electronics Corner

By ELOY MAREZ

ELECTRIC SWITCHES AND SPEED CONTROLS

Just to prove that we use letters as they come, without any editing, here is one from John Schulein, San Jose, California:

"I am into electric flight and enjoy electronics as a profession and a hobby. I always read your piece in Model Builder right after Mitch Poling! I personally would like to have your column more technical but realize that you have to write for a general audience. Keep up the good work.

"I am interested in possibly building a Ni-Cd battery cycler using one logic, a comparator and a cheap digital watch with start/stop timer mode. I would like to obtain the schematic for the Super Cycle battery tester that you mentioned in the June issue for background information. Enclosed is a self addressed stamped envelope.

"In the December 1984 issue of MB you mentioned some fail safe articles published in British magazines. I have some interest in this subject also and would like copies of what you have on this. On the fail safe subject, I have modified the Fritz Mueller electronic switch (Jan. '83) so that if the input signal hangs high or low (input pulses lost), the relay will open (de-

energize). Enclosed is a copy of the circuit.

"I also modified the Jomar SC-1 Speed Controller (Model Aviation) to shut the motor down if input pulses are lost. Enclosed is a copy of this addition also. The switch modification requires no additional IC's, but the speed controller modification does require one new IC and some discretes."

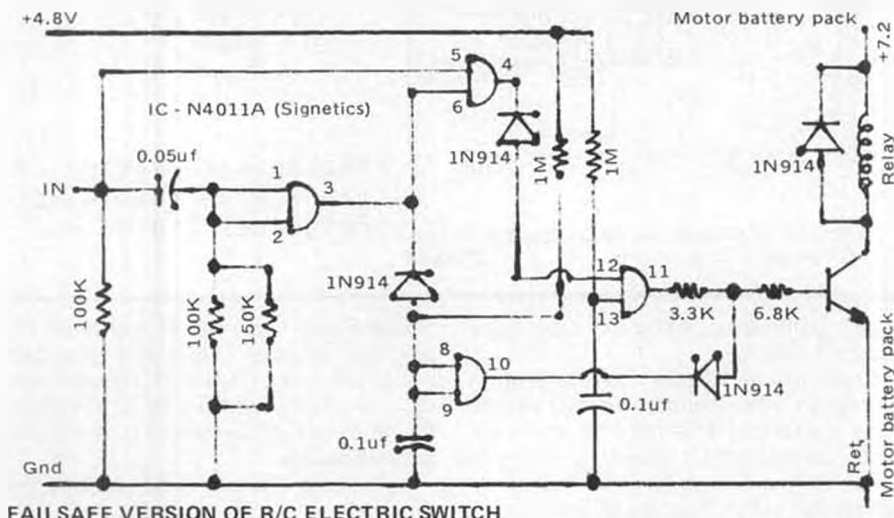
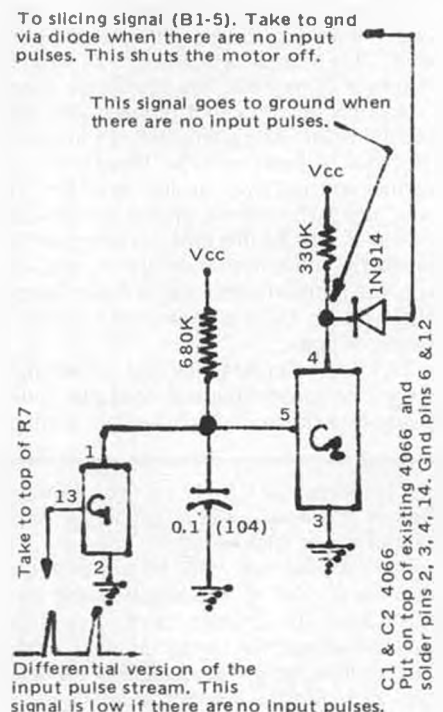
Right after Mitch who? I'll bet some of you thought that was going to upset me, didn't you? Well no, not really. You see, some time back I received a request for one of my electronics indexes, with a check made out to...yep, you guessed it...Mitch Poling. Now THAT upset me! Seriously, Mitch does a good job of keeping those who like to trade watts for thrust current(!) with the latest equipment and techniques. We seem to cross subjects now and then, which is to be expected due to the similarity, but as long as John and the rest of you read both of us, the sequence is not that important.

Anyway, Mr. Schulein now has his schematics, along with some other information I happened to have on battery cyclers. All we ask is that you share the results of your experimenting with us. I have one more suggestion in this respect...if at all possi-

Recommended reading for those who have more than a passing interest in electronics.

ble, use a readily available timer so that the unit can be duplicated by anyone wanting to do so. For this and similar purposes I can recommend some programmable clock modules available from Digi-Key Corporation, PO Box 677, Thief River Falls, MN 56701. These modules are completely one-board, self-contained LED clocks, requiring only the connection of a transformer and some control switches. Such clocks can be made to stop without losing the display by actuating the "set" control, and thus could be used as John states. The modules aren't expensive; the MA1023, with .7-inch high digits, is only \$12.95 less transformer and switches. The catalog, which lists probably everything else that the project will require is free, and you can't beat that! When you order, tell 'em where you read about it.

Continued on page 88



VOLTMASTER

By ELOY MAREZ

• It is indeed doubtful if the radio control hobby as it exists today would be possible without the nickel cadmium rechargeable battery, or something of a different chemical makeup yet possessing the same electrical characteristics. The importance of a healthy Ni-Cd battery has long been understood by the R/C community, even though the battery itself has not always been so. Fortunately for the average R/C'er, he does not have to understand all of the mysteries of Ni-Cd batteries to keep an R/C system going, any more than he has to understand those of propeller design or the boundary layer just to get an airplane in the air.

However, there is one very basic parameter of a Ni-Cd battery that can be easily monitored and measured, which will tell you without any doubt about its condition and that of its individual cells. That is its voltage, the electronic pressure upon which everything else is dependent. A battery must be able to maintain its rated voltage throughout its useful life to have its rated capacity; loss of voltage leads to loss of capacity.

Monitoring of the voltage of a Ni-Cd battery, if it is to be done at all, requires not only an accurate instrument, but one whose indications can be easily read and understood. This requirement is further fortified by the fact that Ni-Cd cells have an extremely flat voltage curve; very little change occurs during most of the useful life of the discharge cycle, only to plummet rather rapidly at the end voltage, about 1.1 volt.

The situation does get simpler, as the majority of our R/C systems operate

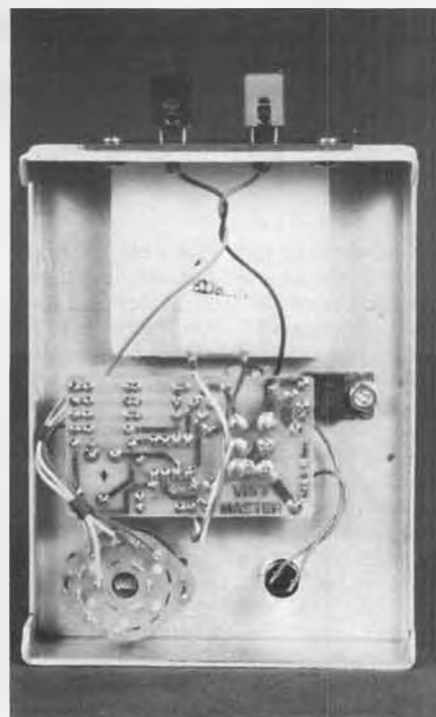
from similar battery packs; four cells for the receiver, and eight cells for the transmitter. This means that we are interested only in monitoring certain voltage ranges; around 4.8 for the receiver and 9.6 for the transmitter. An expanded scale voltmeter (ESV) is just what the doctor ordered.

What is an expanded scale voltmeter, you ask? It is an instrument in which electronic circuitry is used to magnify a portion of the scale of an analog (pointer type) meter. It overcomes the problem of reading small changes in values on an average sized scale. For example, assuming a voltmeter with a two-inch scale, adjusted to read ten volts maximum, a change of .1 volt . . . a useful value in Ni-Cd measurements . . . would move the pointer only .02 of an inch, a nearly invisible excursion. Picture now the same two-inch meter adjusted to read only one volt at full scale. The same .1 volt variation would now move the needle .2 of an inch . . . a variation much easier to recognize and interpret.

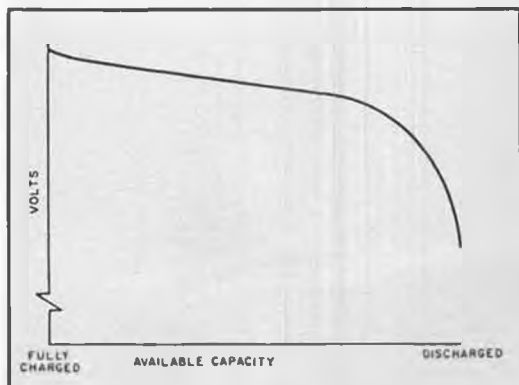
This is similar to what we do to expand the readings of a voltmeter, only that, instead of having a capability that starts at zero, we adjust it to start just below the lowest value we are interested in, and to end just above the highest. In a variation of the 0 - 1 volt example above, say we are most interested in reading 2.5 volts, plus or minus .25 volts. We would then design our ESV to read only from 2.0 to 3.0 volts, which would give us a reading of mid-scale at our critical 2.5 value, with the same .2 inch movement



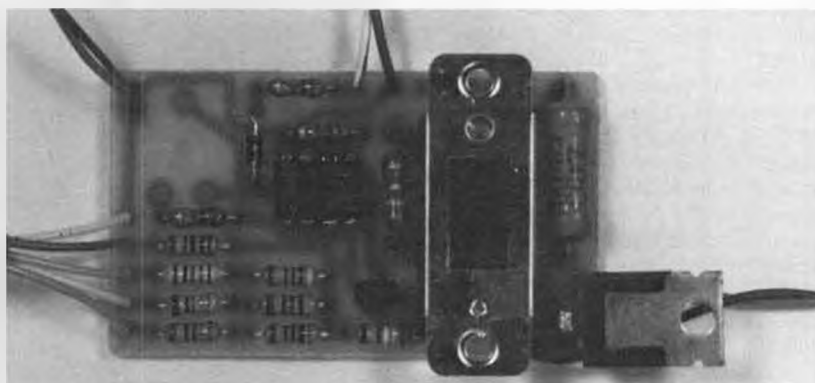
The Ace R/C Voltmaster, precision four-range Expanded Scale Voltmeter (ESV), shown with 500 Ma 'square pack' for size comparison.



Inside of the Voltmaster . . . neither complex nor crowded. Calibration important, but easy, requires charged battery and accurate V-meter.



Voltage curve of the average Ni-Cd battery. Notice that the voltage stays fairly even for most of its useful discharge cycle, then drops very rapidly.



All electronic components are mounted on this small printed circuit board. Kit assembly is simple and fast. Complete instructions are furnished.



The Sea Gull and Victoria Poling at the lake. Sea Gull flies well on Astro 075 and Astro 15 at 3-1/4 to 4 lbs. flying weight.



Jack Pignolo's Astro Flight Super Monterey on old timer floats. A strange combination, but one that works well.

ELECTRIC POWER

By MITCH POLING

I wrote about John Evan's electric photo plane in the January column, it is a very practical plane as well as being a technical achievement. Well, John has fun with electrics too, it isn't all business! His parachute dropping and glider towing plane shows the same ingenuity and impressive flight that the photo plane does. Here's John's description of the plane.

"The olive drab high winger is a scratch design fuselage with modified Oly II tail surfaces and a modified M.E.N. Cub wing of 72 inches. It will tow sailplanes to altitude and release them or take up a G.I. Joe and parachute. The plane weighed 54 ounces and flew beautifully with a Leisure 05 geared 2.5-to-1 using seven Sanyo sub-C's and an old Kraft brick. By the way, it uses the electric race car throttle, as do all my planes. A micro servo and the rheostat do not weigh any more than an electric throttle and are less expensive than any of the electronic throttles I have heard about.

"The tow plane is now powered by an Astro cobalt 15 and twelve 1.2 Ah Ni-Cds. With an Airtronics XL 6-channel with mini servos it weighs 72 ounces. The performance is incredible. It will jump off the grass with the 3-1/2 inch Trexler wheels in about 12 feet and climb until it is too small for comfort in about 1-1/2 minutes. It flies best with an 11/7 Top Flight wood prop (John is using a gear drive, did not mention what ratio-MP), but for towing I use a Top Flight 12/5. A release is built into the tail of the plane and a release is desirable but not necessary in the sailplane. With the two releases either flyer can abort the tow instantly should problems arise, as they did on the first five

tries. Twice the sailplane began doing barrel rolls around the towplane. Once the sailplane climbed so much higher than the tow plane that the elevator could not compensate, and once the towplane zoom climbed and caused the sailplane to pull the tow plane into a spin. The plane has towed a 25 ounce sailplane and would probably tow one up to 35 ounces."

While at the Nats in Reno, I went flying with John, and he demonstrated the plane. It is quite attractive . . . has a sort of "big puppy" appeal to it. John's little boy and some neighbor kids were obviously entranced with it, especially after they found out it could take a G.I. Joe up! The park was pretty small, smaller than I usually fly from, but it does just as John says, a short takeoff "amble," and up and away.

The G.I. Joe is attached by his parachute



The Astro Flight 15 Aircraft motor. Has 11 turns, formerly 10. Works best with a 7 x 4 prop.

to the release at the tail of the plane, and he makes the takeoff a little longer, but not much. G.I. Joe flaps in the breeze back there while in flight, and the plane has to fly quite slowly, with about half the climb, but still it is up to parachute release height in about a minute. There was enough of a breeze to make G.I. Joe drift the length of the field. The kids went nuts, "More, more!" John obliged with a quick landing, and two more takeoffs and parachute drops.

If you have a little kid, this plane is ideal, they love the action! I have seen another parachute plane in action that dropped G.I. Joe from a hatch in the cabin. This has less drag, but not as much appeal, seeing the doll flap in the breeze is half the excitement!

This plane flies beautifully, climbs like a bandit, and is very efficient. Besides that, it is a lot of fun. It would be a beauty on floats.



Glider towing and parachute dropping plane, by John Evans of Reno, Nevada. Uses modified M.E.N. Cub wing, modified Oly II tail surfaces, original fuselage.

I saw some photos of it towing the sailplane. In Europe they have moved the tow point to the balance point of the wing, often with a tow pylon on top of the wing. That makes the tow plane a lot less sensitive to the movements of the sailplane.

For those who would like to try the electric car throttles on electric planes, I do recommend that you install it in a clear area in the plane, away from anything that heat can bother, such as electronics and insulation. John has very clean installations in his planes and there is free space around the throttle, which is usually just forward of the wing leading edge. Thanks for the report, John! I'd like to have a plane like that myself!

Last month I reported some bench tests on the new Astro cobalt 15 aircraft motor. Since then I have had a chance to do some flight testing. I used it in my new seaplane, the Sea Gull, which I designed to be general purpose. It will fly with anything from an 05 to a 25. My initial impressions from the bench tests were confirmed in flight; the motor is a high speed motor and likes to rev up. When I used a 12-cell 1.2 Ah Sanyo pack, the best flights were with a Rev-Up 7x4 prop, which has a narrow blade and draws less current than most 7x4 props. My flight times were about five to six minutes with this combination, with very quick takeoffs from water and a lively climb. The plane flies fast with this motor, about 20% faster than with other motors.

All up weight of the Sea Gull is four pounds. It has a span of 60 inches and an area of about 500 square inches. I could get flights of a little over six minutes if I went to a 7x3-1/2 Cox gray prop, but the climb was sluggish, though the takeoff was prompt.

The aircraft system comes with 800 mah cells, so I flew with twelve of them to see what that was like. The plane weighed 3-1/4 lbs. with this pack. I used a 7x3 Top Flight wood prop, which gave a good takeoff and medium climb. Surprisingly enough, with this prop I got five to six-minute flights too. The current drain with this prop is only 8 amperes.

My conclusions? The aircraft motor is definitely a max per in minimum time



Leisure Playboy on old timer floats, also by Jack Pignolo. Water flying site is near his home in Massachusetts.

setup, that is, it should be ideal for pylon racing, F3E contests, and free flight. If you wish to fly it in a sport plane and get longer flight times, use a narrow blade 7x4 or a 7x3. If you wish to have even longer flight times, a gear box will make a big difference.

John Evans used a gearbox on the older model cobalt 15, which is an even hotter motor (10 turns, as compared to 11 now), and has excellent duration, well over six minutes. However, my favorite motor, and the one I recommend to sport fliers who like to fly easy going planes that make long flights, is the marine motor, with 13 turns. It will easily turn an 8x4 prop for over six-minute flights, and comes with a 1.2 Ah battery pack. So take your pick according to your preference! The motors alone are stock number 6615 for the aircraft motor, 6815 for the marine motor, both at \$90. If you order a marine motor, order a prop driver too, as it does not come with one. The systems are 6515 (aircraft, with twelve 800 mah cells), and 6715 (marine, with twelve 1.2 Ah cells), for \$170. Again, the marine system does not come with a prop driver, so order one. You can order either motor with either the 800 or the 1.2 Ah pack for no extra

charge, but specify this clearly if that is what you want.

Speaking of seaplanes, marine motors, and such, Jack Pignolo sent some photos of his electric seaplanes. He lives on the shore of a small lake in eastern Massachusetts, so floats are a natural way to go all year long. Jack says he has been a modeler for 40 years and has been flying electrics for the past three years, the latter of which has been the most fun yet, he just loves it! He hand launches his seaplanes to keep out water spray. He found that water will melt brushes like wet chalk rubbing across a blackboard. At \$8 a set for silver graphite brushes, he says he can live without ROW! He lands dead stick, then turns on and motors to shore.

Saturday and Sunday mornings are his favorite times to fly. It's mostly calm, quiet, and his fellow lake dwellers NEVER complain. The Super Monterey looks prehistoric on floats, but flies great! The land-

Continued on page 70



John Evans and his glider tug/parachute dropping hybrid. Colors are olive drab and cream.



Interior of glider tug. Batteries placed well forward. Astro 15 cobalt motor.



Mitch's new book on building and flying electric powered model aircraft now available.

PLAYBOY SR. FOR HALF-A TEXACO

By JIM REYNOLDS . . . If you want to compete in the Old Timer Half-A Texaco R/C event and have a chance of winning, this is your model to build!

• Why build a Playboy, you ask? Because it can WIN! The 1983 SAM Champs radio assist results list seven events, first through fifth place, that a Playboy could enter. Fourteen out of the 35 places listed went to Playboys. That is forty percent. There were no 1/2A Texaco Playboy winners, but there should have been. This 1/2A version of the Playboy Sr. is aimed at solving that problem.

The full size Playboy Sr. has a wing span of 80 inches and a wing area of 800 square inches. For no scientific reason a wing area of 315 square inches was selected for the 1/2A Texaco version. The wing span came out to 50.25 inches. According to SAM rules (eight ounces of weight per square foot of wing area) the model has to weigh 17.5 ounces.

I have a love-hate relationship with wings. I hate cutting out wing ribs, notching trailing edges, sanding, covering and putting on identification numbers. I love it when the job is done.

Unfortunately, I had to build the Play-



Cox Black Widow has five head gaskets and a Golden Bee tank. With 8x4 prop and 5% nitro fuel, it'll run nearly seven minutes.



Model has a wing area of 315 sq. in., spans 50-1/4 inches and weighs 17-1/2 ounces. Use a dark color on the bottom of wing and stabilizer for best in-flight visibility. Prather nose weight.

boy wing twice! The first wing was built using the same type structure as shown on the 1941 Cleveland Model and Supply Co. Playboy Sr. plans. It did not last long. After two uneventful test hops, test flight number three was a disaster. The little bird caught a boomer, the engine seemed to run forever, and then flop...it disappeared into the clouds. A little rudder, no airplane; much more rudder, and finally it popped out of the clouds in about a 60 degree dive. The left wing had folded. After a long uncontrollable dive, the Playboy impacted in the middle of a paved runway. Miraculously, damage to the fuselage was minimal, but the wing was a basket case.

The second wing, the one shown on the plans, was built with upper and lower wing spars and has 1/16 inch vertical webbing in between. It is strong.

Most Playboys, big or small, come out tail heavy. This one is no exception. Fortunately, this one also came out underweight. A one ounce Prather nose weight put the CG at the required 50 percent point and helped meet the minimum weight requirement. The weight looks like a small flywheel and was added behind the prop. The hole in the weight had to be bushed to fit the smaller Black Widow prop shaft.

The engine was mounted with 2-56 screws and blind nuts. If you can drill four holes in absolute alignment, then use 3-48 screws and blind nuts, as they are a perfect fit for the engine mounting lugs.

The radio equipment used was a Royal

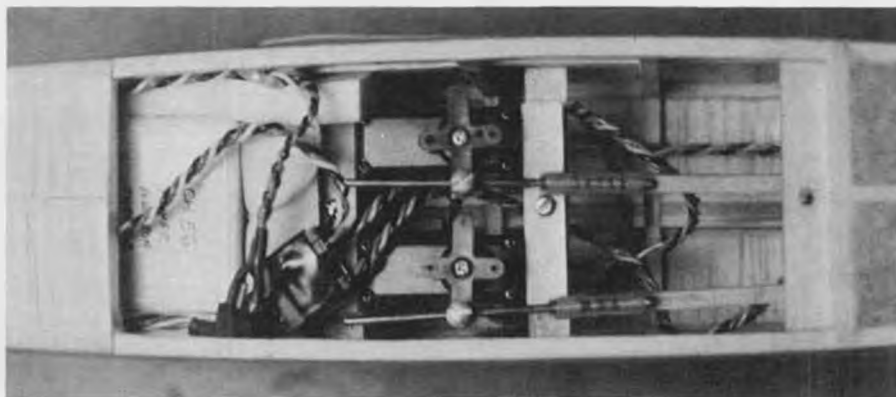
Vanguard receiver, a Futaba 250MAH battery pack and two World Engines S-22 servos. The switch, battery, and receiver all go behind the firewall. The servos are just behind the CG. Access to the radio equipment is through a 1/8-inch sheet hatch on the bottom of the fuselage.

The servo rails were made from 3/32-inch plywood and were fitted between the side stringers. After the crash, I added some 1/8-inch sheet to the 1/16-inch sheet fuselage sides where the servo rails join to help spread out the load. Just some insurance in case I had to make another "test" crash. One-eighth inch square hard balsa push rods were used to connect up the controls. Plastic rods could be used, but be prepared for some unwanted trim changes as the temperature varies.

The control surfaces were hinged with Rocket City nylon strip hinge material. This hinge will Hot Stuff in place. The controls were set up so that rudder throw was 3/4 of an inch each side of center. The elevator travel was plus or minus 1/4 inch. The elevator is more of a trim tab than an elevator, but it works. GM weight Silkspan was used to cover the model; however, plastic covering will work just as well.

If you elect to cover with paper and dope, add a plasticizer to your dope mixture. It helps prevent banana shaped stabilizers and other weird unwanted geometric shapes. A mixture of 1/4 ounce Tri Cresyl Phosphate (TCP) with eight ounces

Continued on page 107



Access to radio compartment is through 1/8-inch sheet balsa hatch on bottom of fuselage. Servos are World Engines S-22's. Push rods are 1/8-inch square hard balsa.



the Staten Island Ferry

By WALT MUSCIANO . . . First of a three-part series on the world's most famous ferryboat line. Plans for a model of the "Miss New York" will be next, followed by a model ferryboat terminal! Stay tuned.

• Ferryboats are the most fascinating of all ships; ocean going or harbor craft, whether naval or commercial. The most famous ferryboats are those which speed across New York Bay, day and night, between the island of Manhattan and Staten Island, weaving between the endless stream of tankers, container ships, ocean liners, and naval vessels which cross the ferry's path on their way into and out of the world's busiest harbor. The large number of harbor tugboats, scows, and pleasure craft add to the traffic encountered by the Staten Island Ferries. These famous boats have been subject of attention by tourists, native New Yorker sightseers or lovers on a moonlight sail, artists, writers and poets, as well as by movie-makers, however, their principal function is to provide a mass transit link between Staten Island and Manhattan for pedestrians, cars

and trucks. On an average working day, the five operating ferryboats transport over 75,000 people and 3,500 cars and trucks on the five mile run across New York Bay.

New York City's Staten Island Ferryboats have special features not combined in most other types of ships: (1) HIGH SPEED is necessary so that each boat can make as many crossings as possible in order to transport the large number of pedestrians and vehicles. The boats have a speed-length ratio of 0.90, which is equal to or better than many ocean liners, and can attain speeds of over 18 miles per hour, which is faster than many ocean-going cargo ships. Moreover, the double-ended ferryboats are equally fast when travelling ahead or astern; (2) MANEUVERABILITY is essential, because the Staten Island Ferry route crosses the very busy shipping channel where all the other traffic has the right-of-way. This is like driving a car back and forth across the busiest city intersection on a rigid schedule without the help of traffic lights; (3) EMERGENCY STOP must be quick because of the heavy shipping traffic. These ferryboats can come to a full stop from full speed in less than a

minute, moving only one and a half to two ship lengths during the stopping operation. Most similar size ships take up to four minutes and often move about four ship lengths during the stopping operation; (4) EXCEPTIONAL STABILITY is mandatory because the entire payload of people and vehicles is above the main deck. Much of this load is mobile, because the more than three thousand people carried by each ferryboat walk around the boat during the trips, usually from side-to-side as the boat passes the many points of interest; (5) EXTRA HULL COMPARTMENTATION is necessary because the hull has no reserve buoyancy due to the low freeboard, which is the distance between the waterline and main deck.

So we see that what appears to be an ungainly ship is in reality a swift and maneuverable vessel with exceptional control and stability; a most unusual combination for a ship which can carry over three thousand people and an average of forty cars and trucks.

For a typical twenty-minute voyage on the Staten Island Ferry, we must first enter the ferry terminal building. After paying



The John F. Kennedy class joined the fleet in 1965, shown here on a trial run, the wake indicating the 18-20 knot speed capability.



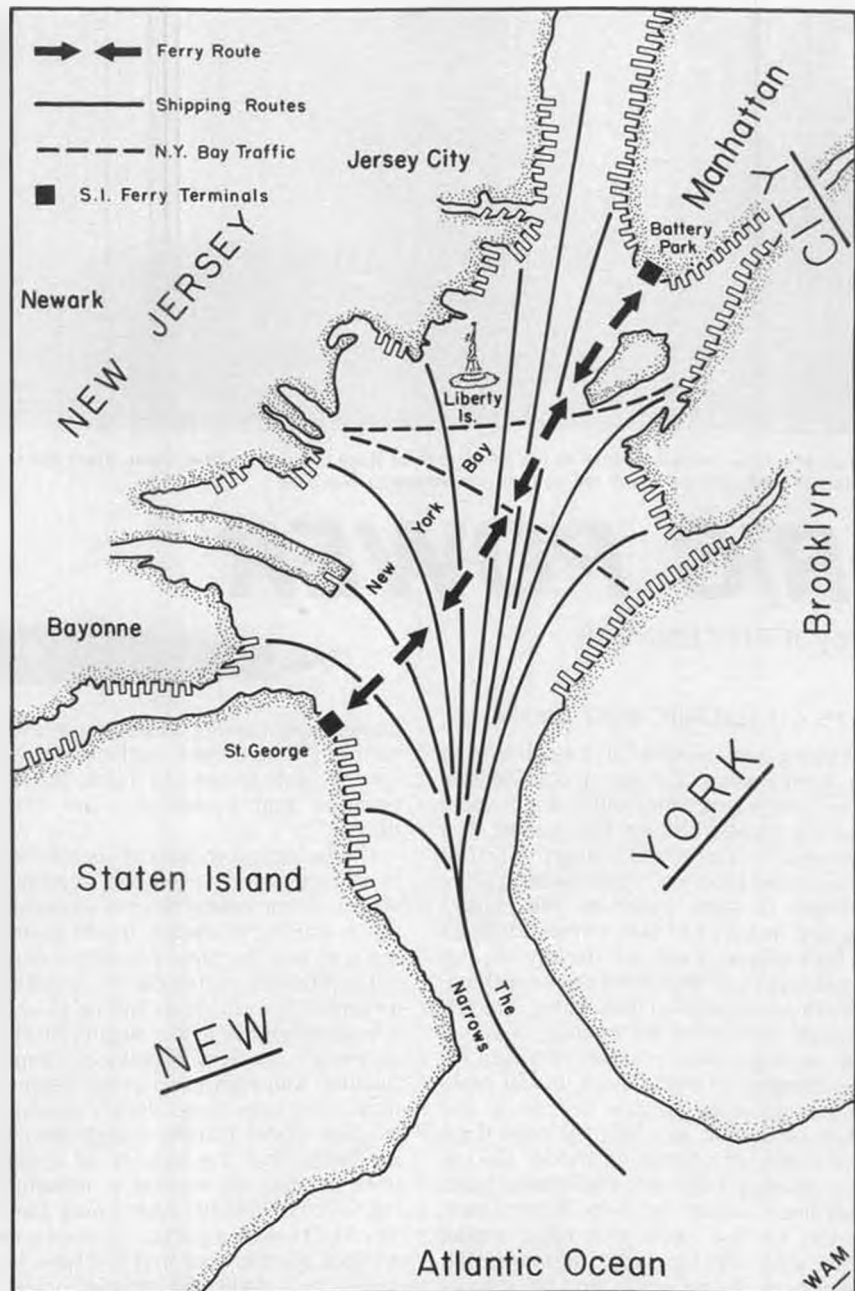
The 1951 "Verrazzano" with the Statue of Liberty in the background. Present color scheme, as shown in the photo, is orange/yellow superstructure, with black script lettering.

the twenty-five cent fare, we can board the ferryboat from either of two levels in the building. Only the center portion of the lower deck of the ferryboat, which is called the Main Deck, can accommodate vehicles. These board the boat simultaneously with the pedestrians. We can sit inside in the comfort of the cabin and even enjoy a snack, or, as many passengers prefer, we can stand at the rail on the open deck to enjoy the sea breezes and admire the many interesting sights to be seen during the voyage. Some of these are the breathtaking lower Manhattan skyline, Battery Park and Castle Clinton, the Statue of Liberty, Brooklyn Bridge, Battery Maritime Building, Governor's Island and Castle William, Robbins Reef Lighthouse, and many other historic landmarks, plus of course, the many ships from all over the world entering and leaving the harbor.

The speed is thrilling as the ferryboat cuts across the bay. At the end of the trip the ferryboat heads for the slip at considerable speed, which makes the uninitiated passenger wonder if this large craft will ever stop in time. When the boat reaches a ship length or two before the slip, the propellers stop turning but the ferryboat continues forward at good speed; then, when the bow is about halfway into the slip, it is full speed astern! Amidst the churning foam created by the braking propellers, the bow gently nestles into the matching curve at the terminal and, before we can recover from the thrill of the amazingly professional docking, the passengers and vehicles are already disembarking. Many passengers take the very next ferryboat back to relive this memorable voyage.

In order to accommodate the vehicles and passengers within a ship of limited length, the decks must be broad and blunt, however, the necessity for high speed dictates a slender hull. These contradictory requirements result in a ship with a superstructure much bulkier and broader than the underwater hull. The double-ended design speeds loading and unloading at the terminals and shortens the travel time because the ferryboat doesn't waste time turning around, which would be very difficult in New York Harbor anyway.

One of the Staten Island Ferry's most important accomplishments is its dependability. Under the most violent weather conditions, which force even the sturdy tugboats to tie up at their docks, these seaworthy ferryboats continue operating, usually right on schedule! New York City has from time to time been hit with crippling blizzards and powerful hurricanes, yet the Staten Island Ferryboats continued to operate throughout nature's fury. Although there was some damage to equipment during adverse weather, no loss of life or injury ever resulted from ferry operations. It is remarkable that since 1937, when the technically advanced ferryboats Miss New York, Mary Murray, and Gold Star Mother entered service, New York Ci-



STATEN ISLAND FERRYBOAT ROUTE



Artist's conception of the Andrew J. Barberi class ferryboat which entered service in 1981 and 1982. Vessel was designed by George G. Sharp, Inc., where author was a member of design staff.

Continued on page 100



Start of a three-minute enduro at the Electric Boat Race in Tacoma, WA. Clean silent electric boats should open up many racing sites not otherwise available.



Close racing action, as two "Sport Vees" round a corner buoy.

R/C POWER BOATS

By JERRY DUNLAP

LET'S GO ELECTRIC BOAT RACING

Having been involved in model boating for twenty years, I've spent considerable time organizing and officiating model boating events. During this period, I've managed to come into contact with just about every aspect of model boating competition. In some instances, the contact resulted in a bruised boat or two. Sailboats to hydroplanes, deep vees to tunnels, I've raced them and organized races for them.

With my emphasis of late being directed towards electric model boating, it was a logical progression to organize a race for this category of model boat. It will probably come as no surprise to most of you when I state that very little has been done in the way of organizing model electric boat racing. Electric powered model boats have been around for years. In fact, most of the earliest radio controlled model boats were electric boats. However, the majority of electric boats tend to be more in the area of non-racing semi-scale or scale model boats. It seems to me there are two main reasons for this lack of activity in model electric boat racing.

The first reason is the lack of a set of formalized racing rules reflecting current developments in electric power for model usage. The many improvements in batteries, motors, and charging systems brought about by electric car racing has created an abundance of items that can be adapted for model marine applications. The electric rules of both the International Model Power Boat Association and the North American Model Boat Association were adopted prior to the technological advancements achieved by electric car racers in recent years.

In hopes of incorporating some of these recent developments, I wrote a set of "Probationary Electric Racing Rules" to be included in the N.A.M.B.A. Rulebook. Two months ago those rules appeared in this column. It remains to be seen how well these rules will work. As more model

boaters begin taking an interest in electric racing, I'm sure there will be a need to modify and update the rules. But I did mention that these rules are "Probationary."

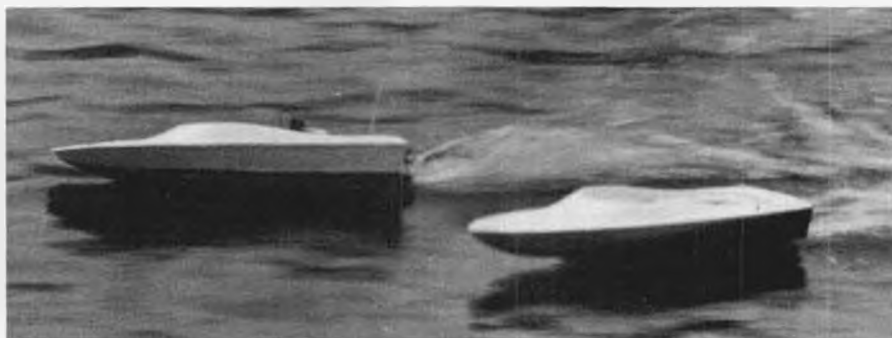
The lack of promotion of electric model boat racing is the second reason this aspect of our hobby has not experienced much activity. If electric model boat racing is to gain the same popularity as internal combustion racing classes, it will need a number of individuals willing to assume a leadership role in the organization and promotion of events for this form of model boating. Although some of this leadership may come from those already involved in existing model boating competition, it is my belief that the amount of crossover from internal combustion to electric racing will be limited. After going forty or fifty M.P.H. with a gas boat, a twenty mile-an-hour electric boat may not have much appeal to a dedicated throttle jockey.

I base this observation on what happened to me as I attempted to generate interest in my local boat club for an electric race. Two months prior to the electric race, I began bringing my electric models out to the gas competition events. During breaks in the racing, and these are abundant in a gas race, I demonstrated the electric boats. I'd pass the transmitter to

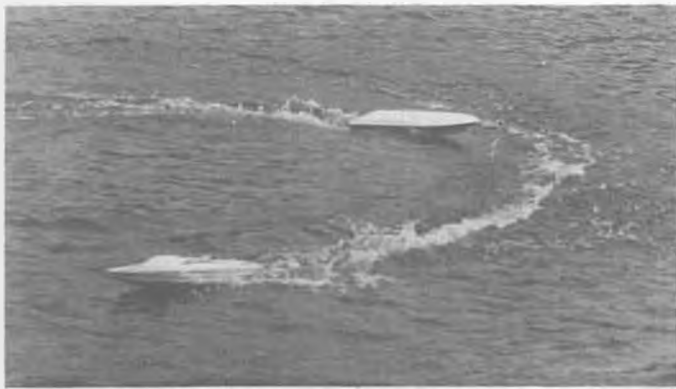
anyone interested in driving the boat. Those interested usually turned out to be kids whose dads were frantically attempting to get a gas boat ready for the next heat of competition. The basic rules that we would be using were distributed to anyone appearing vaguely interested and sometimes to anyone who just happened to be in the vicinity. Out of politeness, many club members listened to my spiel. I cleared my workshop of spare hulls and parts that could be used in an electric race boat. I really thought I'd done a good job of promoting the race among my local club members.

And then race day arrived. One other club member besides myself showed up to participate. A couple of others did make an appearance to watch and help. But the amount of participation from those already involved in the hobby was not as great as I expected. It could have been that two months was just not sufficient time for people to become converts to an alternative power source. There's something about "Teaching an old model boater new tricks" that may have some amount of application in this instance. I learned that it is going to take more effort on my part to generate interest in this type of model boating.

I was very fortunate to have a local hob-



Two "Sport Vees" belonging to Scott Hogman (foreground) and Jim Welch duel side-by-side. Scott and Jim were 1st and 2nd respectively in Experienced Class.



Gary Keyes' Sport Vee leads Paul Dunlap's Dunlap Vee through a corner. Hmmm . . . What corner? Where's the bottle?



Gary Keyes leads Jim Welch, who's Sport Vee is about to eat a marker. Maybe this shot was taken before the one at left!

by dealer willing to assist in promoting electric model boating. This particular hobby dealer is very involved with off-road racing. Because he has an existing stock of electric car items, the base was already established to branch out into electric boating. It turned out that there were a few off-roaders who thought it might be fun to attempt to set up an electric race boat. When questions arose about what to get, the hobby dealer was ready with his catalog to show what was available. As these fellows already had motors, battery packs, radios, and chargers, they were able to get ready with a minimum investment. Because of their experience with electric cars, they had the knowledge on how to set up the motors and radios.

I was fortunate in another way when it came to offering a race for electric boats. Model Racing Products, a leading supplier of boats and components for this activity, was interested in the event. Their willingness to provide awards for the race was greatly appreciated. That the guys from M.R.P. would bring down a batch of boats to race at the event was also encouraging. It's comforting to know that someone plans to attend your party after you've put in some time setting things up. Although the M.R.Pers have done several promotional events with their boats, this was the first actual race for their equipment. They were interested in running their boats in an organized event.

THE PUGET SOUND MODEL BOAT CLUB MODEL RACING PRODUCTS ELECTRIC BOAT RACE

It is a credit to the type of individuals involved in model boating that anyone even bothered to show up on race day. Scheduling a model boat race in the Northwest in mid-November is risky business at best. Race day provided us with an opportunity to watch huge amounts of rain gush from the sky. The biggest winner on this day was the weatherman, who had forecast heavy rains for most of the day.

Although the weather was most definitely bad news, there was some good news. We didn't have to spend all day in the drippy conditions. The Lakes Landing Apartments in Tacoma, Washington served as our hosts for this event. The man-made pond located in the middle of this large apartment complex provided an ideal site for electric boat competition.



Wakes in all the above photos prove that electric provide plenty of fast action for racing.

What really saved the day, however, was the use of the large recreation facility located adjacent to the pond. While the rain cascaded from the clouds, we set about preparing for the event inside the warm, dry confines of the recreation room. This is one of the nice things about electric boat racing. You can test your equipment indoors and not worry about offending anyone because of noise or exhaust.

The extremely wet conditions just outside the sliding glass doors discouraged much pre-race testing. The weather conditions almost discouraged me from even setting out the course markers. But as more model boaters slogged into the recreation room, I knew we'd have to run the event . . . rain or shine. We definitely had the rain.

Originally, I had planned to offer both heat racing and enduro racing for this event. The weather conditions dictated a change of plans. Three enduros of three minutes duration would comprise the day's racing program. Winners would be determined by most laps accumulated in the three sets. The boats we were using for this race were either deep-vees or semi-vees. The maximum battery pack was seven cells and the motor was to have a retail price of under \$25. In the hands of those who knew a little about electric setups, this combination proved to be pretty quick. I was impressed with the performance of the M.R.P. "Sport Vee." The guys from M.R.P. have been working on this boat for a couple of years. It quickly became apparent to me that I still have some things to learn about setting up a competitive electric race boat.

The racing was divided into two categories: Novice Juniors and Experienced. One of the positive aspects about model

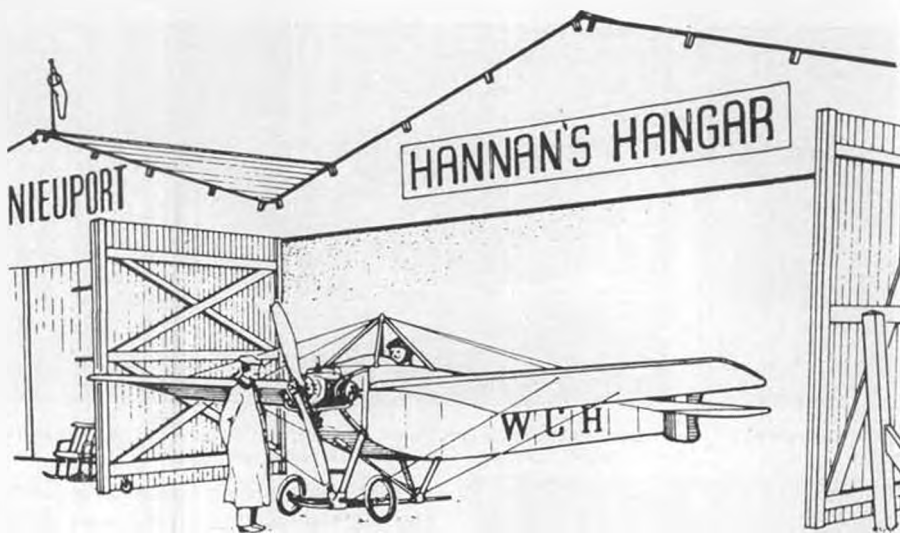
electric boats is their appeal as a racing class for youngsters. I suspect most young people enjoy watching model boats. I also know that many of them enjoy running a model boat. Unfortunately, the reality of operating a gas powered model prevents most young people from experiencing the fun of model boating. Electric model boats can allow youngsters the opportunity to experience all the thrills of competition without many of the difficulties that seem to accompany a gas race. My eleven year old daughter, Denise, isn't at all interested in the gas boats. But she does enjoy running the electric models. She especially enjoys the racing when there are candy and Coke machines in the recreation room!

The actual racing provided some interesting insights. To add a little excitement to the Experienced Class, it was decided to have the boats circle the Start/Finish marker. Well, that decision did create some excitement. With sometimes three and four boats attempting to circle the marker at the same time there were collisions and swamped boats as well as the excitement. In future electric events, I don't believe we'll attempt this circling maneuver. A better idea would be to include a couple of left turns along with the right turns. This would lessen the chances of boats having to cross paths with each other. Circling a buoy can create some bad situations.

Although it might seem obvious, the need for waterproof radio compartments or waterproofing of radio equipment was brought out during the racing. Just because these boats aren't going as fast as a gas powered boat doesn't mean they aren't going to get things just as wet. It is not enough just to install you radio equipment in the boat and then fasten down a hatch that doesn't keep water away from the radio system. Electric racing action is every bit as rough as a gas event. The boats were getting knocked around during the course of racing action. By the end of the day's racing, one fourth of the boats were eliminated from the competition due to radio failures caused mostly by water getting to the radio equipment.

It is interesting to note that even though the driving tended to be very aggressive

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"The truth about aeroplanes is that, as man's most highly-engineered creation, they are inherently troublesome."

• "The truth about aeroplanes is that, as man's most highly-engineered creation, they are inherently troublesome."

This month's lead-in line, from the pen of Roger Bacon, appeared in a 1958 *FLIGHT* magazine. Bacon is also of the opinion that: "The only thing you learn from history is that you learn nothing from history."

QUOTES GALORE!

Our quotations continue to attract comments from readers... along with more quotations! Ordinarily we employ only a couple of them per issue, so our backlog threatens to swamp us at times. Since most are too worthy to be ignored or discarded, we now offer this year-end clearance from near and far:

ON ACCURACY IN MODEL BUILDING

"Measure with micrometer; mark with chalk; cut with axe." (Attributed to Mark Smith, winner of Giant Scale R/C Glider at the 1984 Nationals, by James Lueken, winner of Hand Launched Glider at the Nats)

ON TECHNICAL BOOKS

"Too many textbooks are written by professors whose main objective is to impress other professors with how profound they are!" (Bob Whittier) Whittier adds: "My own impression is that aviation books at least are passports to frustration and bewilderment."

ON OUT-OF-PRINT BOOKS

"Books are like vitamins. You don't miss

them until it's too late." (Frank Zaic)
ON NON-MODELERS

"When it comes to airplanes, they don't know a Peanut from an apple." (Ralph Saldivar)

ON FLYING MACHINES

"You discover one-third of its problems by pure calculation, another third from wind-tunnel and laboratory tests, and the last third during the naked reality of the flight tests." (Lucien Sevanty, quoted in *REVUE AEROSPATIALE*, via Georges Chaulet)

"An engineer's tendency is to improve a design until it won't function." (Cooper Lindy, via Duke Silver and Ken Hamilton)

ON FLYING A FULL-SIZE AUTOGIRO

"I call it a "Heinz Flying Machine"... a pilot can get into 57 varieties of pickle and still walk away from it!" (Johnny Miller, the first person to deliberately loop an Autogiro, circa 1931)

ON POLITICS

"The whole aim of practical politics is to keep the populace alarmed (and hence clamorous to be led to safety) by an endless series of hobgoblins." (H.L. Mencken, quoted in the *AOPA PILOT*)

And finally, Augustine's Law No. XXX: "The Optimum committee has no members."

GOONEY-BIRD GATHERING

June of 1986 marks the 50th anniversary of the classic DC-3 making its inaugural



Bill Brown, running the Brown Junior ignition engine No. 1, built while he was a student in high school. Hand held, no less! Photo by Walt Mooney.

flight, according to Dick Allen. As part of Canada's EXPO 86, plans are to include a DC-3 Air Rally in Vancouver, with 50 aircraft from world exposition countries being invited to participate. As Dick puts it: "The logistics of assembling fifty DC-3s might be even more interesting than the actual flypast. Are there even fifty flying DC-3s in the world?" (I'll bet there are over 200. Can anyone give a calculated guess? wcn)

NOSTALGIA TIME

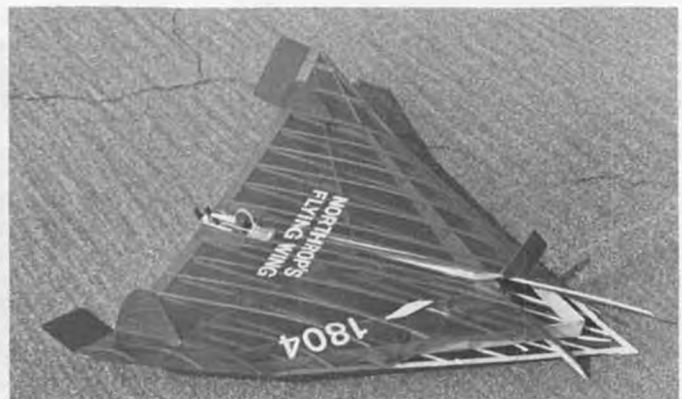
Jean Francis Frugoli, of France, well remembers the visits of U.S. Navy aircraft carriers to Marseille's harbor during the 1950s: "Some of the seamen came to fly control-line models at our club's field. It was during the great years of the *Barnstormer* stunter, Berkeley models, and Jim Walker's control handle. I was proudly using a Dooling .29 I had bought for a fortune in Switzerland. Even now this engine is fascinating. It was a good time... we were young."

CALAMITY CORNER

Dr. John Martin, proprietor of the Florida *Hangar Pilot* newsletter, has a problem: "My 60-pound Labrador retriever "puppy" ate my mailing list of over 200 names! I



Bill Northrop's British designed "Delta I" on takeoff at Northrop Flying Wing contest. Built first one 30 years ago from same plans.



Moments after photo at left. Bill forgot about tremendous power difference between TD .049 and McCoy .049 used in first one!



Florida's Dick MacEntee admires eight-inch span Alco Sport Pistachio Nut flown during MIAMA Inter-Gnats. Photo via Doc Martin.



Sandy and Bob Peck examine Lacey M-10 Peanut built in Japan by Shoichi Uchida, flown in Belgium Internats, then mailed to Calif.

have a partial list of 100, but it is not up-to-date." Any subscribers who have not received a MIAMA newsletter recently should forward their names and addresses to Doc at 2180 Tigertail, Miami, FL 33133. (Spray your correspondence to Doc with dog repellent! wcn)

PISTACHIO PROXY PROPOSITION

Doc also reminded us of his forthcoming World Inter-Gnats for tiny flying scale models, which has been rescheduled for April 13th and 14th, 1985. Martin describes Pistachio Nut models as follows:

They are like Peanuts but smaller.

They are harder to build and trim.

You have to use tweezers sometimes.

Having thus made us thoroughly apprehensive, he presents the brighter side of Pistachios: *They are cheap to build, cheap to mail, small enough to flight trim in your own home, expend less building time and (most importantly) are lots of FUN!!*

He assures prospective entrants that in addition to trophies, all entrants will receive complete results of the meet, even if they place last. He is sending announcements to many different countries in an effort to create a truly international affair. As he points out: "We realize that there are a limited number of people who are inter-

ested in this sort of thing, but at least we will all get to know each other. What can you lose? A few evening's work. PISTACHIOS FOREVER: SIC SEMPER PISTACHIOS."

How can one resist enthusiasm such as that? Full details are available by sending a pre-addressed stamped envelope to Doc Martin at his previously noted Tigertail address. We think he may indeed, have a tiger by the tail...

FUZZY FLYERS

Efficient aircraft should be smooth, right? Well, maybe. Some of Mother Nature's best insect flyers are downright hairy. Burr Stanton, of Kentucky, builds sliced-foam indoor 'Guppys' featuring airfoils which are both fuzzy and full of minute holes. Yet, they perform magnificently, well enough in fact, that he has flown as many as seven simultaneously, no easy trick to perform.

And Dick Baxter has tried felt-flocking Wakefield model wings. His experiments were carefully conducted, including tests in which the model was flown with one wing panel flocked and the other smooth. His conclusions? "I came away totally confused." Next?

FURTHER ON FINISHES

Creating a light-weight, warp-free finish

on small flying models seems an ever-present problem with only partially satisfactory answers. Bob Whittier, of Massachusetts, reports that *Spray-O-Matic* brand spray-can clear lacquer works better than clear dope on tissue-covered surfaces. He says it causes no over-tightening, and provides uniform, streak-free coverage.

Dr. Bill Harris, of Hawaii, is trying a more novel idea. His interest is eliminating the complex bulkhead-and-stringer approach to building elaborately contoured scale models, by employing monocoque stressed-skin components. The examples he showed were formed from glue-impregnated tissue formed over a 1/32nd scale plastic display model Seversky P-35. Difficulties encountered include resistance to removing the parts from the forms, and excess shrinking. But advantages include retention of fine molded-in details, and being able to use the kit decals for markings, not to mention the great weight savings. As Harris puts it: "It almost works... I think I'll just wait for someone else's research and development. I've amassed a horde of plastic kits on the supposition that it will happen sooner or later."

He also mentions that the Honolulu In-

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All-balsa rubber powered Somer Monoplane constructed by model book author Amos Hadas, of Israel.



Variety of Northrop Wing contest entries (l to r): Dan Walton's rubber-actuated variable incidence tail, his Peanut Dyke Delta, and Bill Hannan's low A/R demi-delta with tissue covering on bottom only.



This Pistachio Cub Coupe by Florida's Millard Wells has flown for 45 seconds. Span is a monstrous eight inches!



A tiny Grapenut model of the Found, by Walt Everson, weighs in at 1.49 grams. The quarter gives you an idea of its size.



INDOOR

By KEN JOHNSON

ADVENTURES IN RETRIEVAL

Part of the scene in indoor modeling has always been the retrieving of those hung-up airplanes. It happens to all of us. The turn on a new plane is not yet perfected or a warp develops (from setting in a damp garage) or an open window creates a draft, but nevertheless the model veers off course and hangs up on a beam. Maybe the rubber motor you select is just a tad too powerful and the craft climbs right into the ceiling and lodges where it cannot be bumped with a balloon. WHAT TO DO? I for one don't want to leave my little beauty there at the flying site.

The first thing to consider is whether the custodian of the building will allow the flyers to retrieve "stuck models." It is far better to ask permission to go after it than to just start climbing and get the guy mad and perhaps cancel all indoor flying from then on. Imagine the insurance problems involved if a modeler is injured at a local school gym. If you are lucky enough to be flying in a military facility (Blimp hangar or reserve armory) don't climb without permission. If climbing is allowed, make darn sure the climber is not afraid of heights, or prone to dizziness, or have a trick knee, etc. UNDER NO CIRCUM-

STANCES ALLOW CHILDREN TO CLIMB INTO THE STRUCTURE OR CEILING OF A BUILDING!

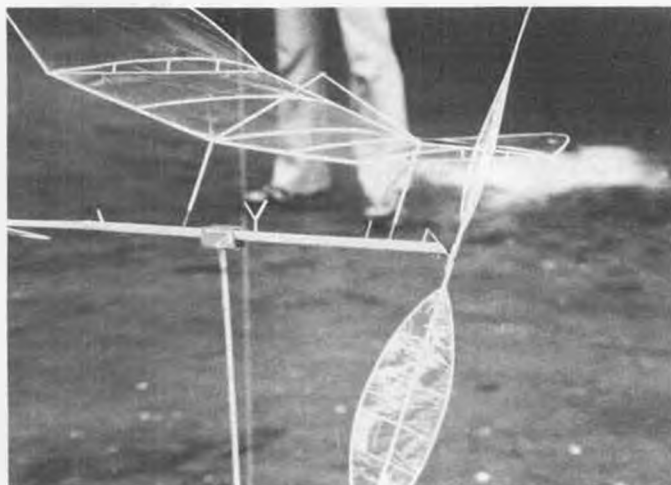
If it is possible to reach the model by climbing, proceed with caution. Remember, dust covers most surfaces that are out of normal reach and dust is slippery. If the structure is wood inside it might be rickety, loose, or rotted. Don't climb out to a place where you can't get back safely. Consider taking along a pole or fishing rod to lift the model free and release it into flight.

At some larger indoor contests a climber is chosen to retrieve aircraft. Let him do the climbing if you can.

I'm sure some of you have some great stories to relate about retrieving your indoor ships. Once at West Baden, my microfilm model got stuck near the big dish in the center of the room. I was not about to leave it there. So I took the elevator up five floors, walked up the last floor and opened a door out to the lower roof. After climbing a steel attached ladder, I found myself at the edge of a huge circular roof. Up and across the roof I went and came upon a vertical door at the center of the roof. Inside the door, a wood ladder let down six feet to the top of the dish (in

the center of the room). I looked down to get my bearings. The flyers appeared so small 100 feet below! To get to the rim of the dish I had to crawl through several steel triangles of bracing (supporting the dish) that were very tight for my 160 pound frame. Finally I reached the rim and found that a previous retriever had left a 10 ft. pole to help in reaching stuck models. It was necessary to reach out three feet from the dish (while hanging onto the beam with one hand and the pole with the other) to snag my model airplane. Carefully the ship was dislodged and away it flew. It bumped again, stalled, and dropped down four feet below the beams. Then it began its descent toward the floor. After squeezing back through the triangles, I brushed the dust off myself and noticed that my wallet was gone. The squeeze was so tight that it pulled the wallet right out of my pocket. I went back up to the dish again that day to get another modeler's plane. My clothes were a mess by the end of the session.

Last year, while flying at the blimp hangar at Santa Ana, my newest flapper stuck up on the inside lower roof. To get to it meant a climb up a 20-foot wooden ladder. I asked someone if I might go up for it. The answer was affirmative. I was not up on the roof more than five minutes when an officer appeared beside me. "Who told you you could come up here?" he asked. "One of the regular flyers!" I said. He retrieved my model himself and directed me to follow him down the ladder. At the bottom he insisted that I take him to the person who OK'd my retrieval. Reluctantly, I lead him over to the modeler.



Expert workmanship is evident in this microfilm duration model. It takes a while to develop the skill and touch to build and fly them.



Millard Wells is adjusting the rudder on his 5-1/16" span PAMA Pistachio Ridotto (reduced) model. Photo by Bob Andrews.

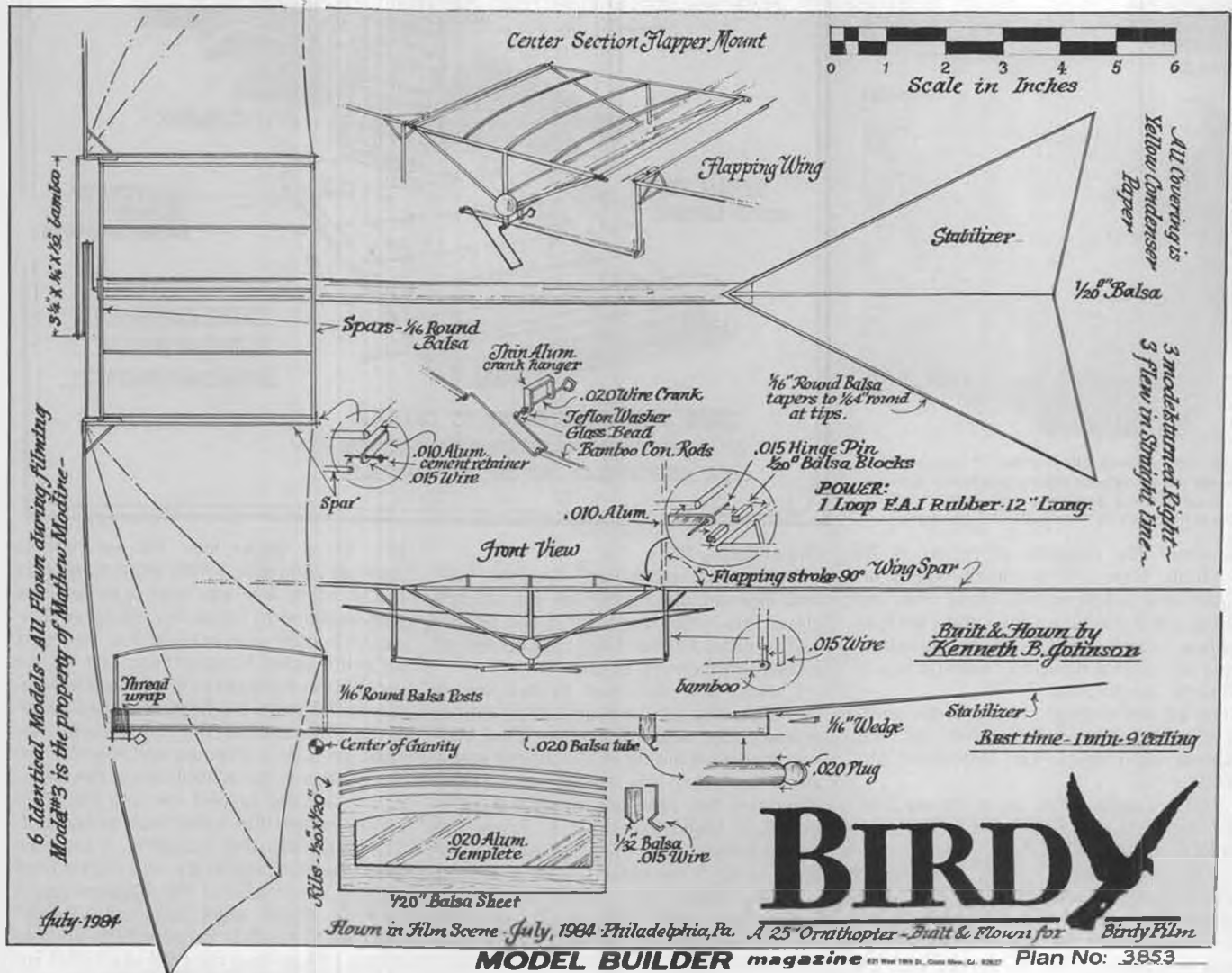


Photo of "Birdy" showing crank mechanism.

He admonished both of us and stormed off. I left for home that day feeling pretty low.

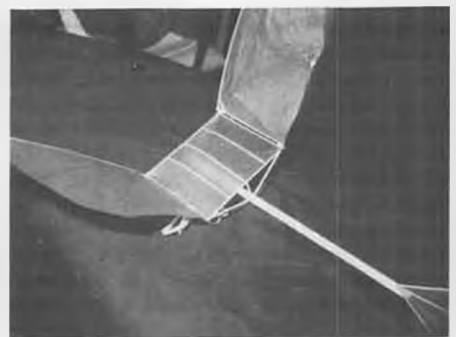
On the brighter side, the Burbank sessions are a real contrast. When the Black Sheep group flies indoors at Luther Burbank gym, the custodian is a prince. Several times lately my models hung up there. A word to the custodian brought me a step ladder and a pole to dislodge the models.

Last session, my new ROG lodged on a vertical pipe at 14 feet. Carlo Godel came over and offered to climb up to save it. He jumped up from a stack of mats, caught onto a thin ledge and hoisted himself up. Pressing his body against the wall he inched his way over to the model. A long

pole was passed up to him. Carlo was then able to lift the model free and away it flew. He knew that I was injured in a truck accident many years ago and this type of climbing was beyond me. I appreciated his effort.

ENCINO DEMO

Recently your indoor editor was asked to demonstrate indoor models for two assemblies at the Encino (Grade) school. Upon arriving, I discovered that I was the entire program! After a few minutes of model trimming in the small auditorium the first group was lead in. Grades One through Three comprised about 120 kids. They were so excited to see the first models fly. After 30 minutes of screaming youngsters, the group was led out. In 15 minutes the older kids arrived. An even bigger crowd. They were even sitting on the floor just in front of me. After flying about 20 models, I gave a brief talk on the reason birds can fly, etc. The next day my school contact, Ila Hebert brought a stack of about 30 "Thank You" cards from the students. One card from a little tot said "Hi there, how are you? I like your planes. Do you like them? Don't answer that. That was a dumb question. Love, TAMI."



NEWS RELEASE

The National Free Flight Society announces that the Fourth United States Indoor Championships will be held on June 18, 19 and 20, 1985 at the Niagara Falls International Convention Center Arena.

EVENTS: Hand Launched Glider, FID, AMA Stick, Manhattan, Bostonian, Ornithopter, Autogiro, Pennyplane, Novice Pennyplane, ROG Cabin, Unlimited Speed, Peanut Speed, Easy B, Paper Stick, Peanut Scale, AMA Scale, and the MIAMA Peanut Grand Prix.

This may be the largest indoor contest in the world, with enough events to satisfy



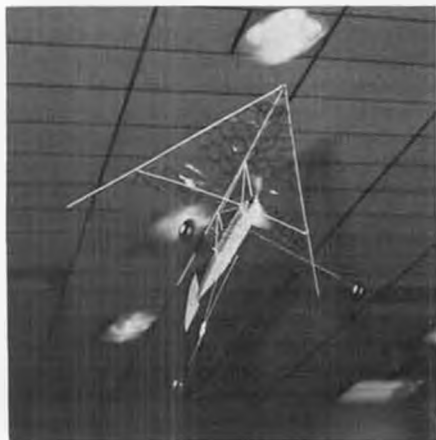
Free flight expert Bill Warner, of Los Angeles, always ready to help young modelers in trimming and flying. See his warning about use of Boron filament in "Workbench" column.

everyone! The category III ceiling is 70 feet high. There will be lots of lodging facilities and campgrounds. Many other activities are available for the family, such as Fantasy Island, an art gallery, museums, aquariums, boat rides, etc. Canada is just a bridge length away.

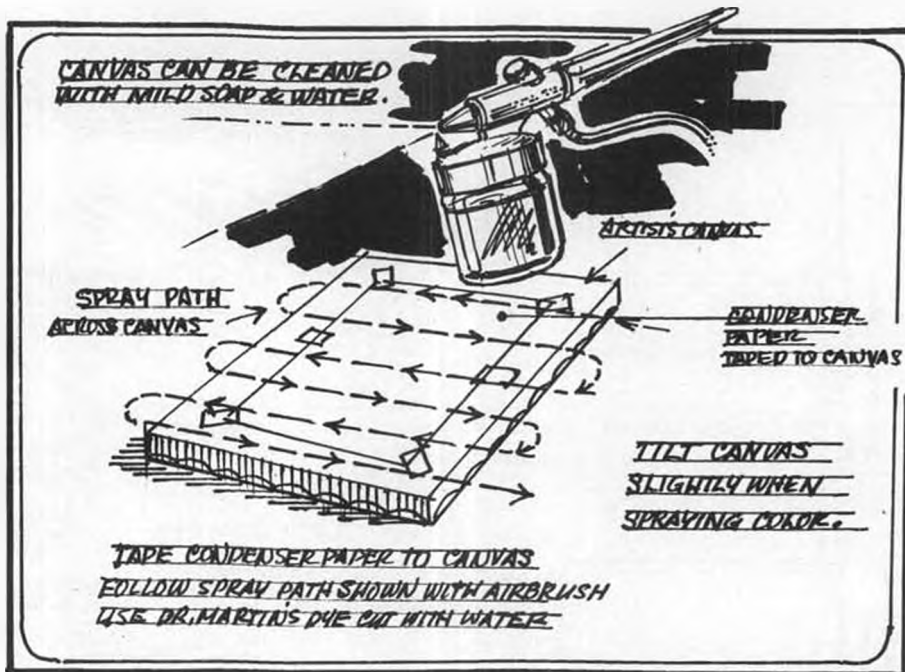
For all the details, send a large envelope, stamped and addressed, to: A.J. Italiano, 1655 Revere Dr., Brookfield, WI 53005.

NOTE: Entries must be in by no later than April 24, 1985. NO EXCEPTIONS! **"BIRDY TAKES WING"**

About December of 1983, your indoor editor got a call one morning. The voice on the other end asked if I might be interested in building several models for an upcoming movie. The lady explained that I would be receiving a call from Jeffery Kirkland of the production crew. Later that day, Jeffery phoned and gave me the details. A film was in progress, about a soldier in a veterans hospital, under psychiatric care. He was in bad shape mentally. The doctors felt that, by using recall, he could be brought back to reality. The film follows his early years growing up in



A CO₂ rogallo indoor model. Hard to trim, as it prefers to fly straight. Trimming is tricky, but rewarding when successful.



Philadelphia, Pa.

During his high school days, he built and flew an ornithopter for his science class. This is the scene the movie people had in mind for me. They needed several model ornithopters for the film.

I asked how they had located me. It seems that the crew was aboard an airliner heading east when one fellow, Don Watson, noted an article in the airline magazine. The story was about indoor modeling and Ken Johnson's name was mentioned. It stated that the L.A. Times was my employer, and that was enough for them to track me down.

Several weeks later, Jeffery flew out to L.A. to visit. After examining about 30 of my flappers, he left. Several months later he returned with his camera. He shot various models and we flew one in front of my house, in the dark. Later he phoned and said that the movie people had made a choice of a style of ornithopter they wanted. It was a combination of two designs, but looking mostly like the "DaVinci flapper" he had seen at my home. Construction had begun. The scene dictated that the model be flown over the students in class and then crash into the wall, then the kids would all laugh.

The assignment was for six identical flappers. I didn't know whether the design would fly or not, so one test model was completed. The living room test flights looked good. The craft was taken to our local flying session at Luther Burbank High gym. The first flight looked great until it collided with another model and the wing was crushed. After repairs, a second attempt was made. It climbed to about 15 feet and circled nicely and landed just behind a modeler about 30 feet away. I called to him not to move, but he didn't hear and took a step backwards. Crunch! Back in the box it went.

After more repairs, I decided the flapper was airworthy and began construction. Several paper color swatches were mailed out and the color chosen was a light yellow.

Three weeks later the six models were all complete. When word came that the shooting date was near, a model box was modified to house the airplanes. The movie people were notified that I needed an airline ticket for myself and one for the model box. I wanted to keep the ornithopters with me on the flight from Los Angeles to Philadelphia. The models and I arrived on Sunday evening and Monday we were taken to the school to test the room.

Mr. Kirkland helped me into the 1905 school where the scene was to be shot. The room was very authentic. It was like going back in time to my own high school days. I was told that the flappers could only fly about eight feet high. WOW! How was I going to impress them on how high and how long the craft would fly? For about three hours the models were trimmed to turn in a 12-foot circle and for almost one minute of flying time.

That evening 35 motors were made up for the next day's shooting.

At 10 a.m. a van took eight crew members and Ken Johnson to the school. The gal sitting next to me was in wardrobe. The one behind was in makeup. The school was flooded with people. Student actors were all dressed in winter clothes. The temperature was about 98 and the humidity was very high. I asked to fly again in another room to test the new motors. In a few minutes the director brought a young man into the room.

"This is Mathew Modine," he said. "Mathew is the star and he wants to meet you and see the ornithopters." He appeared to be about 16. He related that he was 25 years old. What a nice young fellow. We chatted for about an hour as I flew the models. He asked to have one of the ornithopters after the shooting was complete. Of course, I agreed. Then the word came to start shooting.

The students were all seated, the crew

Continued on page 87

MODEL BUILDER



WHEELAIR III-A FOR CO₂

By WALT MOONEY . . . Built in the Seattle area right after WW-II, one of the chief designers is a friend of the author, and was also designer of the Wee Bee, Honey Bee, and Queen Bee aircraft, Ken Coward.

• Here is an out-of-the-ordinary model powered by the Brown A-23 CO₂ engine. The twin boom pusher arrangement is very protective of the little jewel that is produced by Bill Brown. The engine itself is actually very robust, but it seems a shame to subject it to the abuse of running into walls as is inevitable if a model is flown indoors. Also the Brown will run in either direction, which makes it an admirable powerplant for a pusher design.

There are likely some ghosts on the plan that indicate there were some changes from the original drawings to the final design. These were not the result of modifications required to make the model fly. They were the result of the "Bane of a Scale Modeler's existence." Photographs of the prototype aircraft, obtained after the first model was built, showed it to differ significantly from the promotional three-view used to design the first model. So the model was disassembled, the fuselage, nose gear, engine air inlet, and tail surfaces were rebuilt, and the model was recovered in the correct color scheme.

(It must be admitted that some of the disassembly was accomplished by a high-speed entry into a rosebush, which disclosed the necessity of replacing the wing leading edge with harder wood.)

The wing and tail structure of the model is quite conventional and needs little in the way of building instructions. The wing ribs should be cut out of firm 1/16 sheet balsa. The wing dihedral break is at rib R-2 and the amount of dihedral is shown on the side view. The main landing gear is designed to be a torque arm shock absorbing system and is mounted on the wing's lower rear spar by means of a length of 1/16 diameter aluminum tubing. Use 1/32 diameter, or thinner, piano wire for all landing gear wires.

The tail booms are round in cross-section and can be carved from solid balsa if desired, however, they turned out to be exactly the diameter of common plastic soda straws and I utilized straws on the model in the photos. This doesn't save any

time, the end plugs still have to be carved, and saves little weight, but soda straw booms are an interesting structural application.

The fuselage of this model, which includes the engine installation, is the real "piece de resistance" of this construction article and will be covered in detail.

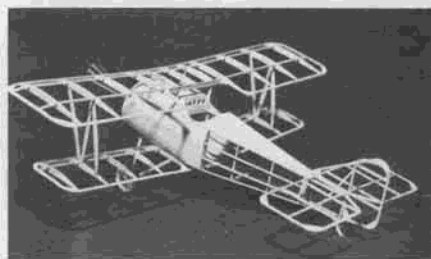
First off, enough good things cannot be said about Bill Brown's "A-23" CO₂ engine. It is a thing of beauty, reliable, starts with the first flip, is easily adjustable as far as power output is concerned, is easily fueled, is clean, and is quiet. Actually it makes just enough noise to sound realistic indoors on a small model.

Start the fuselage construction effort by preparing the CO₂ engine for installation. Use a round, not a hexagon, shaped pencil to make the loops on the tubing. Be very careful not to get a kink in any of the lines. When bending the loops make sure that the tubing is snugly up against the pencil as the bends are made. No bends should be attempted with the tubing in free space between supports. When the

engine is ready for installation, it will lie directly over the drawing in the side view. There should be no strain on any of the engine components when they are installed in the fuselage structure.

The fuselage sides are cut from 1/32 sheet balsa. The sides below the engine cowl are considerably longer than the airplane side view, and this extra length is shown as a phantom line almost all the way back to the propeller. The side panels

Continued on page 94

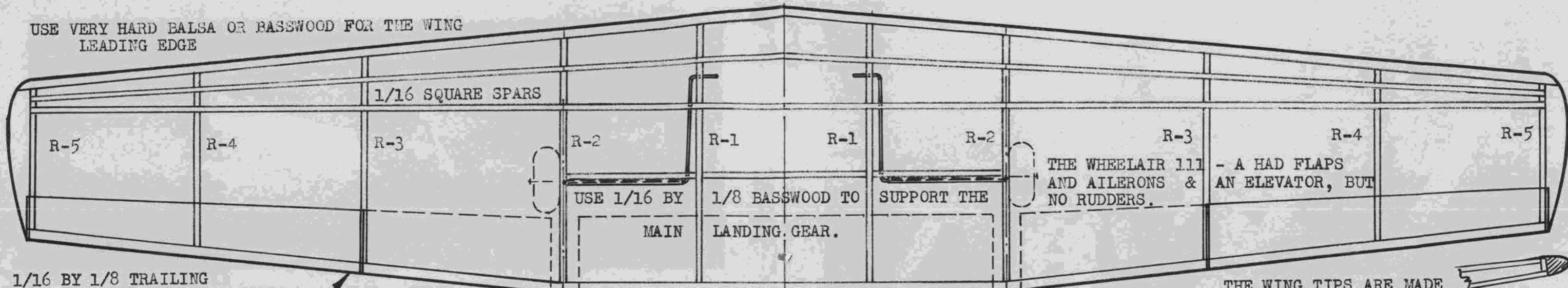


Next Mooney Peanut project will feature the 1919 Graham White GWE-6 Bantam.



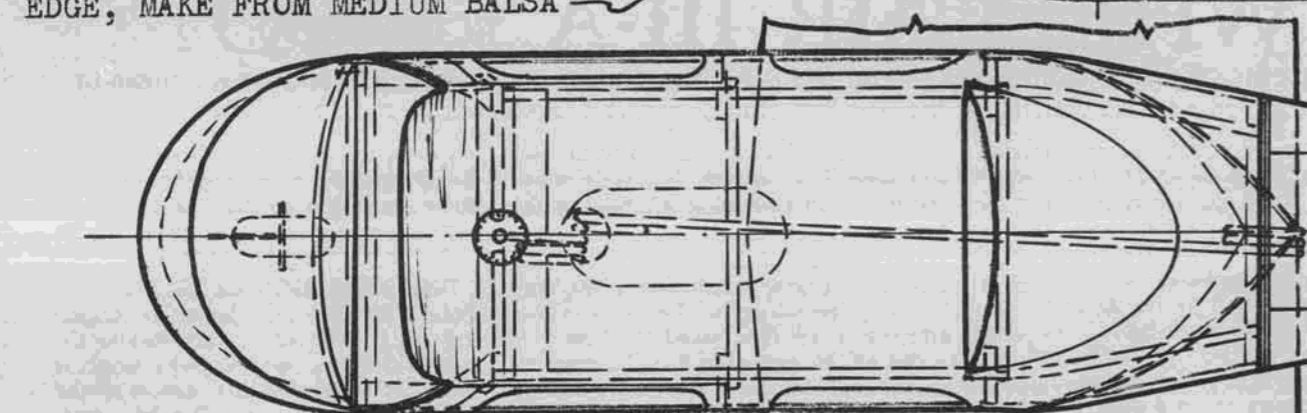
Partially finished Wheelair. Note CO₂ filler on top front of cabin, soda straw twin tailbooms, and wing rib cut from some old printwood! Keeping proper incidence angles require extra care.

USE VERY HARD Balsa OR Basswood FOR THE WING LEADING EDGE



1/16 BY 1/8 TRAILING EDGE, MAKE FROM MEDIUM Balsa

THE WING TIPS ARE MADE FROM SOFT Balsa BLOCKS

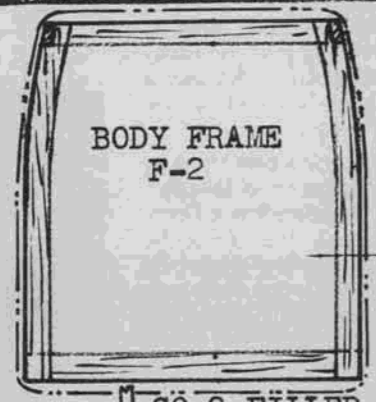
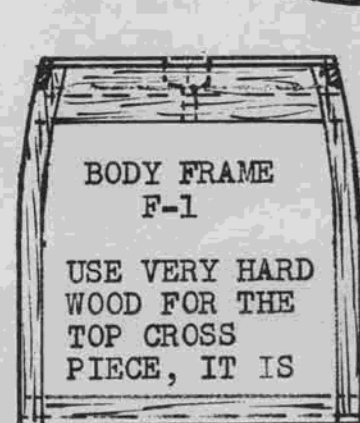


1/16TH PLYWOOD FIREWALL ENGINE MOUNT

THE ENGINE COWL IS MADE UP FROM SOFT Balsa BLOCKS.

COVER THE MODEL WITH LIGHTWEIGHT TISSUE. THE ORIGINAL WAS RED AND 111-A WHITE.

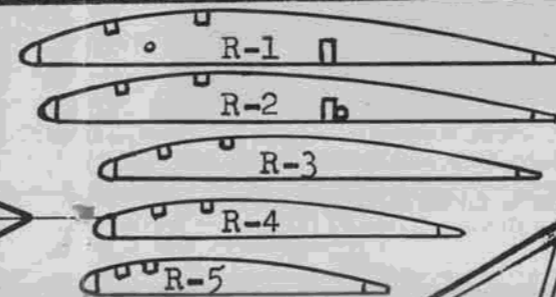
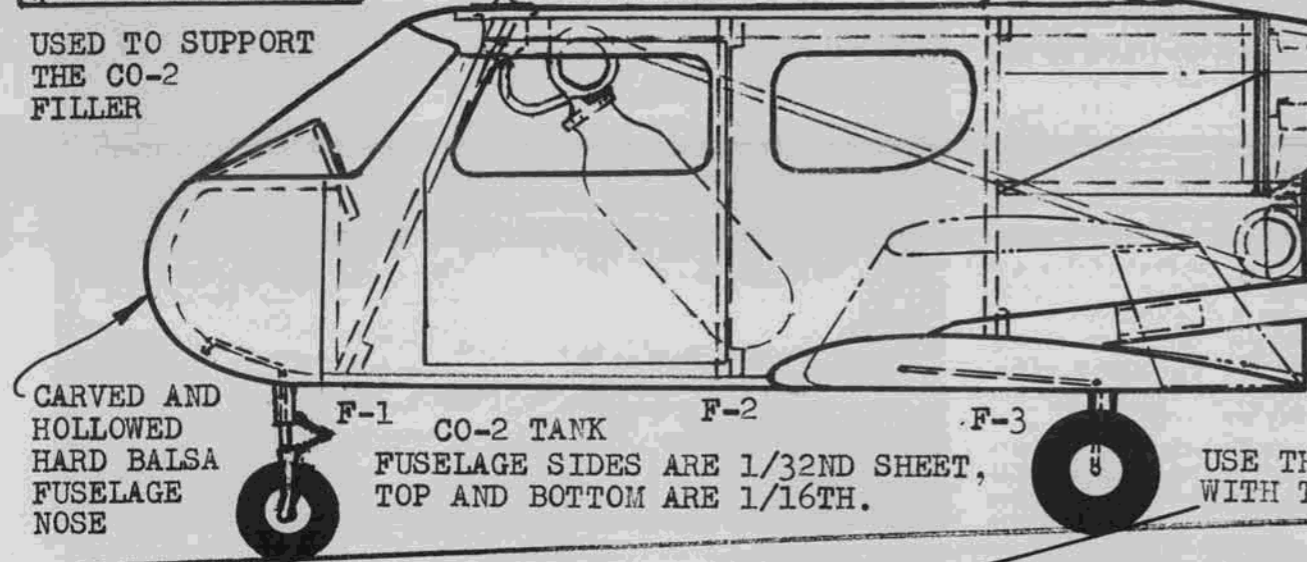
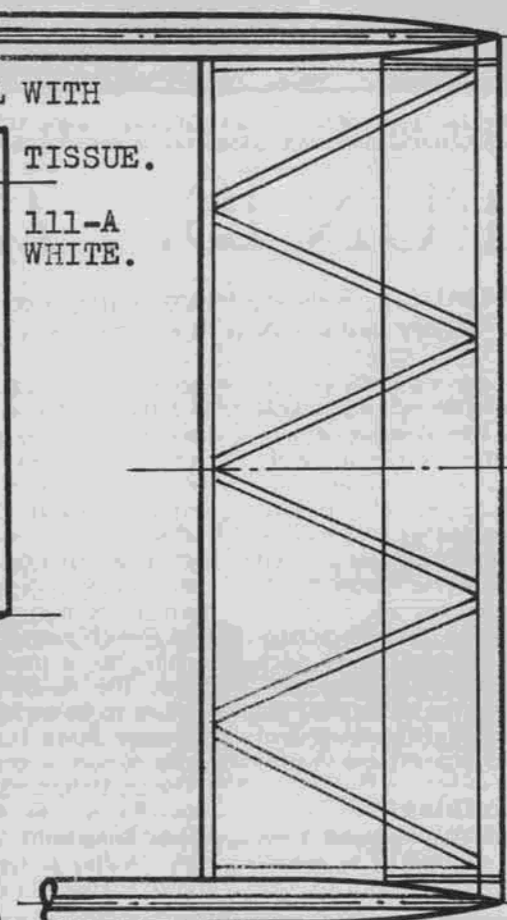
THE HORIZONTAL TAIL IS MADE FLAT DIRECTLY OVER THE PLAN, ALL PARTS ARE 1/16 TH THICK BY THE SIZE SHOWN ON THE PLAN.



USE THIN PLASTIC FOR THE WINDOWS AND THE WINDSHIELD



TAILBOOMS CAN BE CARVED FROM SOLID Balsa IF DESIRED



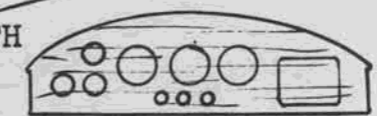
BROWN A-23 CO-2 ENGINE

BUILD TWO VERTICAL TAILS DIRECTLY OVER THE PLAN. ALL PARTS ARE 1/16 THICK BY THE DIMENSION SHOWN.

CARVED AND HOLLOWED HARD Balsa FUSELAGE NOSE

FUSELAGE SIDES ARE 1/32ND SHEET, TOP AND BOTTOM ARE 1/16TH.

SODA STRAW TAILBOOMS WITH CARVE SOLID Balsa PLUGS AT EACH END.



Wheelair 111A
 A 1946 TWIN BOOM PUSHER
 TWO CONTROL SAFETY DESIGN
 BY *Walt Mooney* 11-15-84



Some of the 1934 Wakefield personalities who are still going strong in 1984. From left to right; Denis Fairlie, Pat Fillingham, Walt Getsla, and Alwyn Greehalgh with rebuilt originals and reproduction models of yore. All photos on this page by Ron Moulton, of England.

FUN IS... *The best reward*

By BILL HANNAN . . . Building and/or flying model aircraft does not have to end up in the frenzy of competition. Friendly gatherings with a little casual rivalry can be a lot more fun.

• Many tend to view contests as very serious propositions attended primarily by experts with win-at-any-cost attitudes. However, many competitions are much more casual affairs, where winning is secondary to enjoyable participation. Trophies and prizes may be involved, but are not nearly as important as sharing enthusiasm for model building with like-minded people.

We are pleased to present photographs and brief reports of two such contests, differing widely in geographical location, objectives and rules, yet sharing a common bond, the rewards of organized but low-pressure model competition.

WAKEFIELD ANNIVERSARY

Thanks to Ron Moulton and John Blagg of England, we have a few details of a special meeting hosted by the

Society of Antique Modellers, Chapter 35. Although the prestigious event dates back to 1923, the present celebration concerned the era 1934 to 1984, and was held at the site of the 1934 contest. Not only were reproductions of many British and American 1934 designs present, but also the *actual*, original winning model.

By way of background, during 1934 the majority of participants were British. Two French entrants participated personally, but a third entry was proxy-flown. The Australian models arrived too late to be included in the contest, but were flown in England and their performances recorded.

The six United States models were all proxy-flown: L.M. Adam's was proxied by J.W. Kenworthy; A.H. Du Flon's by H. York; Walter E. Getzla's by R.O.G.(!) Booth; A. Howell's by C.S. Rushbrooke;



Alwyn Greehalgh with actual original 1934 Wakefield winner which he rebuilt. Cruised beautifully, but was no match for other types in the 1984 event.



Typical of the 1939 period, this Korda Wakefield jumps off the hardboard R.O.G. surface, stirring up not too much attention!



Phil Ball and the 8-ounce class winning Hi Ho, designed by Ed Lidgard. Note long retracting single gear for 45° takeoff angle.



No, Doc Martin is not reaching out to pinch the Peanut Ansaldo's tail . . . he just launched it! Photo by Frank Scott.



Jack McGillivray with his outstanding S.E. 5, during the Detroit Peanut Gran Prix. Photo by Frank Scott.



Doc Martin gives his Elias Airport 'Pistachio Nut' about 300 scale ft. of altitude at launch, during the Detroit Peanut Gran Prix. Scott pic.



Here's Millard Wells again (see "Indoor") flying his PAMA. Was crushed when an exploding rubber motor startled person holding it!



Curtiss Hawk built by Canadian Jack McGillivray, though 'not quite finished', was a splendid flier. Frank Scott photo.



Mike Colling, England, flew this CO₂ Hovey Wing-Ding during Detroit Indoor meet. Frank Scott photo.

and Frank Zaic's *Streamliner* by R.N. Bullock. *Flight* magazine of that time described the U.S. entries as "very well-finished specimens."

During the 1984 Anniversary event, two classes were flown, one for four-ounce minimum model weight and one for an eight-ounce minimum, reflecting rules changes over the years.

Participant John Blagg offered this report: "On June 24th I made the 80-odd mile trip to Warwick: a beautiful city for the Wakefield Anniversary. Probably this is one of the best non-scale meetings I have ever attended. I went dressed for the part (in vintage togs) and Ron Moulton's comments were as follows: 'John, what a great shame that such sartorial elegance is so seldom seen on the flying field today!'"

"There were over forty Wakefields of all types from the early thirties up to the mid-fifties. All had to rise-off-ground, and in the stiff breeze the attrition rate was as high as one in four.

"Walter Getsla, who had been unable to attend in 1934, made the journey over from California (he is now in his 70s). Mike Heatherington had made a reproduction of Walt's 1934 model and after

the meeting made him a present of it.

"The Mayor of Warwick conducted the prize ceremony: It was a truly wonderful day and my Gutteridge Wakefield did not let me down. It did not make the fly-off, but it certainly performed very well."

Winner of the four-ounce class was Bernard Aslett flying a 1936 Lanzo reproduction, while first place in the eight-ounce class was Phil Ball flying a 1938 *Hi Ho*. But really, every entrant was a winner in this historic Wakefield Anniversary contest. As Ron Moulton so aptly put it afterwards it was, "One of those delightful experiences that linger on in memory and refresh one's energies and inspirations."

THE PEANUT GRAN PRIX

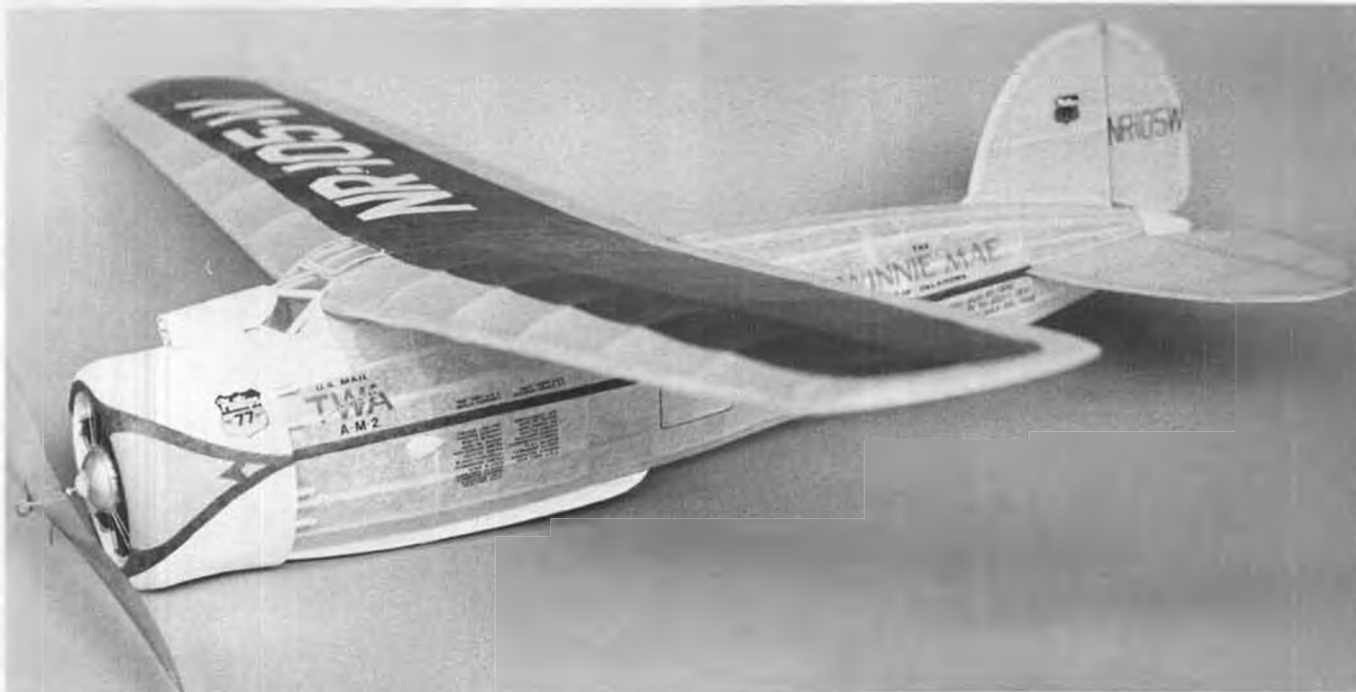
This was a study in contrasts to the Wakefield Anniversary contest, as it was conducted in Detroit, USA, for tiny, indoor flying scale models. However, it too attracted visitors from other countries and was equally satisfying to its

participants.

Thanks to Frank Scott, we have some photos and a few details. Formerly held at West Baden, Indiana, for 24 hours at a stretch, this year's meet was reduced to five hours' duration because of the high cost of building rental (\$500 per day!).

In addition to Peanuts, the sponsoring Miami Indoor Aircraft Model Association flew Pistachio Nut models, which just may be the next sweeping development in flying scale. These incredibly small aircraft range in size from eight-inch wingspan (or six-inch length) down to a mere 5-1/16 span, yet they are capable of impressive flights. Dr. John Martin, moving force behind the Peanut Gran Prix, intends to increase promotion for the Pistachio class for next year, planning for increased international participation, in what may represent the most practical category for proxy-flying ever conceived.

In summary, very few recreational activities can offer the variety found in model building and flying. If you are among those who have always avoided contests, why not try one of these relaxed events? Part of the fun is in the sharing!



The author's Jumbo Scale Lockheed Vega, Wiley Post's high altitude research ship, the Winnie Mae. Selected for its unusual features: drop-off landing gear (less drag, less weight), massive supercharger intake, two-tone blue trim, and LOTS of lettering!

LETTERING TECHNIQUES

By MARK FINEMAN . . . Interesting scale model subjects can often be covered with lettering that needs to be duplicated. It's either a choice of unmarked aircraft to scale, or learn how to apply lettering.

• Deciding which model to build next is an endless perplexity. Sure, there are lots of plans down in my files, hundreds of magazines, and a shelf full of kits, but which one will ignite that little spark, will set the gears in motion, and have me hacking balsa 'til one in the morning? Sometimes the plan itself inspires me, sometimes it is a magazine article, photograph, or three-view that insinuates its magic. I once designed a Cessna AW peanut because I fell in love with a photograph of the real ship; my Nikitin-Shevchenko fighter grew from a three-view and an artist's impression of the airplane in flight.

In the case of the Lockheed Vega, the bug that bit me was hatched while I was reading one of the Smithsonian Annals of flight volumes on Wiley Post. Out came the 36-inch span Comet plan of the Winnie Mae (still available from Golden Age Reproductions, P.O. Box 13, Braintree, MA 02184), and I knew I had to build this 1936 jumbo job. Now high-wing cabin models can get a bit repetitious, so there had to be something to set my ship apart from the rest of the look-alikes, and the high altitude version of Post's aircraft had it all: a distinctive paint scheme with two-toned blue trim, drop-off landing gear (read that as *no* landing gear) with belly skid, massive supercharger intake, and lettering. Not just lettering mind you, but what seemed to be acres of lettering! This plane was covered with the stuff. At the time I had started construction, I had little

idea how I would bring it off, but therein lies a tale.

Construction was straightforward enough and I even managed to modify the original plans so as to incorporate a detachable, plug-in wing that has worked flawlessly. Inevitably, of course, I had to face the worst of it: all that lettering.

The upper wing surface, as was the case with many Vegas, had a dark center panel (dark blue in this case) with light registration numbers. To accomplish this, the panel was masked off with drafting tape and then sprayed with dope. Drafting tape is preferable to masking tape because it can be peeled off more easily, lessening the chances of ripped tissue. The spray painting was done with an old-fashioned artist's atomizer. These are still available at art supply stores and look like two metal tubes at right angles to one another with a gap where the ends of the tubes intersect. Mix up some very thin dope, about the consistency of water, dip the longer tube into the paint bottle, apply lips to the short tube, and BLOW. Out will come a fine mist that coats beautifully. No compressors, no airbrushes, no canned air...just raw lungpower. To clean my atomizer I just poke some rolled up bits of paper towel through the paint tube with a length of wire, like cleaning the bore of a gun. As long as a paint scheme requires nothing more complicated than masking two separate colors, the atomizer should work just fine. If you've never used one, though, practice on old newspapers be-

fore spraying a model. I've also found that it is better to apply several fine coats than trying to get the full thickness of paint in one application; the first coat should be the finest misting possible, with subsequent coats applied only when earlier ones have dried.

The Vega side trim was a matter of luck. I just happened to have two shades of blue tissue that matched the original colors perfectly, so the shapes were cut using a tracing of the trim from the plans and doped in place. The white wing registration letters were cut from white contact paper. Although these look O.K., I'm not sure I'd do the letters that way again as the rest of the covering is semi-transparent, but not the wing registration.

Of course that still left the fuselage lettering and the moment of truth was now at hand. The words "Winnie Mae" on the fuselage were cut from the same light blue tissue that had been used for the side trim, then doped into position and shading added with a dark blue, fine line, permanent marker (Pilot brand, ironically enough). Everything else, I knew, would have to be done with decals.

Decals? I only had a detailed plan and a three-view. The model hadn't been kitted in 45 years and probably hadn't come with decals even then. Some of the decals were made using a clever trick that produces astoundingly good results. A decal can be made by burnishing pressure-sensitive lettering (Presstype, Letraset, etc.) directly on to blank decal paper. Some

blank decal material is nothing more than a paper coated with "decal glue," in which case you will have to spray the paper with a few coats of clear dope to act as a base and carrier for the lettering. Other decal material is already coated and needs to special preparation. You can obtain the latter by saving the scraps from commercially produced decals, or by buying it directly in larger sheets. The stuff I use is manufactured by a company that makes decals for model railroading and is available in many hobby shops.

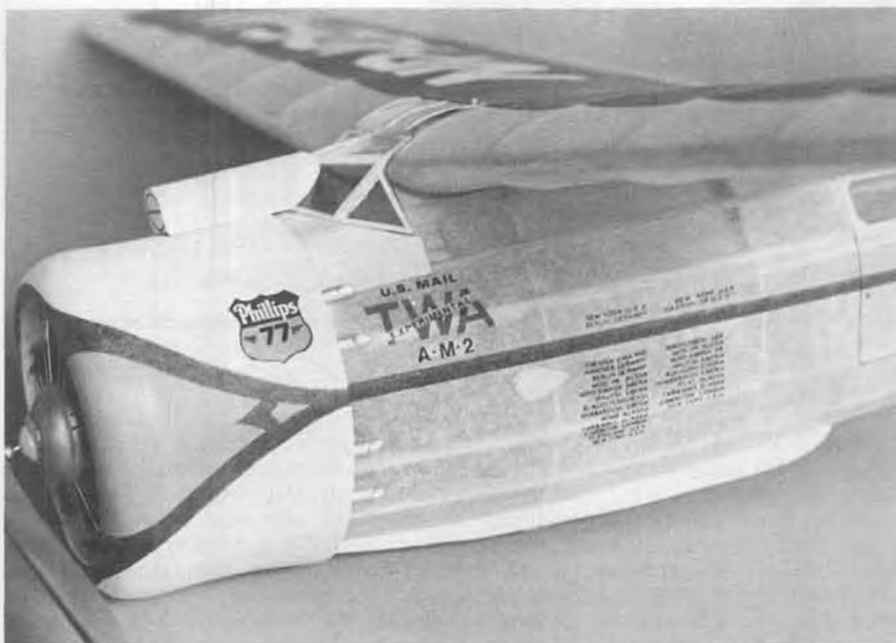
Still another variation on this theme is to apply the pressure sensitive lettering directly to a bit of tissue the same color as the model's, trim it closely, and then carefully dope the lettered tissue to the model. The double layer of tissue is all but invisible. You do have to work with a light touch since dope applied over the lettering tends to crack it. Both the tissue... and decal-mounted lettering work exceedingly well, and as the lettering can be obtained in such a wide variety of sizes and styles, the types of decals possible are almost endless.

But getting back to the Winnie Mae, that still left a great deal of extremely small details, such as the listing of the cities Post had passed in his famous 'round-the-world flights, and various world records painted on the aft fuselage. Here again fortune smiled. All of the lettering was present on the plan, so the object became to get the lettering (actually copies of the lettering) on to a decal. Enter "Decalon."

By sheer dumb luck I happened to be in an art supply store and asked if there was any way to make decals from scratch. The answer was "yes." For less than \$4.00 I bought two generous sheets of Decalon, an amazing product that should have wide application in model building. Here's how it works:

First, one should have a copy (Xerox, 3M, Kodak) of the artwork to be made into a decal. In my case I just copied the lettering from the plan. The Decalon material resembles double-sided Contact paper, that is, the decal medium has pressure sensitive backing paper on both sides. Next cut a piece of Decalon just slightly larger than the material to be made into a decal. Carefully peel away the brown backing paper and adhere the Decalon to the artwork; burnish thoroughly with a blunt instrument. Then peel away the white backing paper to reveal the original artwork copy with what appears to be a plastic coating over it (the coating is the eventual decal).

The decal at this stage must be soaked in water for a period of at least 30 minutes (a drop or two of household detergent seems to help the soaking process). Eventually the fibers of the remaining paper become soft and can be rubbed away with the fingertips. Be very sure to remove all of the paper fibers so that none will be transferred to the model. Now here is the really amazing part: You will then be left with a thin, plastic membrane that has picked up all the artwork from the copy! The part that had been the white paper



Nose detail. TWA markings are combination of cut tissue and pressure-sensitive type applied to blank decal material, which is then applied to model in the usual way.

background of the copy has been peeled away and is now clear.

This membraneous Decalon decal is still difficult to maneuver since most attempts to lift it from the water just make it turn back and adhere to itself. The decal also has no adhesive attached to it. To get around these problems, I devised my own system that works quite well: A small rectangle of waxed paper is cut just slightly larger than the decal, and a few drops of diluted Elmer's white glue are spread across it. Then, using tweezers, one end of the decal is fished from the water and the whole thing is slipped on to the glue-coated slip sheet. It can then be handled much like a conventional decal. Just locate it into its proper position on the model, adhere one end in place and slip out the paper. Blot with tissues to remove excess moisture.

I have only tried Decalon with black

markings, but suspect that other ways of making colored decals should be possible, perhaps by working from a colored Xerox copy. Fortunately for me, there are a heck of a lot of black aircraft markings. One advantage of this system is that the original artwork is always preserved, as you only work from copies, allowing unlimited reproduction of the same design. Pressure sensitive lettering is getting expensive and I would like to use as little of it as possible. One final word of caution: the larger the Decalon decal, the more difficult it is to position. For a large design, you may be better off breaking it down into smaller sections.

If you cannot find Decalon decal medium in your art supply or craft store, don't write to me! Write to the company: Sangray Corporation, 2318 Lakeview, Pueblo, Colorado 81004.



Tail detail (Say that several times in a row and you're ready for a waltz!). Both the rudder registration and the lettering below the trim stripe are Decalon decals (see text).



Control Line

By MIKE HAZEL
PHOTOS BY THE AUTHOR

THANKS FOR THE MEMORY DEPT.

In one of the photos you will see what is simply a layout of photos. I have recently started the practice of taking photographs of my projects at key points of construction. These photos were of details with a tank and fuselage blank for a jet speed ship. Critical dimensions can be jotted down, and construction layout can be sketched, but nothing beats a real picture for reference.

That particular project was being built from plans, but modifications were being made that needed to be accurately documented. Now that the details have been recorded for posterity, they will be invaluable on the next similar project.

★ ★ ★

I have received a few letters from CL readerland, and would like to share some tidbits from a couple of them:

George Lieb, of Omaha, Nebraska, wrote in response to the "invisible CL" situation, and with some good construction hints.

"...I agree with what you say about many so-called R/C items being used for Control Line. My local hobby shop owner knows where the stuff I buy goes, and so does yours, but, who tells the distributors and manufacturers? Probably no one. It's too bad that some of the engine manufacturers and importers don't see the Stunt appearance judging at the Nats. They'd see 60 or 70 planes lined up with Control Line venturis in them. Most of the engines were probably bought with R/C carbs in them!

"...The best method of holding the

wing in a profile that I've ever seen goes like this: The wing should slide easily into the slot with this method. It should not fit tightly. Line the wing up and tack into place with CA (cyanoacrylate...mwh) or five-minute epoxy. Then, tape all around the wing-to-fuselage joint on one side of the fuselage with masking tape. I like to tape the outboard side. Then, hang the piece by the leadouts, or prop up so the tape side is down. Now, drip slow-harden-



Pat Wilcox displays his K&B powered racer. "Quicky Rat" racing event very popular in Texas area.



"Sure we can be bribed!" Stunt judges Bob Parker (left) and Jim Parsons seem to be enjoying duties at '84 NW Regionals. Bergstrom.

ing epoxy into the joint until it is full. After the glue has hardened, go back and do it again, as some of it will have soaked into the wood, and there will be some gaps. The joint should be completely full. Needless to say, there better not be any leaks in the wing, or the controls will be really stiff!

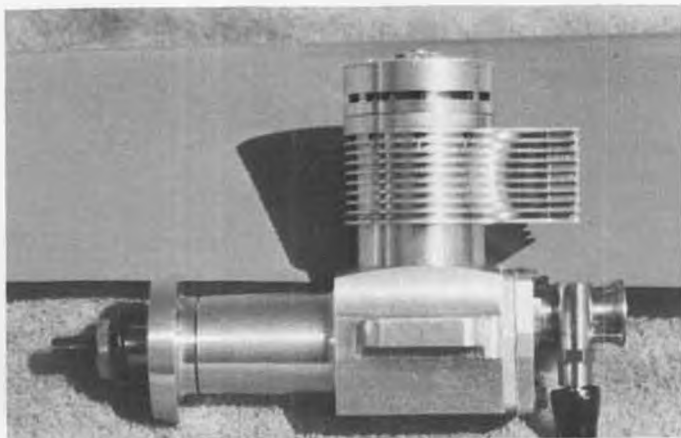
"The 'built-up' profile fuselage works fine, but, if you aren't very careful about wood selection and glue, it ends up weighing about as much as a solid one. Also, it can't be carved to a nice oval section, and is really a mess to repair when it gets broken. I like to run a piece of spruce down the center of the fuselage in a position so that the stab will be glued to it. It adds very little weight, and makes things a lot stiffer. It's also easier to build profiles without the wing opening, then drill a hole and cut the wing opening later."

Next we hear from Tom Dixon, of Atlanta, Georgia. Tom has a few points to make regarding the state of the hobby. I have taken the liberty of editing this, due to the length.

"...Fact is, the (modeling) hobby is being marketed at the 'new-rich' mentality. Not really rich, mind you, but the guy who has lower class values but has gained enough income to consume tastelessly. That's what sells bass boats, cars with power windows, \$20,000 pick-up trucks, unnecessary home computers, homes too large, riding lawnmowers, and many other 'status' symbols.



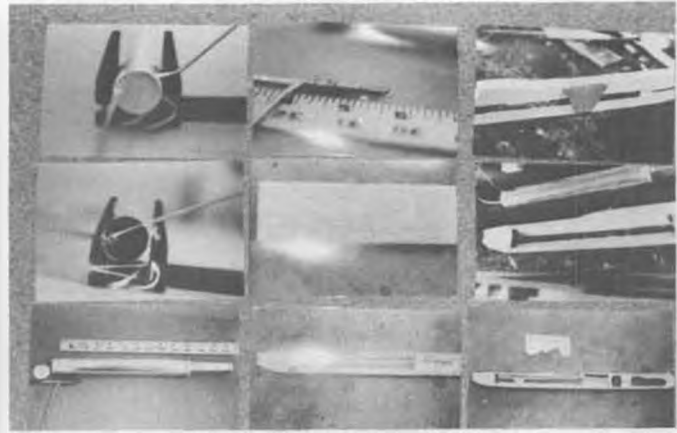
People's Republic of China FAI Speed team used this engine make effectively at World Champs. Looks similar to Rossi 15. Red head.



U.S. FAI Speed team member Carl Dodge built and uses this .15 engine. Beautiful workmanship. Both engine pics by Gene Hempel.



Bob McKinney (left) readies his Profile Carrier Hellcat entry, while George Cox kibitzes. Note inboard tank, racing style LG. Williams.



Author used a series of photos to document construction details for future use. See text. Hazel photo.

"RC airplanes became the latest adult toy in a long line of passing interests. Probably RC helicopters are the worst in a way, as nobody could build a helicopter, or would even try, without the kits that are available. I don't know how many people I've seen come into the local hobby shop and plunk down the bucks, or more usually, a credit card for a 'copter, radio, and engine. These people seldom have any previous modeling experience at all. You just want to tell them to save the money, because there ain't no way they're going to get it put together and get it flying. It's the (plastic) 'ready-to-fly' disaster taken out to the n-th degree.

"Essentially the manufacturers, with few exceptions, are interested in selling, not modeling. Control line is too low buck to bother with. They are not interested in people who want to learn a skill, but rather the focus is on the 'modeler' as a consumer, not as an artist. It is as if the market provides ready-made Picassos instead of teaching painting."

"Maybe we need to start an anti-instant toy protest, like the anti-war movement of the 60's! We need a hippie revolution in modeling, with back-to-the-basics, organic models that you can make yourself. What a novel idea! All it takes is time, curiosity, manual dexterity, patience, ability to read and think, and a willingness to try. Money is optional, but not really required."

Thanks for your input, Tom. One point that is really hitting the nail on the head is the sentence, "all it takes is time, etc..." In our ever changing society, with increasing "sophistication," the true aesthetics of modeling have simply become an aspect that seems to be a concern of a decreasing number.

The scenario of the would-be 'copter ace is one that I have also seen. The local dealers have this happen all the time. I have heard several horror stories from dealers who sell stuff to an imitation modeler who wants no advice in regard to building and flying what amounts to an accident looking for a place to happen. I wonder how many of these types of people are drawn into the hobby attempt by the types of advertisements that seem to be selling an "image" of modeling, rather than the real stuff.

The last couple of columns you have probably noticed that some attention has been given to the subject of the modeling industry, and the current relation of Control Line activity. It is one that I will continue to pursue until some more important points and opinions have been fully expressed. Please don't perceive all of this as "cryin' the blues," but it's as Rodney Dangerfield says, "I don't get any respect!" speaking for the CL fraternity.

Control Line continues to be a viable, but admittedly not very visible, segment of the aeromodeling hobby. If the industry continues the trend of hawking instant-gratification pseudo-modeling, with an emphasis on big ticket items, CL will probably continue to become less visible.

Please let me make it clear that I have a healthy respect for all real aeromodelers, whether in RC, CL, or FF. I particularly admire the individual who is genuinely proficient in all phases, but with the age of specialization these are few and far between. The real objection here is with the individuals who will buy their way into the hobby, pretending they are modelers, and the industry members who cater to this. Enough soapbox for now!

★ ★ ★

Now for some tidbits gleaned from the newsletter of the Orbiting Eagles Of Oma-

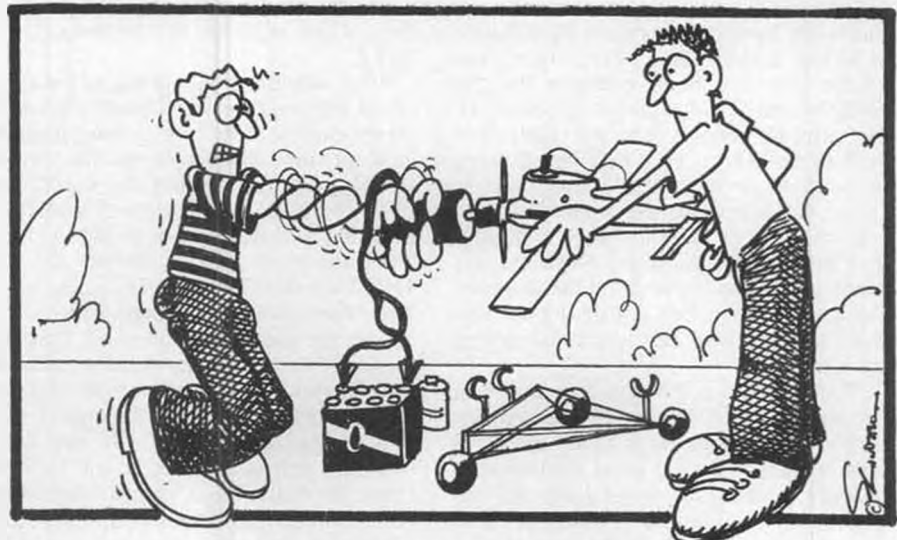


Midwest Skyraider by Gerald Schamp awaits paint job. Mods to kit include; built-up profile fuselage, sheeted wing. Enya 40 engine.

ha. Bob Furr was the author of this information. The first bit may be of interest to carrier fliers.

"Many carrier aircraft have flaps to increase lift and drag at low speeds. For the most part, modelers have stuck with simple flaps that hinge on the trailing edge of the wing. This works, is simple to build, and to activate, but if you want to do a little experimenting, you may be able to improve performance somewhat. Full size aircraft use a variety of lift increasing devices, including flaps, slots, and boundary layer control. The last one you may have not heard about. By using a large

Continued on page 68



"HIGH COMPRESSION!"



Bill Barr, Lexington, KY, lights fuse on "Auntie Freez" (Linstrum design). First in Coupe at COFFC fall annual. Photo by Jennifer Barr.



Bill Gaiser is happy with his Black Bullet (but it's blue!) Site is Harts Lake Prairie, Washington.



Bob Stalick shows launch technique for his D Quell. Model is silk covered, Epoxy and glass clothup front. Photo by Bill Giffen.



• After extolling the great virtues of George Fuller's "Dixielander" design as the perfect answer to the Ram Rod in Nostalgia gas, think how silly I felt when I received the following letter from Harry Murphy, one of the drafters of the original set of NFFS Nostalgia rules. "Even though the NFFS Sympo Report and Bob Stalick of Model Builder say it's O.K., the 'Dixielander' has not been endorsed by the NFFS Nostalgia rules (as yet, anyhow) for the simple reason that we can't find nothing-no-how as to it ever being flown in contests prior to 1957 ('Zoot Suit' is O.K.). Until we can get a confirmation, you might wish to notify your area guys that any NFFS sponsored Nostalgia gas event won't honor the thing. Meanwhile, I've got 'Birdog Bob' Larsh out sniffing the trail. If anyone can locate the origin, it's him.

"Tony Italiano has Ralph Prey and Bob Larsh pounding out an eligible design list to brush away all of the 'fuzz' on questionable designs. This is a good deal without a doubt, and a lotta work! Larsh did the engine list and now he is volunteering to play policeman, with Ralph Prey to nail down the gas designs so that all the de-

signs are either OK or No! Ralph and Bob will also serve as a two-man approval board after the list gets aired. John Pond made up a preliminary list which was a good jump off, but it had some errors and omissions in it. Anyway, that's how I stumbled onto the Dixielander problem. Sorry! Sometime, I'll send you some good news."

WELL... EXCUUSE ME! Here all along I thought I had the right to make those determinations. After all, I am a big-time free flight columnist, aren't I? Well, maybe not big-time. Well, maybe not. So, all of you folks who wrote to me telling me what a great idea the "Dixielander" Nostalgia idea was can direct your attention to Ralph Prey and/or Bob Larsh. Just to get your point directly to them, here are their addresses: Bob Larsh, 45 South Whitcomb Ave., Indianapolis, IN 46241. Ralph Prey, 4589 W. 97th St., Inglewood, CA 90301.

What would really help would be a dated set of plans or a dated magazine article (Aeromodeller would be a good place to look) or some dated pictures that show a "Dixielander." Remember, the cutoff date (year) is 1957. The ship must have been designed and flown prior to Jan. 1, 1957. Now, you scroungers... gopher it!

THREE-VIEW FOR MARCH...

The "Zoot Suit," by George Fuller

With the above rebuff in mind, I present for your Nostalgia consideration, another Dixielander-like creation from the hand of the Dixielander creator, George Fuller. This is the "Zoot Suit." In the Aeromodeller article, supplied to me by Peter Lloyd of Australia, it plainly states that Fuller, a jazz musician, has designed and flown many models named because of his profession. Among these is the "Dixie-

lander."

However, this three-view is the "Zoot Suit." Except for the fin layout and the high incidence angle, it could pass as a Dixielander. The original was powered by an Elf diesel 149cc disp. The plans do state that this model is suitable for any engine between 1.5cc and 2.5cc (.09 to .15) including the K&B .15. The ship is trimmed to fly right-right in a corkscrew type of climb with glide adjusted by right stab tilt.

The fuselage at first glance may appear to be a typical all-balsa box, but in reality, it's built with an open framework behind the pylon... much the same as the "Matchsticks" design.

I guess the message behind all of this is: if you can't prove the Dixielander to be a legitimate Nostalgia model, then why not try for the next best thing... the Zoot Suit. This three-view should get you on your way to doing just that.

MARCH DARNED GOOD AIRFOIL...

The S-EX-G 9035

Last month, I covered some of the



Kevin Collins, top Nordic flier in N.W. and Strat O Bats treasurer, with his winning A/2 before heading for Seguin. Taken at Harts Lake Prairie.

parameters that Barnaby Wainfan stressed as characteristics of a good gliding airfoil. This month, I thought I would try my hand at designing an airfoil that would meet each of the parameters stated . . . thus, the Stalick-EXperimental-Glider 9035. If nothing else, the title of the section should catch your eye. Essentially, this section has a 9% highpoint at the 35% mark. The undercamber follows the mean camber line and is modest as far as usual practice goes; however, in order to get appropriate thickness for the construction methodologies, it would be difficult to have an airfoil much thinner. I have suggested two possible construction methods to use.

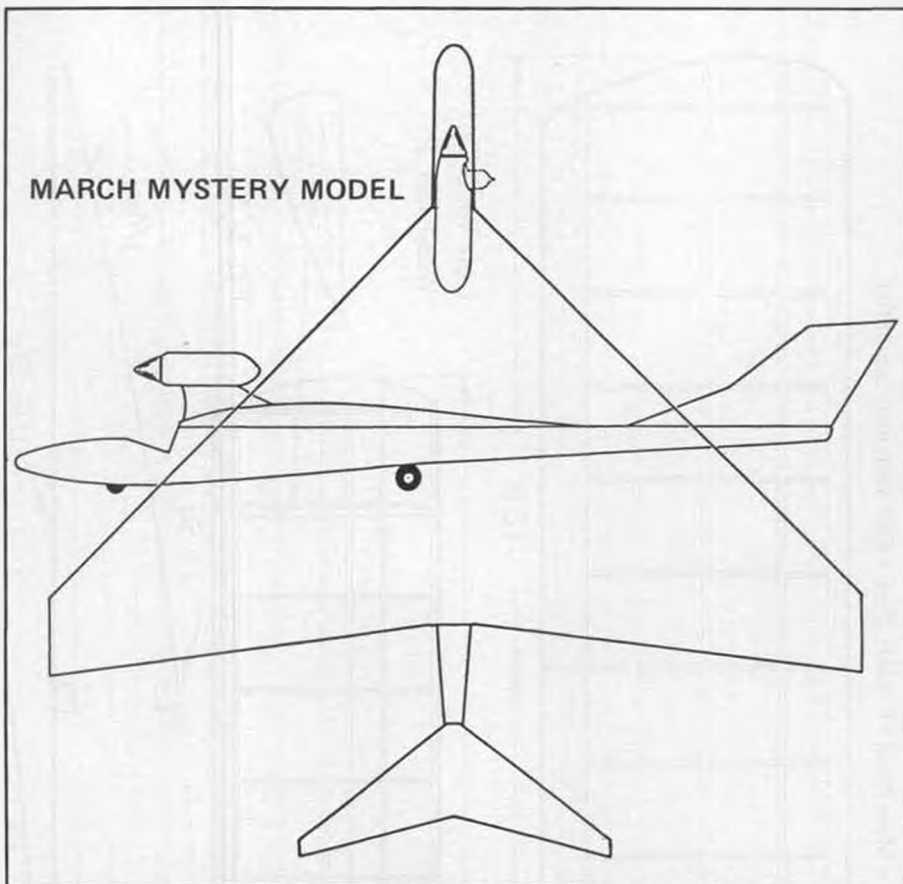
Method No. 1 is a D-box style system using 1/16 sheet on both the leading edge top and bottom cambers. The spars are 1/16 x 1/4, and the spar web is 1/16 balsa vertical grain. A spar doubler is shown to enhance the strength near the root of the wing. Added strength could be gained by using carbon fiber on the outer surfaces of the spars.

Method No. 2 is the standard sheeted leading edge system with a cap strip behind the top spar. All sheeting in this example is 1/32 balsa, including the cap strips. Spars are 1/8 x 1/4 on the top and 3/32 x 1/4 on the bottom. A spar doubler is shown once again, but this example continues throughout the span of the wing in order to provide a base for the sheeted leading edge. The spar doubler is 3/32 balsa with vertical grain.

I'll be the first to point out that no one has built a model using this airfoil. That's why it's labelled as Experimental. I would be very interested if someone were to try it out and see just how it performs. If you are game, give it a try and drop me a line with the results. A picture of the model (and the modeler) would also be appreciated. I hope you try it.

MARCH MYSTERY MODEL

O.K., you old model freaks. Here's one to test your memories. Technically, this design qualifies as a nostalgia model, although it was carried in a national magazine in 1958. No, that doesn't qualify it . . . it's the fact that this design represents the 21st delta designed and flown by the author of the construction article. It could be flown with any engine between .049 and .15 . . . noting that with a .15, it really came into its own. Enough hints. If you can name it and get your response in to Bill Northrop's hands first,



you can win yourself a free one-year subscription to *Model Builder*. If you built one way back when, and have a story to tell about it, so much the better . . . you may find it published right here in M.B.

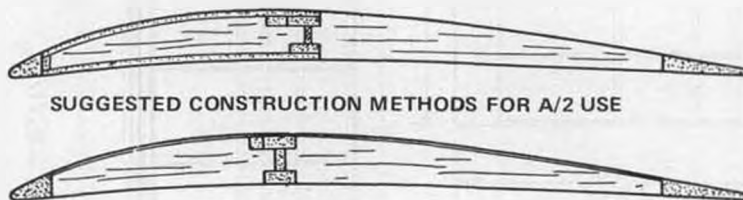
JANUARY'S MYSTERY MODEL WAS...

"Tomahawk," designed by the late Paul Del Gatto and published in the Aug. 1950 issue of *Model Airplane News*. Phil Oestricher, of Fort Worth, Texas, had the correct answer with the earliest postmark. Franklin Warner, of Newport, Washington was also correct, though his answer was postmarked later . . . However, applying the handicap to Phil's answer backed him up

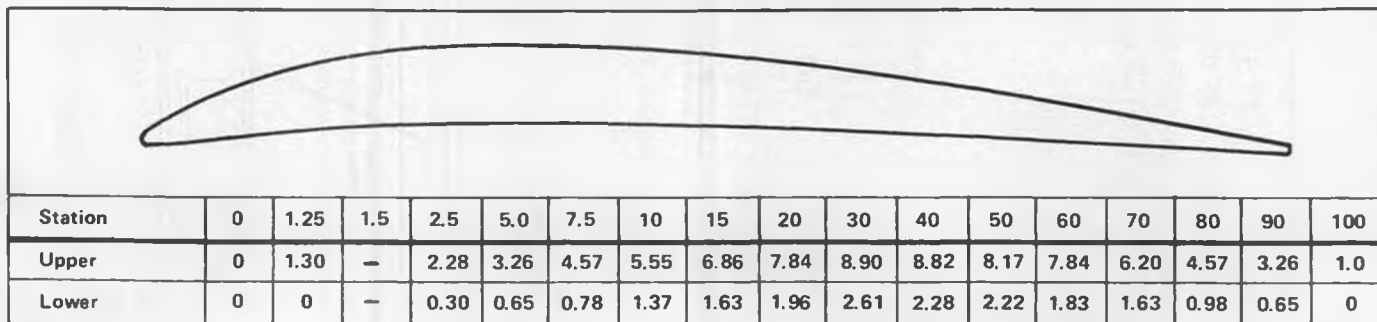
a little, and that put him in a tie with Frank, so we'll dish out two one-year subscriptions to the winners! Congratulations Phil and Frank. (wcn)

THERMALS

It's what makes a mediocre free flight model look like a world beater. It's what makes for marvelous "still air" times. It's something you cannot see, seldom hear, but occasionally feel . . . I suppose some can even taste it. It's the thermal. Recently, I came across this sketch in the *Thermal Thumber* that explains in easily understood form, just how a thermal looks (assuming that one can be seen). Look at the sketch and read along.

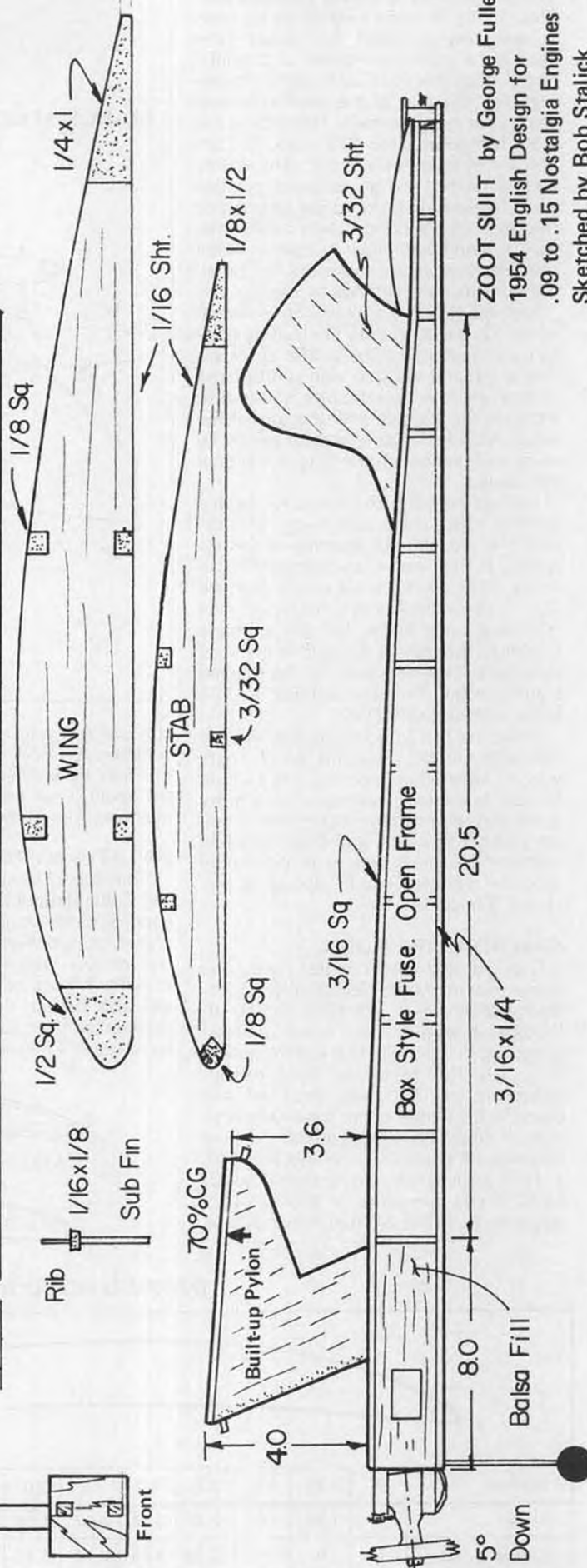
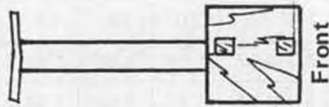
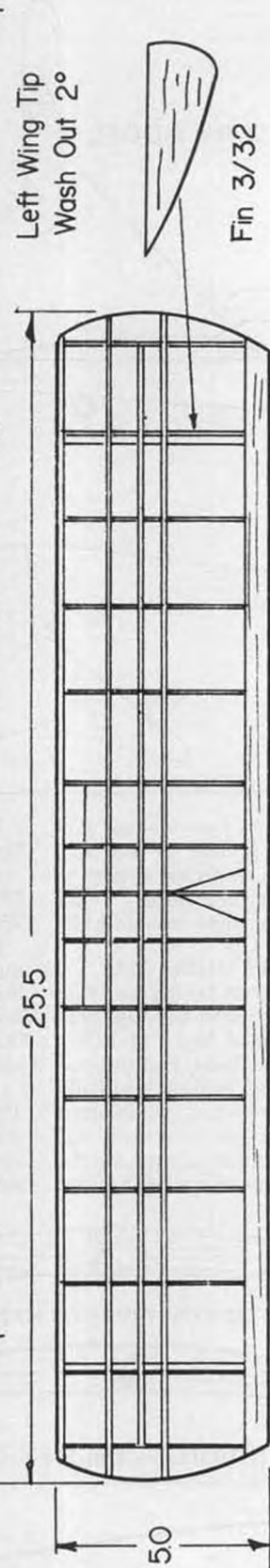
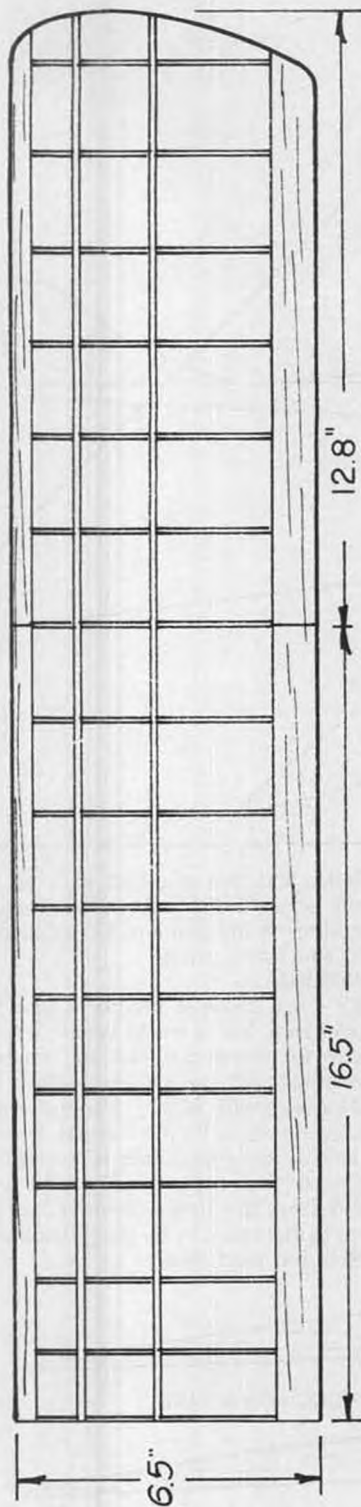


DARNED GOOD AIRFOIL — the S-EX-G 9035



DIHEDRAL = Main Panel: 1" each, Tips = 5.5" with main panel flat

SCALE 1/4" = 1"
 SPAN 57.5"
 LENGTH 37.0"
 WING AREA 390 sq. in.
 STAB AREA 128 sq. in.



ZOOT SUIT by George Fuller
 1954 English Design for
 .09 to .15 Nostalgia Engines
 Sketched by Bob Stalick



Peter Lloyd's version of the "Zoot Suit", this month's 3-view design by George Fuller. Good choice for Nostalgia event.



Another shot of Bob Stalick and his D-Quell, taken by wife Barbara. K&B .61, 1300 sq. in. Scene is Parker's field, in Oregon.

Thermals, by their very definition, are air currents caused by the air at two adjacent locations being at different temperatures. The difference can come about by heating one location more than the other (the usual daytime condition) or one location cooling more rapidly than the other (the evening or night condition). The difference in temperature does not have to be large . . . a couple of degrees is enough . . . as long as the distance between the two locations is small. Obviously, if the distance is too great, the potential energy due to the temperature difference will get consumed in turbulence caused by the surface roughness while the cooler, denser air is moving to the warm spot.

The common concept of thermal formation is shown in the accompanying sketches. It conforms reasonably to observed conditions, doesn't violate any basic physical laws, and is a convenient means of visualization. It has the objections that the warmed air is treated as a bubble with a well defined outline that deflects the wind. This does not occur. The warm air has no distinguishable boundaries and the wind mixes in with the warm air. Considerable turbulence results, which effectively blocks the wind. A dust devil or the infamous "Taft trash mover" is an extreme example of this conversion to turbulence. The critical factor is the calm air shadow

downwind of the building thermal.

Most of the successful detection systems are based on noting the breakdown of the shadow. The problem is separating out this breeze from the breeze that is the result of a simple local gust. Streamers, fluffies, and the like, will tell you if a wind is blowing and what direction, but cannot distinguish a thermal.

A PLUG FOR THE NFFS

As Charter Member No. 1 of the National Free Flight Society, I would be remiss if I didn't promote the premier organization for free flight activities in the world. The NFFS does represent all of us who are interested in the promotion of free flight. In addition to the Free Flight publication, one of the most complete currently available, the NFFS also provides a number of other services. One of these services that I availed myself of lately was the supply department. Finding myself in need of some new pacifier tanks and always on the lookout for good quality Japanese tissue, I sent my order off to Joe Wagner, the proprietor of NFFS Supplies. In short order I received the pacifiers and some of the nicest red tissue I had seen in some time. The price was right, too. The pacifiers were 45¢ each and the Lite Flite Japanese tissue was 30¢ per 17 x 23-inch sheet. Joe carries quite a bit of free flight specialty items that are hard to find in most hobby

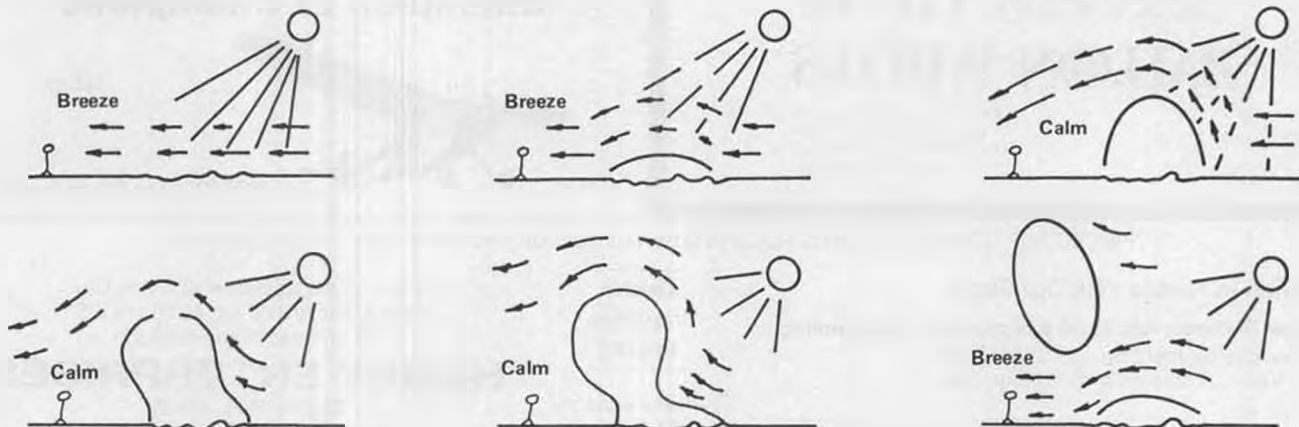
shops. I'd suggest you send him an SASE for the list. Send to Joe Wagner, 12 Cook St., Rowayton, CT 06853. Tell him you read about it in *Model Builder*.

While you are at it, it's probably time to renew your NFFS membership . . . or to join, if you haven't gotten "A Round Tuit." A year's subscription is \$15.00. Send your money, along with the usual name and address information to NFFS, 8383 Zancanaro Ct., Citrus Heights, CA 95610.

FINALLY, THE END . . . BUT FIRST . . .

Ralph Prey passes on this little tidbit about patching those holes in silk or other doped coverings that have an epoxy paint over them. I have always kept a tube of AeroGloss cement in my field kit for just that purpose. It has yet to fail me. When I get a big rip in the covering, I glob a bunch of A-G cement on the rip and bridge the gap with it. Then, using masking tape, I pull both sides together and leave the tape in place for a half hour or so. Then, I gently pull the masking tape off and the two ripped edges are drawn together and the hole or rip is sealed. A little more A-G is applied over the top of the rip to seal it off. Wait just another half hour, and you are ready to go flying again. I know that it seems like magic . . . and maybe it is.

That's it for March. Keep cool, build like crazy and catch a thermal for me. •



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is a beautiful sight and guarantees to please the crowds both on the field and at flying displays. After the landing the steerable nosegear allows you to taxi back where after a few flights, you will really appreciate the pusher engine which leaves the craft and engine clean, since all exhaust matter is left behind

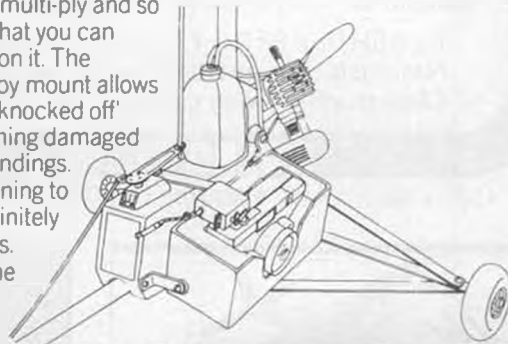
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On the field the Windbag rigs in minutes. It requires only three channels for the controls,

up/down, left/right (including steerable nosewheel) and throttle. The streamlined cockpit is detachable and the Windbag can be flown without it. Other available channels can be used for example to do a 'toffee drop' or to trigger a camera mounted to the side of the Windbag. The cleanliness of the pusher engine, the slow flying speed and the 'no-hands' stability make the Windbag superbly suitable for aerial photography. The drawing shows a simple box with a self-winding camera mounted to the side of the fuselage pod



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the wood to make it more pliable. Put the wood in place on the model (or mold...mwh) and use lots of masking tape or rubber bands to hold it in place. In about two days the wood will be fully dry. When dry, the wood does not spring back as far as when it is soaked with water alone."

★ ★ ★

Last month's column included some discussion on an AMA general rules proposal that would define usage of supercharger devices on model engines. I have since been informed that this proposal has been withdrawn. What a relief! With that being taken care of, let's discuss another area.

That area is the topic of engine mufflers. This subject always brings out some strong opinions, as any regulation enacted would be a significant change in the Control Line ranks. In Precision Aerobatics, use of mufflers is nearly universal, but it is not required. The use is more a question of aesthetics, and engine run characteristics. At present, the only muffler requirement for CL as dictated by AMA rules, is for the Scale event. Could someone please explain that to me? There is an event where generally lower power and quieter engines are already in use.

The latest news is that the Western Associated Modelers (WAM) of Northern Californian are changing over several of their competition events to fully align with AMA rules. This means that after having a muffler rule for all their competition for many years, this is being dropped. Someone please fill me in on that.

There is a CL proposal that would require muffling devices on all engines larger than 1/2A. As quickly as that was proposed, others proposed that if this passed, certain events would be exempt. So obviously, there is much disagreement on what to do. The typical argument in the past was the concern over lost power with muffling devices. This is not very valid anymore. The technology with noise suppression has advanced somewhat, and the engine technology certainly has, so the power loss concern should not be there.

One anti-muffler proponent made the interesting point that combat planes need to make the noise for safety concerns. The reasoning was that if you did not have the awareness because of the noise, then safety would be compromised.

Another point is that some feel we need the noise to be "visible." Well, this can certainly work against us, too. There is one strange contradiction on this point, however. Having been involved in flying demonstrations for large crowds, it became obvious that engine noise was an essential element of the excitement and impression that was given. Simply put, the crowd expects the noise! But it is probably safe to say this is the only situation where the noise is not a potential problem.

Another concern area is the obsolescence of current competitive equipment. This is one of the primary concerns of any proposed change. Obviously, different types of events will be affected differently.

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Control Line . . Continued from page 61

pump (a turbojet works well) air can be pulled into the upper surface of the wing, smoothing out the airflow, reducing drag, and increasing lift. While this may not be practical for models, it is interesting to think about.

"There are two types of flaps that we might want to look at more carefully, split flaps and Fowler flaps. A split flap is mounted on the bottom surface of the wing, and when open, the shape of the upper curve of the wing doesn't change, but the flap changes the shape of the bottom of the wing. Split flaps don't provide a lot more lift than simple flaps, but they do increase drag dramatically.

"Fowler flaps are hinged so that they move backwards and down at the same time. This is done by having the hinge point below the wing. The simplest way to accomplish this is to use nylon control horns to form the hinge. The control horns are joined by a small bolt at the outermost hole. As the flap goes backward, it moves down. This changes the

shape of the wing and has the effect of increasing the area of the wing. Fowler flaps are among the most efficient and are very common on high performance aircraft that need to land slowly. Sounds familiar, doesn't it?

"If you could create enough drag you would not even need a throttle on a carrier aircraft. As many of the very high performance racing engines don't throttle well, some builders have been experimenting with spoilers. RC gliders have used spoilers for several years to allow them to fly into fields that normally they would just pass right over. One of the best systems has both flaps and spoilers working in combination. The spoiler goes up as the flap goes down. This keeps pitch changes up and down to a minimum. The use of flaps or spoilers alone can cause violent up or down changes in a plane's attitude at full speed. Either could result in a rekit of your favorite plane...

"Next time you have to make a piece of balsa curl to fit, such as on a turtle deck, soak it in household ammonia. It seems the ammonia has a temporary effect on

Canard!

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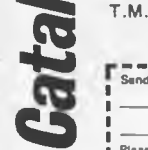
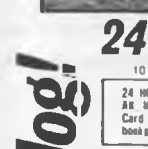
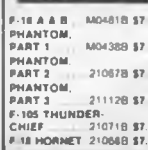
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At present, I have little hope of any general sweeping muffler rule being approved. While I agree that progress needs to be made in this area, I also feel that it must be done in a transitional manner. This means a longer period of time in which to implement modifications. I believe that more work needs to be done by not only the industry and the AMA, but also by the modeler in this area. The frustrating thing about it all is that for every flying site or contest field that has a real concern about the impact the noise has on its neighbors, there is another field where the noise is of no concern because of remote location. Your input is solicited.

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Electric Continued from page 41

ings are so pretty that they bring tears of joy to the eyes. It has had 200 plus flights, and uses an Astro cobalt 05 turning an 8x4 direct drive on seven 1.2 Ah Sanyos. The floats are the RCM Old Timer floats, #598. The Leisure Playboy has had over 500 flights, and uses an Astro cobalt 15 geared, with twelve 1.2 Ah Sanyos, with on-off by servo. Jack plans on using a Jomar throttle in the future.

In the winter, Jack leaves on the floats, and lands on the frozen lake using them as skis. He's had over 200 flights in the

winter this way! Jack is so enthusiastic about lake flying that he extends an invitation to any electric fliers that have water planes to come and fly with him in his front yard! He offers a canoe for retrieval, and power for the chargers, in return for BYOCAD, which stands for bring your own coffee and donuts. He prefers his donuts glazed and honey dipped, and black coffee please! Contact Jack Pignolo, 1-617-429-4215, Holliston, MA. Jack, if I wasn't on the other ocean, I would be on your doorstep right now! Maybe someday I will get a chance to see what that other coast looks like, and go flying with you!

Jack's comment about brushes and water is quite true, in fact, car racers dip running motors into water to instantly seat the brushes. I have not had any brush problems with my Astro 05, 020, 15, 25, and Astro cobalt motors, but I do not have ventilation of any kind, so the plane is water tight. Water just does not get in, unless I dunk the plane (flip it over). This is why I prefer slower-revving motors, it is easier to get away with totally enclosing them, because they do not heat up. I have had brush problems with the Leisure LT 50; some water may have gotten into the motor somehow. My feeling is that for seaplanes, the best bet is a cool-running motor and sealed motor enclosures. Then you can ROW all you want! Find a prop that will let the motor run at least four minutes on the ground (static), and it will run cool in the air.

And yet more seaplanes! The photo shows the cover of my book on building and flying electric model aircraft, and it features one of my float planes flying over Lake Washington (along with an inset of yours truly charging it). There is one minor error that I am aware of in the book, in the chapter on power packages, I have a drawing of a motor brake circuit. The circuit is all right, the statement that you cannot use a charge jack is wrong. You can install it on the battery side of the switch. Anyhow, there is a section on seaplanes, read it and enjoy!

The annual Astro Flight all-electric contest is coming up; it has just about everything you could want to see or do with electrics. This is definitely the place to be if you want to see the state of the art! Seven-cell pylon racing, seven-cell sailplane, and F3E will be on Saturday, February 9, at Estancia High School, Costa Mesa (near the Model Builder office). Registration is at 8, flying at 9 till 3. The next day, Feb. 10, will be at Mile Square, and will feature Old Timer, scale, and aerobatics. The free flight will be the next weekend, Sunday, February 17, at Mile Square, so that those who fly both R/C and free flight can do both. It's going to be fun. See you there!

Speaking of contests, there is a possibility that there will be an FAI F3E World Championships. Joe Beshar, who is chairman of the electric team selection committee, would like to hear from you if you are interested in being on the team. Write a note to: Joe Beshar, Chairman, Electro Team Selection Committee, 198 Merritt Drive, Oradell, NJ 07649. By the way, the

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WING SPAN: 48"
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best way to find out what F3E is all about is to go to the Astro contest in February! There is some excellent competition there, and the very latest state of the art in F3E is used.

R/C Boats . . . Continued from page 47

there was no hull damage suffered by any of the boats. Had gas powered boats been involved in this amount of racing action, there would have been considerable damage inflicted. Electric boat racing seems to allow a much "freer" style of driving. I'm not sure if this is good or bad. You can do some things with an electric boat that would be foolish to attempt with a gas boat.

After my first "official" electric boat race, I'm looking forward to organizing and promoting more. Without doubt, there are many positive aspects about electric boat racing. There are also some problems related to the fact that it is a new activity and there isn't a whole lot of information available about setting up a competitive electric boat. This lack of information will become less of a problem as more people become involved.



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I believe it will be only a few years until we see model electric racing boats capable of speeds upwards of thirty miles-per-hour. With those types of speeds, electric racing will attract a lot more attention. At this time we are laying the foundation for what could become a most exciting form of model boat racing. Just think, now is the time to get in on the ground floor of this developing new sport.

**RACE RESULTS
JUNIOR NOVICE CLASS**

1. Adam Grim, M.R.P. Sport Vee, 14 laps
2. Denise Dunlap, M.R.P. Pantera, 13 laps
3. Robbie Morgan, M.R.P. Sport Vee, 5-1/4 laps

EXPERIENCED CLASS

1. Scott Hogman, M.R.P. Sport Vee, 27-1/4 laps
2. Gary Keyes, M.R.P. Sport Vee, 25-1/2 laps
3. Bob Welch, M.R.P. Sport Vee, 24 laps
4. Jim Welch, M.R.P. Sport Vee, 21 laps
5. Paul Dunlap, Dunlap Vee, 16 laps
6. Tony Bellezzi, M.R.P. Sport Vee, 13-1/2 laps
7. Jenno Bellezzi, M.R.P. Pantera, 13-1/2 laps

8. Dan Rome, M.R.P. Sport Vee, 13 laps

Plug Sparks . . . Continued from page 37

Howler was one of the myriad of engines that made their appearance in 1946 and 1947 in answer to the tremendous demand of orders and requests for the latest hot engine. Like so many of the manufacturers, this engine failed to attract the competitive modelers, hence, another company had to fold during early 1948. **40 YEARS AGO I WAS...**

Received the most interesting packages from Mickey DeAngelis, one containing newspaper clippings and photos, the other envelope containing the much sought after Kloud Queen and Miss Trenton plans.

Photo No. 11 shows Mickey in those "good old days" in 1939 with his "Kloud Queen," having registered 160 flights as of May 6, 1939. Needless to say, this model is an antique follow-on to the Kloud King. Just to show you the spectacular performance of this model, Photo No. 12 shows the model climbing at a very steep angle without stalling. Once we get the plan squared away on this jewel, there should be some requests for it.

Getting back to the clippings on the Lehigh County WPA Aeronautical Society meet at the Allentown-Bethlehem airport, the article states this was the largest contest for this type, attracting over 175 contestants with 217 entries. This crowd attending the meet was estimated at over 3000.

The most interesting item was the description of six automobiles full of competitors arriving from Trenton and Philadelphia. As luck would have it, DeAngelis provided Photo No. 13 showing the boys and their tents after camping Saturday night. The newspaper reported the group formed two circles with their cars, much like the early pioneers did with their covered wagons. Those who did bring tents, slept under the stars.

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The newspaper further reported that despite the large number of entries, the meet went off very smoothly, employing six specially constructed lanes that kept everyone moving in regular order and eliminated confusion. Spectators were quite sympathetic with those who cracked up their models, twelve in all. They did appreciate the work that went into those beautiful six and seven foot models requiring many hours of painstaking work.

Results for the day showed that at least one of the Trenton boys, Steve Vosa, won second with a Miss Trenton in the Duration Event that was won by Robert Gable, of Reading (flying a Long type cabin, what else?) How about these results:

LIMITED ENGINE RUN

- | | |
|----------------------------------|-------|
| 1. Joe Horwath (Philadelphia) | 12:00 |
| 2. Bob Gable (Reading) | 2:24 |
| 3. Martin Rohner (Staten Island) | 2:17 |

DURATION OF FLIGHT

- Robert Gable (Reading)
- Steve Vosa (Trenton)
- Carmen Costello (Scranton)

BEST CONSTRUCTION

- Joe Kabrak
- Walter Eggert
- Willis Hartley

Concluding, the *Allentown Morning Call*, in its report on Monday, August 2, 1937, stated the heat did take its toll in heat shock. The meet was so well organized, that all injuries, heat prostration, etc., were treated by the American Red Cross First Aid Corp. on hand just for these emergencies. When was the last

time you saw a medical facility on the field?

As Mickey DeAngelis pointed out, those were great days, as the meet was well stocked with trophies, prizes, and merchandise donated by the local merchants. Best part was that the airport officials fully cooperated by closing the field for two full days. How about that?

REPLICA ENGINES

For those who have been wondering what happened to Replica Engines, things are really popping now that Karl has fully recovered from his triple by-pass heart operation. This, plus his partner, Dick Dwyer, being available for full time work, has made a difference.

The boys have finally gotten production of the 1937 Finned Head Brat engine started. At the time of this writer's visit to Replica Engines, Karl was running the columnist's Brat (#008). Rather surprising was the ease with which the engine started, but unfortunately, Karl had picked out a "tight" one for Pond, hence, it will require considerable break-in.

Although it was apparent the engine was quite stiff, it registered 7000 rpm, not sounding at all like it was broken in. Estimates vary, but it appears the engine will run in the 9000 rpm range. All running tests were conducted using an 8 x 5 propeller, something a little higher in pitch than this writer would care to use: an 8 x 4 would seem more reasonable.

Those who have ordered the new series of 1937 Finned Head Brat engines are be-

ing notified by postcard as they are ready, according to Dick Dwyer. If you are not presently on the list, there may be a few left (only a guess). Price, including all ignition parts and wooden mount, shipped First Class mail is \$199.95. C.O.D. deliveries are slightly higher at \$202.50. Remember, only fifty are being produced!

More good news! Although it has been a long time coming, Karl and Dick announce the following engines will be produced. (Prices quoted are tentative)

Baby Cyclone: Model D only. There will be no production limit. Engines will be manufactured to demand. Price: \$194.95

Batzloff Triump 60: Only fifty (50) will be produced. Write immediately to get on the list. Price \$249.95

Bunch Warrior: At present, only 100 are scheduled. Again, if you want one, get on the list. Price \$199.95.

NOTE: (1) All engines will be test run! This means you can use the engine if you so desire. Everything that was manufactured in the original engine will be faithfully reproduced.

(2) At present, an unspecified spark plug will be provided with each motor, and a new coil and condenser plus a wood mount, all as required to run the engine, will also be included.

(3) Accessories:

A. Coils and condensers will be sold separately.

B. Super Cyclone and Anderson Spitfire parts are no longer available. Write

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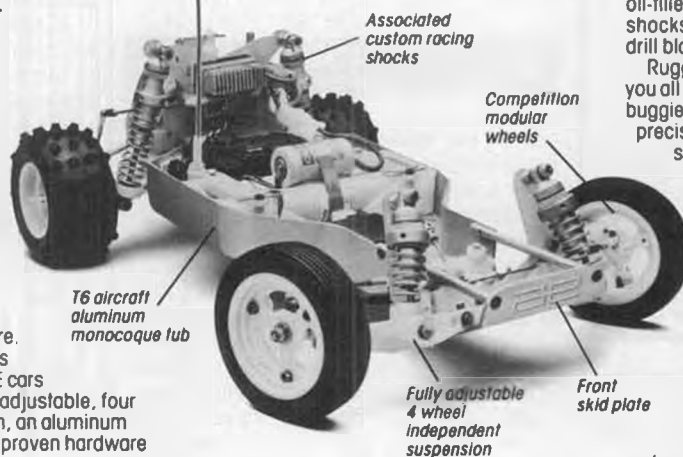
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.03 R/C



\$32.95
6000 - 18,000 RPM

.061 R/C



\$35.95
5000 - 17,500 RPM

.061 U/C



\$32.95
14,000 - 18,000 RPM

.061 R/C-C



\$38.95
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to Tom Morrison, Super Cyclone Engines, P.O. Box 10658, Phoenix, Arizona. He has a complete listing of parts available.

(4) Hetherington 23 (As featured in Model Builder, March 1979) sometimes called the "Sheetmetal Special," is available from Replica Engines. This project includes all tooling for parts. Best offer takes!

All the foregoing is only the sketchiest outline of what is going on. For more details write: Replica Engines, 1837 Flood Drive, San Jose, Ca. 95124. You will get an answer, honest!

N.C.F.F.C. UPDATE

Bill Bowen reports that the Northern California Free Flight Council (NCFFC),

one of the leading and most progressive free flight federations of the West Coast, at their Annual Business Meeting, approved the staging of old timer R/C events in conjunction with their regularly scheduled meets.

This is the most astonishing innovation to date (except for the abortive effort to establish Old Timer events at free flight contests). The ramifications of this move are two-fold. The first should hopefully bring more modelers to the field. Based on two to three different type contests being held simultaneously at Condor Field, Taft, as an example, there is bound to be an interchange of views with many modelers switching back and forth between R/C and F/F.

In an attempt to attract the present Old Timer R/C flyers, Society of Antique Modelers (SAM) rules will be used. This will automatically preclude the use of any model design after Dec. 31, 1942. Perhaps later, as interest increases, the R/C portion of flying may be extended to include the ever increasingly popular Nostalgia Event.

At present, no Texaco Events will be

staged, the majority of NCFFC clubs feeling that three events take too much time as it is. However, a full schedule for one day will consist of the Limited Engine Events, Class A, Class B, Class C, and the Antique Event.

The flying schedule that includes old timer R/C events has been formulated as follows:

- Feb. 3 — Stockton Winter Bash
- Mar. 3 — NCFFC (O.C.D. Host)
- April 14 — NCFFC (Sierra Host)
- May 5 - NCFFC (Stockton Host)
- July 14 — Stockton Summer Bash
- Sept. 15 — NCFFC (Sierra Host)
- Oct. 6 — NCFFC (Stockton Host)
- Nov. 10 — NCFFC (O.C.D. Host)

(Since this article was turned in, several conflicts have been discovered. Watch for revised schedule next month. wcn)

All meets will be held at the Waegell Ranch located off Hwy. 16 on Sunrise Road. This field can also be reached from Hwy. 50 by taking Sunrise Road south for six miles. Starting times are 8:00 or thereabouts, with the meets generally closing at 3 p.m. If you need practice, here is a great way to get some contest time in!

JIMMY ALLEN BLUEBIRD (JUMBO)

Based on the terrific amount of interest generated by the Jimmy Allen Event offered at the Bong Field SAM Championships, Wisconsin, and the popularity of the J.A. Bluebird, according to Larry Ladd, a scaled version (1.5 times) of the Bluebird will be offered by Hobby Horn.

Larry sends in Photo No. 14 to show just what is proposed in the way of the Jimmy Allen Bluebird. As can be seen, the model is much larger (57 in. wingspan) and is powered with an Enya 40 R/C. Larry admits this is too much power, but says it sounds great with the engine speed just above idle!

At present, plans for production of the kit is still uncertain. If you are interested in this item, the best idea is to let Bob Sliff know about it. Bob can be reached at Hobby Horn, 15173 Moran St., (B), Westminster, Ca. 92684, phone: (714) 893-8311 during office hours.

READERS WRITE

Seeing that we published a photo of the Cleveland Boeing 40 Mailplane, R.B. McKenna, 1620 Artesia Blvd., Redondo Beach, Ca. 90278, sent a set of three photos of his Cleveland Curtiss F11c-2 Goshawk. We reluctantly passed up the excellent color shot and present Photo No. 15 of the model.

For the benefit of readers who should like to identify Bruce Norman, of Ft. Worth, we are using one of Art Schroeder's shots taken at the Rancho San Rafael Recreational Area, Reno, Nevada, during the NATS Old Timer R/C events. Photo No. 16 illustrates how Bruce has expanded his attitude regarding radio control models. Gone is that slender figure derived from chasing free flight...haw! We present Bruce in a three-quarter frontal view with his highly successful Lanzo Bomber, Ohlsson 60 (front rotor type) powered. Turns out to be an excellent combination.

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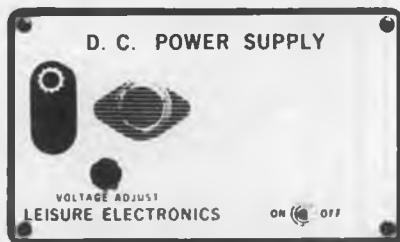
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	Weight	Price
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1/3 Scale	6 oz.*	\$16.95

*Weight may vary depending on material used in construction.



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SAM ABROAD

SAM in Australia has taken off like a rocket. Barely three years from start, the 2nd SAM Championship is planned at Canowinda, N.S.W. Accommodations in this town were primarily for balloonists, as this area is considered the calmest in all of Australia.

The Balloonary (headquarters normally for the balloonists) has been completely booked up by the free fliers, while the radio people have taken all the motel and hotel reservations. The townspeople are probably wondering what hit them, as this promises to be the largest SAM Championship in Australia to date.

Along with the views expressed by Gordon Burford, this columnist received a

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the initial crash.

Worth mentioning is the fact that hard work finally pays off. Dennis Parker won three places in three events, winning two firsts with his Zipper. The writer does note a crossover is allowed from old timer (1934-42) to Vintage (1943-52). In the U.S.A. contests, you are required to state which event you have selected and you are stuck with it!

On a free flight kick, Photo No. 18 is a shot of Paul Straney, well known Victorian free flihter, taken at the Richmond Nationals. However, he is still using his good flying "Jimp," a local design that was popular with the VFFS boys.

Roy Robertson, Contest Manager, says after such a successful beginning in Victoria, he is now working on a big interstate meet with New South Wales. This should develop at the big SAM Seminar scheduled for January.

We didn't get any times on the results but let's take a look at what the Aussies are flying in competition:

R/C OLD TIMER

1. Winston Crowther — (Miss America)
2. Derek Buckmaster — (1937 Bowden)
3. Warwick Bates — (Red Zephyr)

R/C ANTIQUE PRECISION

1. Winston Crowther — (Miss America)
2. Warwick Bates — (1937 Bowden)
3. Graham MacDonald — (Miss America)

R/C BEAUTY (CONCORS D'ELEGANCE)

1. David Reynolds — (Powerhouse)

F/F O/T POWER

1. Dennis Parker — (Zipper)
2. G. Wyer — (Thermal Thumber)

F/F VINTAGE POWER

1. Dennis Parker — (Zipper)

2. R. Allbun — (Alert)

3. Paul Straney — (Jimp)

O/T RUBBER

1. Peter Ellis — (Korda)
2. Dennis Parker — (Lanzo Stick)
3. G. Wyer — (Korda)

To top off a gorgeous day, only one crash was noted; Steve Watson's Red Zephyr smashing on takeoff. Don't know if it was "switchitis" or just a high speed stall. Tough act!

THE WRAPUP

There is nothing like getting an answer to a letter sent out Feb. 8, 1973. Plenny Bates, 2505 White Eagle Trail, S.E., Cedar Rapids, Iowa, 52403, who figures better late than never, finally got around to answering the columnist's letter outlining a few do's and don'ts on models. Plenny took the time to write some tips as he had discovered them on adjusting a Custom Privateer. We feel some of this is worth passing on to other would-be hydro fans.

First of all, Plenny states the Privateer is a good flying seaplane, his is now in its third owner's hands. Bates paid attention to strength and weight (especially the latter) when he built the wing using a D-tube. The fuselage was also built light, but all outlines have been faithfully reproduced.

Plenny says when he builds No. 2 Privateer, he would do the following:

- (1) Reduce the dihedral. This would help immeasurably in crosswind handling. You only need large dihedral for a free flight

nice writeup from Dennis Parker, newsletter editor for SAM Australia, describing the latest O/T activity in Victoria, called the "SAM Southern Regional," held on 17 November.

Dennis reports the weather was perfect at Laverton AFB. However, because the base was still on an operational basis, the free flight boys had to fly from an adjoining field.

Although Dennis did not include photos, we still have quite a few photos of the boys still using the same models. An excellent example of this is Photo No. 17, showing the Beauty Award winner, David Reynolds, with a Powerhouse. The one he won with was Enya 60 powered, the Anderson Spitfire having been removed in

version.

(2) Reduce the incidence of the wing and tail and particularly the incidence difference between the wing and tail. With a large amount of incidence in the wing, the model is slow to get up to flying speed. As soon as stall speed is obtained, the model lifts off in an almost ready-to-stall attitude.

(3) Setting the wing at a very small incidence angle allows the model to easily exceed stall speed before you rotate the hull by use of the elevators. No question about it, you have better control on takeoff.

We know there is quite a bit of interest out there in old and antique seaplane flying, as can be noted by SAM 21 activity and Lake Elsinore fly-ins. Incidentally, SAM 21 took over the old South Bay Seaplane Society's activities. We do hope the foregoing is of practical help for all long-planning hull seaplanes under radio control. Any other ideas are welcome. We would like to share your experience. •

Counter Continued from page 10

732-0022. All that's required to apply the covering is a hair dryer or heat gun. Main rotor covering is \$1.99, in clear, red, black, yellow, transparent blue, transparent yellow, and white. Tail rotor covering is \$1.49, and is available in red and white. There is enough material in one package to cover both blades of even the larger helicopters.

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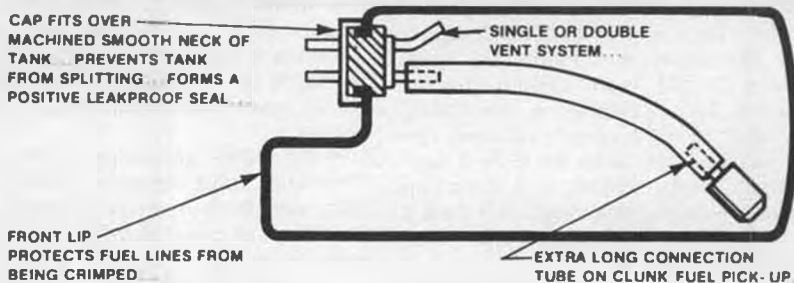
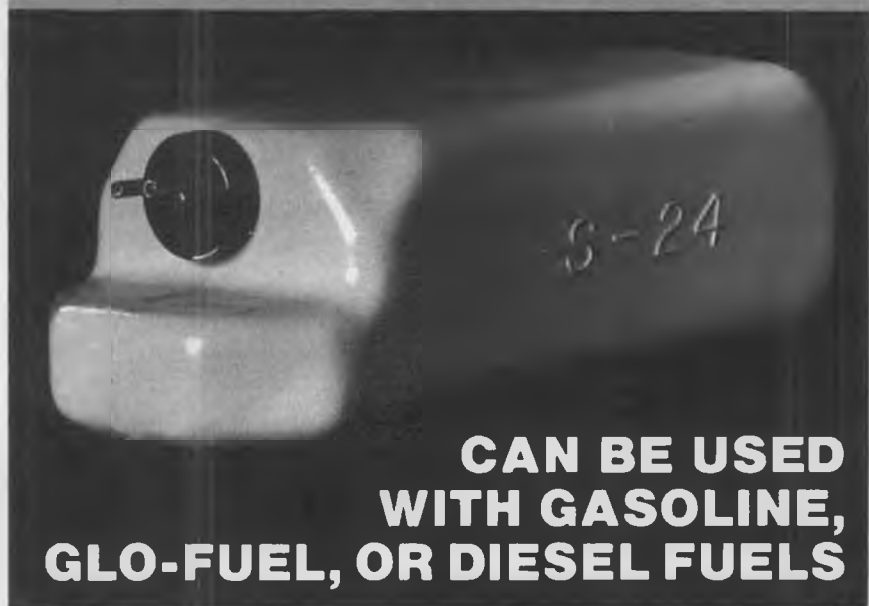
The "Kwik-Klip II" is a new locking glo-plug connector for both standard and four-cycle glo-plugs, by Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084. Operation is similar to the hypodermic needle syringe...thumb on top, fingers under the flange, then press to clip on, press to release. It will not loosen, rotate, or fall off, even during heavy engine vibration. As Du-Bro says, "One Bite on Tite."

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Called the "Glitch Buster," a new electronic device by Jomar Products, 2028 Knightsbridge Dr., Cincinnati, OH 45244, 513-474-0985, features "six channels of OPTICALLY ISOLATED signal conditioning which completely eliminates any electrical connection between the receiver and the aircraft wiring system." Two separate battery packs are used...one for the receiver and a servo pack, which can be four, five, or even six cells. The optical isolation technique has been used extensively by the military for their target drones with great success, and now you can use it in your "giant" aircraft to eliminate glitches that can be caused by long servo leads and heavy duty servos.

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- 30, 35mm—\$1.97; 40, 45mm—\$2.23
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Robbe Model Sport announces two new aircraft for R/C; the "Geier" flying wing and the "Parat TF." The "Geier," which spans 59.6 inches, is a thermal or slope soarer with full span elevator-aileron, providing high-performance aerobatics. The "Geier E" is the electric powered version, and the kit includes the EF-76 II electric motor, prop, adapter, and mounting hardware. Flown with an eight-cell pack it still has a wing loading less than some non-powered gliders.

The "Parat TF" is a high wing cabin trainer type aircraft with tail-dragger landing gear, for .09 to .15 size glow engines. Span is 49.8 inches. The "Parat E" is the electric version, using the same EF-76 II motor as the Geier, which is supplied with the kit. Construction features Siro's® covered foam wings and simple box-type fuselage or die-cut balsa and ply.

See them at your dealer, or contact Robbe at The Office Center, Princeton Meadows, Plainsboro, NJ 08536.



Ace Radio Control, Inc., Box 511, 116 W. 19th St., Higginsville, MD 64037, is introducing a bunch of new items. A pneumatic quick disconnect for use with 1/16 ID plastic tubing (primarily for retract hook-ups) features a "Luer" taper for quick, leak-proof seal. Female fitting has threaded bushing for bulkhead mounting. Ace also has the 1/16 I.D., 1/8 O.D. tubing in three-foot lengths.

For covering those foam wing cores,

obechi veneer, popular in Europe for many years, is now available from Ace. One millimeter thick, it comes in 49-inch lengths, either 12 or 24 inches wide.

Next is a heat shrink tubing assortment packaged in a reuseable plastic box. Includes seven sizes, from 1/16 to 5/8 diameter.

Ace's Nilite glow-plug lighter, with "Headlock" plug connector, is now available with built-in meter to monitor the condition of your glow plug. Available with or without charger.

The Nilite III puts the Nilite on board your aircraft and provides servo switching linked to the throttle, for dependable idle in the air and convenient starting on the ground. The switch box used in the Nilite III package is also available for separate switching jobs rated for five amps at 250 volts.



A unique little 10-1/2-inch span hand launch glider, the "Acrobat Ultralight Looping Glider," is available from Racing Wings Co., Box 261226, San Diego, CA 92126. Made of tough poly-styrene plastic, the colorful glider, configured like an ultralight, has been demonstrated at various trade shows around the country, and is expected to be sold nationwide soon. If you can't find them locally, check the ad appearing in this issue to place your individual order direct from the factory.



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announces two softbound books, each featuring a particular aircraft. The McDonnell F-101 B/F Voodoo is covered in the Aerofax Minigraph series, No. 5, by Kevin Keaveney. The 8-1/2 x 11-inch book contains 139 black and white, 10 color photos, and many detail drawings, in a thorough study of this aircraft.

British Aerospace Hawk is the title of another book on the BAe Hawk basic and advanced jet, by Roy Braybrook. This 8 x 10-1/2-inch book contains 168 pages, 120 black and white and 12 color photos of various models. Inside stories on the development of the Hawk as a weapons instruction trainer, ground attack aircraft, and air defense fighter are revealed. Includes history and flight test program, along with detailing service in other countries.

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Europe Continued from page 18

two-stroke boxer engine! According to the manufacturer, this very compact engine delivers 8 hp, but he does not quote the rpm at which maximum power is reached. Weight, complete with the ignition system but without the necessary battery, is just under 8 lbs. Compact, I said, and the following measurements prove it: Width (without spark plugs) 9-5/8 inches, distance between firewall and the face of the propdriver 6 inches. Fitting the plugs adds 1-3/16 inches to the total width. The total height of the engine, including the carburetors, is 5-7/8 inches.

The engine features a battery powered electronic ignition system, triggered by means of a Hall sensor. This ignition system is built by a German firm by the name of Becker, which is also one of the smaller manufacturers of R/C systems.

The first time the owner and (partly) builder, Jan van Ageren, took this Laser to the field, the day was used to get acquainted with the engine, and to run it in. After some initial adjustments to both the Tillotson carburetors, the engine appeared to start, hot or cold, at the second or third flip every time. It ran very smoothly and is obviously well-balanced. I could not resist holding my mechanical Deumo-S tach to

the spinner and read 6500 rpm, with a 24 x 12 prop. Not bad, considering it was brand new and running slightly rich!

Next time out, the owner wanted to see his bird fly. He was strongly advised not to do so by the majority of those present at the field. Although this ship was well-built, we noticed excessive play in the elevator, caused by linkages and servo-installation that were not up to par. He resisted his urge to fly, but when his son Martin was taxiing the Laser around at the end of the day, he suddenly decided to give it a try and opened the throttle. The take-off was very impressive, but after a few rounds around the field, the big Laser obviously decided to call it a day, pointed its nose down and disappeared behind the trees.

Well, the site of the crash appeared to be a muddy ditch, so the damage was less than expected; it was not a total wipe-out. The cause of this all? A broken elevator horn! No wonder. The builder had fitted standard .61 size airplane rudderhorns on the moving surfaces of this giant model!!

Although its maiden flight was not successful, I thought this to be an interesting enough large model and engine to tell you about it. Hope you liked it, and more next month!

BIG Birds . . . Continued from page 23

he went wrong. Most manufacturers are "straight-arrow" and value your business,

and always appreciate good feedback.

One product that so many guys seem to get emotional about is propellers; we usually either swear by them or at them. Too many BIG Bird people don't even bother to balance their props, assuming that they come perfectly balanced from the factory. T'aint so! We'd have to pay a lot more per prop for that kind of balancing to be done by the manufacturer. And then there are the guys who know their props are not balanced, but seem to think that it doesn't matter...which is really strange behavior for people who go to the trouble and expense to have their flywheels balanced. I have never bought a BIG prop that was in balance. True, some were close, but all needed the accuracy and sensitivity of the High Point Balancer for the kind of balancing that really counts; otherwise, that engine will never be able to put out all the power of which it's capable.

Of course vibration could also be due to a poorly installed engine. If your engine isn't solidly mounted, and if the mount is bolted to a thin, poorly supported firewall, you're not being fair to your engine, airplane or radio. In fact you're probably going to "buy the farm" in short order because of excessive vibes.

With the engine and mount installed properly, and the prop balanced, and with just a few minor trim changes, your new bird seems to fly great...or does it? How do you know what great is? You haven't tried any other prop size to compare performance so you really don't have a feel

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for what the plane can really do. This attitude is a hangover from our small airplane days; almost without exception we stuck a 10x6 on a forty and an 11x7-1/2-8 on a sixty, and let it go at that. Rarely was there any attempt to find the best prop/engine combination. As we've found out with our BIG Birds, the type and weight and angular settings of a particular airframe make prop selection important. I use a 20x8 on my Quadra-powered Fleet biplane because it's the best combo I've found for this 21 pound bird. On the other hand, I use an 18x6-10 on my Zenoah-powered Big "E" because that prop allows this 15 pound ship to sparkle in the air. So don't be afraid to experiment with different size/pitch

props; you're very likely to turn a dog into a fine flying machine. I use only wood props because I feel more comfortable with them...and because I'm convinced that replacing a wooden prop is cheaper than replacing a crankshaft.

I appreciate you guys hanging in there with me...and don't forget to preflight and postflight that BIG Bird as though you really were going to be in the cockpit each and every flight.

TRD AIR 40 AUTOMATIC

Got a call a few months ago from Altech Marketing, Inc., that sorta confused me a bit. The guy at the other end started to tell me about a great Italian-made engine they were importing, and of course I associate

Altech with the Enya line of engines. Anyhoo, I couldn't resist the offer to see what this new import was like and get to try it out. I couldn't help but wonder why Altech was handling an Italian gas engine; didn't seem to me that there was room for it on the market.

My plan was to get it on the test stand first and make sure that it was worth putting in a bird; there's no sense jeopardizing an airplane if the engine has low power and/or high vibration. However, my trip to the hospital and this protracted recuperation period messed up those plans, so GOFB Bruce Edwards stepped in to help me out. In spite of bad weather, Bruce has had a chance to run this TRD 40, and was impressed; it appears to have one helluva lot of power (it's only a 2.44 cubic incher) and a remarkably low level of vibration. In truth I'm reluctant to repeat the tach readings that Bruce got using my AccuTach 2...because they seem quite high for props like a 20x8 and a 20x6-10 on an engine that's barely 2.5 cubes.

This TRD 40 is compact, and at first glance looks very much like a Quadra painted black. There was little in the way of instructions accompanying the engine and no parts list or parts breakdown. I did talk to Altech Marketing about the need for better instructions and more data, and I assume future engines will include a complete information package.

As you can see from my photo, the TRD does come with a mount and a muffler... and inside the mount is a spring starter (which probably accounts for the manufacturer using the word "automatic"), so it is a nice little package. As is, the engine weighed 5-1/4 pounds, not too much more than the flying weight of either a Quadra or a Zenoah.

As I'm going to have to take it easy for a while, Bruce is also gonna do the flight testing. He plans to install the TRD 40 on his Big "E" and, weather permitting, I should have some sort of flight evaluation for the April issue.

TATONE'S NEW TEST STAND

For quite a while, Tatone has had a fully adjustable cast aluminum engine test stand that handles everything from 1/2A to .80 size engines. Well, never being one to sit still and become idle, John Tatone has come up with a whole new, bigger, stronger aluminum test stand designed for engines up to 1.2 cid. There's a lot of beef in this unit, and it easily and safely handled my OS FS-120, which by the way is set up with CH Electronics Throttle Coupled Spark Advance and runs beautifully on 50 percent gas, 40 percent methanol and 10 percent Klotz KL-1000.

Mr. Tatone had a fine idea making a test stand out of aluminum; all the other commercially available engine testing units are made of wood, and sooner or later will succumb to a diet of glow fuel. This Tatone stand should last a lifetime as fuel can't hurt it...and because it's made from aluminum, it acts as a heat sink, also. A real dandy item!

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The Trendsetter

IMAA FLY-IN'S

The HOTMAC (Heart Of Texas Miniature Aircraft Club) Squadron, Waco, TX, is just about all set up for their 3rd Annual Dr. Pepper BIG Bird Fly-In on June 8&9. They already have both their IMAA and AMA sanctions approved for this two-day affair at Speegleville Park in Waco. How does an 80x300-foot paved runway sound? And that ain't all; all 12 acres of grassy area's gonna be mowed and looking like a putting green.

For more info and a flyer, drop a line to good buddy C.B. Horton, Event Director, 916 Wedgewood, Waco TX 76710.

And just a week later, on June 15 and 16, IMAA Chapter 48 will be hosting its 4th Annual Fly-In at Converse, Indiana. According to Chapter 48 Prez Bill Johnson, this site is an ex-WWII training strip with 52 acres of concrete... "and surrounded by almost nothing taller than grass."

Bill sez they have commitments from Tom Cook (F-4), Bob Campbell (C-130), and Gary Bussell (Sopwith Pup) to be there. Also included at the fly-in will be concessions, overnight storage, camping, a pitch-in dinner Saturday... and surprises.

Bill didn't mention who the Fly-In Director was gonna be (it may be Bill), so send your queries to: Bill Johnson, R.R. 1, Box 62, Gaston, Indiana 47342.

And on the third weekend of July (20 and 21), the Puget Sound Rocs (IMAA Chapter 108) 3rd Annual BIG Bird Bash and Tea Social will be off and running.

Our new site at Yelm, WA, was appreciated by all who attended last year... and this year it's gonna be even better... because we're moving the fence that's near the runway a good 300 feet further away. As usual, our Bash will be both IMAA and AMA sanctioned for everyone's protection, and food/refreshments will be available.

Don't know who the Bash Boss is gonna be, yet... so just drop me a line and I'll see to it that you get all the details.

DEFINITION OF A QUARTER-SCALER

In place of a Tip of The Month, thought you might enjoy this bit sent in by Chuck Curtis, Bozeman, Montana.

Quarter Scaler... is a modeler with a shade too much ambition, a chain-saw engine, and a set of baby-buggy wheels.

Al Alman, 605 168th Street, East, #95, Spanaway, WA 98387. Let's see what your winter projects look like, guys. Those shop pix of framed-up birds are most welcome... and don't forget some inflight shots later on. Black and white photos are best, but clear, sharp color prints are acceptable.

FLYING SAFETY IS NO ACCIDENT!

Hannan Continued from page 49

door Model Flyers, such as Walt Takatsuka and Milt Ishii, have the free use of the fine Kilauea Gymnasium, and other participants are welcome to attend the once-

per-month meetings.

THE ZAICS ABROAD

Frank and Carmen Zaic recently returned home from an European vacation. John Blagg described a reception for them in England: "Mike Hetherington and I drove round to Hilda and David Bakers' London "magic-house." Names such as Capon, Fairly, Judge, Imrie, Parham, Moulton, Kemp, Barr and perhaps thirty more were there to greet the Zaics. Hilda and her two lovely daughters served endless cups of tea and plates of homemade scones. I found Frank Zaic quite charming and most modest." We feel the same way about both Zaics, and welcome them back to California!

STILL IN EUROPE

Although we reported the results of the Flemalle, Belgium indoor internats previously, Fernand Van Hauwaert, the organizer offers a few post-contest comments and announces another meet for 1985. The event was declared a success, having attracted entries representing France, Germany, Switzerland, Japan, USA, Czechoslovakia, the Netherlands, and of course, Belgium.

One useful idea employed by Uchida of Japan, was a caption on the outside of his proxy-entry model box clearly indicating that the aircraft was in transit for a contest. This eliminated any potential customs problems in a most logical manner.

A series of special awards were donated to the Flemalle contest, by such firms as the Credit Communal of Belgium, the Ad-

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ministration Communal of Flemalle, and individuals including Rene Jossien, F.L. Van Hauwaert, and Jacques Delcroix. And every entrant received an attractive cloth pennant.

Certainly this is a prestigious and well-organized competition that merits support. Now is the time to prepare for Flemalle '85, which will take place during August. Full details may be obtained by sending International Reply Coupons (available from post offices) to: F.L. Van Hauwaert, Grand Place, 1/52, 4110, Flemalle-Haute, Belgium.

CLOSER TO HOME

The 18th Annual Northrop Flying Wing Contest is now history. This event numbers among the most relaxed and enjoyable events of the year. A big attraction is the remarkable variety of entries. With the "deadly serious" aspect of some competitions removed, builders seem much more willing to try innovative designs. Thus, even the non-placers are winners too, in the sense that they attract plenty of interest from the spectators, and enjoy the built-in rewards of trying whimsical and/or radical designs. Flying styles also vary widely, ranging from long-running, slow-flying indoor-style rubber-powered models through rocket-like gas jobs that grab for the sky in no uncertain manner. Winners have ranged from ultra-high to ultra-low aspect ratio layouts, proving there are many possible solutions to any given problem.

A disappointment this year was a short-

age of entries in the scale division, causing Contest Director Carl Hatrak to drop the category for 1985.

An unexpected entrant this time was the "Northrop Wing" (what else?) of *Model Builder's* Editor/Publisher. This beautifully crafted model took off in fine fashion, roared skyward impressively, but descended with equal vigor still under power, terminating in a sudden arrival, rather than a landing. The post-mortem opinions suggested an excess of thrust as the likely culprit, but the ship did bow out in a spectacular style...and appeared repairable.

Editor's note: As I'm willing to publish the "after" photo, I deserve permission to elaborate (that means make excuses).

The design is the "Delta I" from old Aeromodeller plans. I built one back in 1956 to fly while waiting a turn to fly R/C. This was when we all flew on one 27 mHz frequently, 27.255, and with super-regen receivers...only one plane in the air at a time! That first Delta I flew great; had many, stable flights...but I overlooked one important thing...it was powered with a McCoy .049 glow engine. The Cox .049 TeeDee I used on the 1984 model put out about five times as much power! What would have been a mild turn with the McCoy, was a screaming spiral with the Cox! When I rebuild it, I'll either use the old McCoy, which I still have, or I'll install an .020 TeeDee with the prop on backwards!

Although Hatrak reported a \$41 finan-

cial loss on entry fees (those beautiful plaques are costly awards) he said enough fun was had to justify sponsoring another contest in November of 1985.

Results: Towline:

1. Jim Adams
2. Bud Overn
3. C. Lindley
4. B. Wainfan

Gas/Electric: 1. B. Wainfan

- Rubber-Power: 1. Don Larsen
2. Lynne Wainfan
3. Dick Baxter
4. L. Sargent

Scale: 1. Dan Walton (Kansas proxy entry)
WING BOOSTERS

Avid newsletter support for the Northrop Wing event has long been provided by the *Blacksheep News*, edited by Tony Naccarato and Marylou Sberna. Blacksheep squadron members are somewhat unusual in their multiple interests, taking part in free flight, control-line, and R/C events. The Burbank California based group succeeded in proving their expertise by capturing U.S. Nationals trophies in categories including Indoor Cabin, Indoor Glider, E.Z.B., Peanut Scale, AMA Scale, Indoor R/C, Manhattan, Indoor Control-Line, R/C Pattern, Control-Line Carrier, P.30, and Free Flight Electric! There must be a message here...

BERT POND OFFERS

Anyone for compressed-air engines? Model plans? Model airplane and full-size aircraft magazine indexes? Copies of old model catalogs? Frank Zaic Year Books?

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BOREDOM? NEVER!

A dedicated hobbyist never has time on his hands...witness Eddie Rowe, of Endicott, New York, who says: "Can you imagine a retiree who has so many other things to do, he can't find time for all of them? In addition to models, photography, fishing, fossil collecting, gardening... that only scratches the surface. I don't care for the drive that passes for most TV or movies...I now have five kids building models and don't have time for my own!"

Soaring Continued from page 30

PHOTO NEWS FROM GERMANY

To supplement the caption information about the German aircraft pictured this month, Chris supplied the following:

The *Floh* is a V-tail two-meter design by Herbert Ihn. It has slightly swept wings having a 160 mm (6.3 in.) root chord and 140 mm (5.5 in.) tips. The Eppler 212 was chosen as the airfoil with camber-changing capabilities (flaperons), allowing a wide speed range. The model weighs 1100 to 1200 grams (40 oz) for a wing loading of 40 grams per square decimeter (13 ounces per square foot). With stats like these I'm sure it's plenty fast!

Herbert Heil and Ralf Markwort's two-meter is a really high tech design. Its wings are constant chord, 240 mm (9.5 in.), and made in a mold. The skin is a sandwich of fiberglass, foam, and fiberglass. The airfoil used is the Eppler 178. This rather thin section is plenty fast and very stable. What makes this model very unusual, however, is the lack of a spar!

Herbert Heil's *Dohle* is next in line for some details. The sketch mentioned earlier in the column was taken from this particular aircraft. The T-tail mounts on top of the CF pedestal or post. The plane has a span of just over three meters, a root chord of 250 mm (10 in.), and weighs 2.7 kg (six pounds). Chris reports that the German *Dohle* is quite fast, maxes all F3B distance events, and carries weight well.

The stabs are foam core, covered with 0.15-0.2 mm thick fiberglass skins. This combination is very light and adequately strong. Thanks, Chris, for the input!

LAUGHING WHALE "DRAGONFLY"

What has a 48-inch wingspan, Jedelsky wing structure, a ten-ounce flying weight, and a cost to build of less than \$15.00? Well, if you guessed a German *Dohle* you'd be dead wrong. At the other end of the soaring spectrum flies the diminutive *Dragonfly*, a glider so cute you'll want to make up a dozen as door prizes at your next club meeting. Maybe even keep half

a dozen for yourself!

My good friend Phil Mahoney of Lime Rock, Connecticut, did just that...only he gave one to me in the process! Actually, it was in return for sharing with you the techniques involved in covering with Coverite Micafilm. Well, I haven't yet put down my Micafilm experiences on paper, but that's only a few months away (I have an Old Timer to cover, and that's going to be my test bed). I could tell you a few things right now based on my prior working knowledge of the stuff (I like it.), but I'll wait to do the subject justice.

To make a long story short, Phil and I both thought you all should know about this dandy little glider designed by Ed Stinson of The Laughing Whale, whose scale boat designs are so well known.

The *Dragonfly* is a quick-build, school-yard sailplane. We have contacted Ed, and full-size patterns and a perspective drawing are on their way. We'll publish the *Dragonfly* as soon as we get all the material together.

FIBERGLASS MOLD TECHNIQUES

Back in the April and May, 1984 issues, I wrote a series of step-by-step instructions for making fiberglass molds and fuselage parts. Two of the letters I received in response to those two articles contained added information which I would like to include here.

The first letter is from Brad Markin, of Burbank, California. Brad writes: "I am writing in regard to your articles on fiberglass fuselage construction. I have built fuselages in much the same manner, but



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with one difference: in preparing a plug or a mold before laying up the glass, I have always waxed first, then applied the PVA (mold release). The nice thing about the PVA is that it is water soluble. With a deep draw mold (most likely not a sailplane fuse) it can be very difficult to remove a part. A little warm water between the mold and the layup will dissolve the PVA and the part will pop right out. I have made parts (again, not sailplanes) that could not have been removed if not for the PVA. Obviously, your method also works well, but it seems to me that some of the PVA will be wiped off, and the rest covered up if waxing over it, preventing the PVA from really doing its job. I have never seen a pattern (drips, streaks, etc.) in a part from the PVA being directly next to the glass. Your method might also allow the wax to be washed from the mold, which is not desirable, as the more a mold is waxed and used, the better it gets. Ask ski boat builders!

"When removing a part, the PVA is washed from the part and mold, and only the PVA need be applied to the mold for the next layup, waxing again after five to ten layups.

"One last tip. If using HydroCal as your mold, before waxing it for the first time, apply three to six coats of thinned orange shellac to the mold. It will seal the mold and make waxing much easier. Even when brushed on, I have never seen brush strokes from the shellac in the part.

"Everyone does things differently, and I would appreciate your opinion on my methods."

The reason I chose to apply the PVA first, and then the wax, is that I could never get the darned PVA to quit beading up over the wax when I tried it the other way. If you have access to a spray gun, then it is possible to mist-on several very light layers of the PVA without any beading up over the wax. I don't have the spray equipment, so I work PVA first, wax second. I can't see how this reversal of layers would change the warm water part removal trick, it should work either way. It is a good thing to know in case of a sticky part.

When I made my one and only HydroCal mold, I used a thin layer of vaseline as a mold release over the plug. When the heat of the chemical change from liquid to solid occurred, the vaseline impregnated the plaster a little bit. When I went to apply the shellac (not mentioned in the original article) the shellac beaded up (again) and in general wouldn't behave. When it dried, it was too easily pulled away from the plaster, leaving an unusable mold! Perhaps if I had used some MEK to remove the greasy Vaseline from the pores of the plaster, it would have been OK, but you know what they say about learning from experience...and hindsight!

If you are looking for a way to make a mold cheaply and quickly, I would recommend the HydroCal technique. Back issues are available through **Model Builder**

for \$2.50 each including postage, except for overseas (Check ad.).

The second letter comes by way of Philadelphia, Pennsylvania. Bob Mackay writes, "I have been experimenting with various mold release agents from polyvinyl alcohol (PVA) to dry lubricants. I recently found one called MS-122, available from Miller-Stephenson for only \$4.15 per 16-ounce can, postpaid. It is available in two formulas: MS-122 (blue can) and MS-122R (\$4.30) for those who like a dye (red) included to aid visualization. Believe me, a very light dusting is all that is required. Also, it does wonders on pushrods and other dry lubricant applications. Your imagination is the only limit!"

Bob continues and says that this price applies for one to four cans on a "sample" basis through their "advertising program." Contact: Miller-Stephenson Chemical Co., Inc., George Washington Highway, Danbury, CT 06810, (203) 743-4447, or in the Los Angeles area contact: Miller-Stephenson Chemical Co., Inc., 12261 Foothill Blvd., Sylmar CA 91342, (818) 986-4714. If you live in the Midwest, contact the same company at 6348 Oakton St., Morton Grove, IL 60053, (312) 966-2022.

It should be noted that these prices were pulled from an April 1, 1983 pamphlet which stated "All prices subject to change without notice." So if you can't find this stuff at the hardware store, and you want to order some directly, you'd better call first!

NEW CROSS COUNTRY SHIP

While at a recent SC² contest hosted by the North (San Diego) County Clouds soaring club, I had a chance to talk to Dean Clark of Lutmi Enterprises. He came down from San Luis Obispo with his *Hijinks* glider and a few catalogs from his company. We talked about cross country soaring for awhile when Dean asked me if I'd heard about the new *Vygeur* sailplane that he was marketing. He handed me a catalog, and I turned to the appropriate page.

Quoting from the catalog: "This high performance cross-country sailplane combines good looks and excellent flying behavior. It is one of the smoothest sailplanes to fly. Tip stalls have to be forced. *Vygeur* has a wide speed range.

"The wings are polyhedral...in three pieces for easy transport...with flaps in the center panel. The wing spars are capped with carbon fiber and are fully shear webbed.

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Specifications for this sailplane read: fuselage, 78 inches; wingspan, 16 feet;

surface area, 1881 square inches; aspect ratio, 22 to 1; wing loading, (minimum) 11 oz/ft², (maximum) 13.5 oz/ft²; control functions, rudder, flaps, elevator (spoilers at builders option).

The semi-kit goes for \$150 and includes two-piece epoxy fiberglass fuselage (front and wing fairing), plywood tail cone, foam cores for wings and stabs, and full building instructions.

The full kit includes all of the above plus: balsa sheeting, rudder and tips, spars, and all necessary hardware. For these extras, the price goes to \$225.

It might be noted that the photo included with this article was taken at the Western Great Race this past July near Taft, California, and that the plane being held by Dean appears to have less taper in its wings than the catalog three-view. Perhaps the airplane in the picture was merely a prototype, because the fuselage and stab are identical to the *Vygeur*. Anyway, I like the looks of the three-view much better, and that is the way it is being kitted.

If you'd like more information, write to Lutmi Enterprises, P.O. Box 1697, San Luis Obispo, CA 93406. Prices quoted above include shipping and handling. Dealer inquiries welcome.

BOBBY GERBIN, AMA JUNIOR WINNER

In all the coverage of the AMA Soaring Nats I've read, I haven't seen much mention of this fine young flier, nor have I seen his picture. I'm referring to Bobby Gerbin, of Anaheim, California. Here is the one flier in all the Nats to win three first place trophies! Now, I don't know if there were other fliers who achieved this same goal in other events, but no other R/C sailplane pilot did.

Bobby flew his trusty LJMP *Icarus* two-meter in the Two-Meter and Standard class events at Reno. For the Unlimited event, he switched to his venerable Pierce Aero *Paragon*. He won all three Junior events. Now don't you agree that we should recognize achievements such as Bobby's? I knew you would agree.

AIRFOIL OF THE MONTH: SELIG S3010-103-84

Attention all hand-launch glider designers! This 'foil's for you. Quoting the developer of this section, Michael Selig, "In viewing the Theoretical Boundary Layer Summary Table, the S3010 is expected to operate efficiently at very low Reynolds numbers. Because of this, it is well suited for R/C hand-launch gliders." The airfoil is 10.3% thick and close enough to flat-bottomed to be easy to build. Let me hear from you if you build a model around this airfoil, okay?

Well, that's it for another month. Stay close to the magazine rack of your local hobby shop for future issues of *Model Builder*. Please note my address for any and all mailings: Bill Forrey, 5815 E. La Palma, No. 281, Anaheim Hills, CA 92807.

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Indoor Electric .Continued from page 52

and the cameramen were in place and Birdy (Mathew) was at the front of the room. The windows had been frosted with spray. Outside, huge spot lights shown in through the frosting. "Birdy" sat on the edge of the teacher's desk. At the directors queue he started his lines and I launched the model off camera. It flew into view as "Birdy" said, "A bird can take flight whenever it chooses." The schoolmates watch the flapper in amazement and chatter as it circles over their heads. Again and again we did the scene. The rubber mo-



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tors were getting 20 winds, one after another. For 2-1/2 hours we did the scene where the flapper crashes into the window, falls to the floor and the students all laugh. The heat was so intense that two of the big lights exploded, sending a shudder throughout the room. Finally, at 6 P.M., the director said, "Cut and print." Everyone went out to the grass school yard where a complete dinner was waiting for us. I sat across the table from Mathew and Al (the other lead). Back at the hotel I turned the six used models over to the "Birdy" people. The next day I flew back to L.A. without the flappers. A month later I received a handsome check.

The film was released in December of

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'84 in New York and Los Angeles. By now it should be playing in your local theaters.

The best part of it for me is that I got the credit line I had asked for when we started the picture. Go and see "BIRDIE" if you can and let me know what you think of it.

HAIL COLUMBIA

Latest word from Ed Whitten is that the Columbia University flying sessions are on again through March of 1985. For information on dates, call Mark Ferguson 212/280-6972, Ron Williams 212/722-5262 or Ed Whitten 212/724-0282.

Larry Peters advises that Glassboro, New Jersey State college indoor flying is possible in January and March. Call Larry at 601/887-1404.

The 2nd World Inter-Gnats proxy contest is looming on the horizon. This meet for 8-inch models is great fun and a real challenge to send in your airplanes to be flown by the expert modelers at the MIA-MA club in Florida. The competition will be worldwide. For details, contact Doc Martin at 2180 Tigertail, Miami, Florida 33133.

Work continues on the doors at Hangar One at Lakehurst NAS, N.J. A full schedule is expected for 1985. Call Dan Domina at 609/448-2840.

REMEMBER MUSELAGE

When I was a kid in school we used muselage in the familiar glass bottle with the red rubber tip. It was mostly to glue paper to paper. Well, I guess it's still

around. Mr. Jean Andrews, helicopter pilot and indoor modeler tells me he is using it to attach condenser paper to indoor duration models. He cuts it half and half with water and reports that it works great. Most of the weight evaporates away when the water disappears. Worth trying.

Speaking of cement, some of us remember the little bottle of clear cement that was enclosed in every Megow kit in the '30's and '40's. A small cork was stuck in the top. The strange thing was the smell of this glue. I haven't noticed a cement since with this same pungent odor. Does anyone know what was in this concoction? The 1940's also bring back memories of those 5 and 10¢ Japanese silk and wire rubber planes. The wheels were punched out of thin metal, I remember. I used to fly them from our front porch. Do you suppose there are any of those little planes still around? I sure would love to own one. Many times, I've told my son Chris about the great fun we had with them.

Please send photos for this column and comments to: Ken Johnson, 10927 Andalous St., Granada Hills, Ca. 91344

Electronics . . . Continued from page 38

John's modifications to Fritz's and Joe's circuits will probably cure some problems in some applications, and they are presented here as received. They are interesting; be sure to take a close look at them...right after you read "Dear Jake!"

MR. O'HARA'S BATTERIES

Back in the December column, we discussed some problems that a P.M. O'Hara in Minnesota was having. It seems that he had run into a couple of packs with leads broken off, apparently burned. A couple of readers had some comments on the subject. First to be heard from was Larry Sribnick, of SR Batteries, who wrote:

"Naturally, I read with great interest about the problems Mr. O'Hara was having with his wiring. Mr. O'Hara did not contact us about finding "burned" and "scorched" leads in his SR and Futaba packs, or we would have tried to solve the problem for him long before this.

"I think you came to the right conclusion about the probable cause of

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broken wires being mechanical failure for other brands of packs. Many packs have little or no strain relieving on their internal wiring, and slack in the wires inside the plastic case allows the wiring to move around from vibration, causing the leads to fatigue and eventually break.

"However, vibration proofing a pack is one of SR's major concerns. The connector leads on all of our packs, as well as the welded steel straps between cells, are heavily strain relieved so even a direct and deliberate pull on the lead will have to break the strain relief before any load is put on the solder connections themselves. In addition, the heavy Polyolefin outer covering we use on our packs is designed to compress the wiring against the cells so that no movement can take place which would eventually cause the leads to fatigue.

"Like you, I doubt that Mr. O'Hara's MEN charger could be so out of adjustment that it would be causing the problem, but his reference to "burned" and "scorched" wiring, covering, and foam seems to indicate that the cause is electrical rather than mechanical. As is always the case, if Mr. O'Hara would like to send the SR and Futaba packs to me, we would be glad to repair them and try to determine the cause of the problem. In the almost three years of SR Batteries, no one has ever reported a broken strap between cells or a broken connector lead, so I am more than interested in solving the problem for Mr. O'Hara.

"By the way, we don't recommend the MEN charger for our 150 Series packs because our tests showed that the charger would go to low rate at only a 50% charge and we were concerned that people would leave the pack on charge at the low 40ma charge rate too long and overcharge the pack. A rate of 40ma will charge a dead pack in only six hours. With any other charger I would have suggested a resistor in the charge lead, as you have mentioned in your column, but I didn't know how the resistor would have affected the high rate cut-off circuit of the MEN charger.

"Let me know how we can help."

On the same subject, we heard from Cal Malinko, of Rialto, California, who wrote:

"Concerning your column in the Dec.

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MB, I think possibly you may have missed the boat slightly in describing the correction for a problem a fellow was having with broken or nearly broken wires in his battery packs. I read some time ago in one of the R/C magazines (If I remembered where, I would tell you) that it is a characteristic of Ni-Cd packs that the enclosed wiring becomes corroded and brittle after a time, due to chemical action. The end result is a broken wire. I did not believe this at first, but since then have been told the same thing by a number of knowledgeable people. I had thought that a 'sealed' Ni-Cd cell was really sealed, but I guess not.

"Incidentally, I believe I met you at the scale flying area during the Reno NATS; I was the guy who needed a screwdriver to fix his glasses."

There is little I can add to Larry Scribnick's comments on the subject. Unfortunately, I seriously doubt if Mr. O'Hara still has the subject packs in a damaged condition so that he can send them in to Larry for the evaluation that Larry so kindly offers to do. So we'll probably never know. But if anyone else should run into a similar problem, or any other with SR batteries, please rush the pack off right away without repairing it, Larry may learn something that will benefit all of us.

I did include a lot of conjecture as to what the cause of this problem might be in the December issue, so I won't repeat it here. One thing it isn't is the corrosion that Mr. Malinko mentions...which in-

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identally Cal, you read about in this column, referred to as the Black Death, back in November 1983. This corrosion does occur, and it will eat wires to the point where they will break, but for some unknown reason it does this only to the negative, or black wire. The phenomena was later referred to in one of the British magazines, called therein the "Black Wire Blues." On that end of the pond, the writer had even obtained some battery engineer's opinions on the subject, the consensus being that it was related to high rate or over-charging. But it only happens to negative wires; the O'Hara problems were occurring with positive (red) wires!

I do have some late input to this nega-

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tive corrosion problem. As stated, it is believed to always be connected or caused by charging, but I have since run into a case to disprove this. I use Ni-Cds to power my camera's strobe light; using a pack which drops in and connects via two spring loaded contacts. Every now and then, the unit will quit, due to corrosion on the negative contact, which must be cleaned off before it will work again. Now, the packs are not charged through these contacts, and as a matter of fact are not even charged in the strobe. So whatever the cause is, it has to do with the current flow through the negative conductors and to the first break, I have seen wires in transmitters completely affected by this corrosion from the battery to the switch, but no trace past.

Weird! And it could happen to you...especially in your older equipment. Look for fuzz around the negative terminals of the battery, and if any is present, push back the insulation on the wire. If it is not clean and shiny, but black or black speckled, you've got a touch of the Black Death, and the only cure is to replace the entire wire from the battery to switch, plug, or whatever.

So now you found out that I also fix eyeglasses in my spare time! Cal M. also sends in another interesting piece of information about the Super Cycle, for which we are still furnishing schematics:

"One of the timer motors quit in my cyclor, and I asked L.R. Taylor, the present

manufacturer of the Power Pacer (not the cyclor I have) to provide a replacement. They did, and it works, but now I have to multiply the indicated time by 2/3 to get the correct timing!"

This ought to serve as a reminder that in spite of the obvious similarity in the way the two units look, the old "Super Cycle" and the presently available Taylor "Power Pacer" are not the same nor are they made by the same people. Cal's hint is worth remembering though, it is better to have a 2/3rds reading timer than one that doesn't work at all.

I hate to shatter a myth that most of us have lived with all our lives, but there are doctors around with legible handwriting. The following note came in from H.W. Wong, an MD in Eugene Oregon...I didn't have the slightest problem reading it. And yes, it WAS handwritten:

"Can I use the M.E.N. C-50/4 (charger) to charge the Rx and Tx packs in my new JR (CIRCUS) Century VIII pattern radio?"

Fortunately, the Century Seven which belongs to a friend in Mexico and which I wrote about in the January column was here at the time the Doc's letter arrived, so I was able to run a couple of tests for him. The bottom line is "Yes!"

As mentioned back in January, this transmitter is unique in that a fuse is included in the battery circuit, which will go if any attempt is made to fast or quick-charge the battery. The M.E.N. charger works slightly different, in that it sends

short pulses of high voltage to the battery, which apparently due to their short duration are safely carried by the low current capacity fuse.

To test this out, I first charged the battery with the system tester, and dropped it with my Ace Digi-Pace to establish the normal capacity. Then, I charged it with the C-50, and again dropped it to see if it had charged to the same level as before. Not enough difference one way or another to worry about.

Why should any difference be expected? Well, in addition to the fuse mentioned, the JR radios have diodes and/or rate setting resistors in the charge circuits. The diodes prevent testing the installed batteries with either voltmeters or battery dischargers. In my testing mentioned above, I discharged the battery directly through the plug installed on it, before it goes through any other circuitry. It is possible that these added components would upset the M.E.N. charger's sensing, but apparently they don't. I would like to mention, though, that this charger does not resort to trickle charging once the LED goes out. That is, it does not drop to a rate low enough for safe continuous charging, it should be removed after the normal fourteen to sixteen hour charging period.

ELECTRONIC SWITCHES

We hear from ski country...Bruce Augustus writes from Sun Valley, Idaho:

"Always enjoy your column...it's the surest place for me to find a discussion of something I know nothing about: electronics. Anyway, what I understand, I like.

"A technical question...I build old timer ignition models and use a servo driven micro switch to kill the engine. Seems primitive...is there some way to rig a switching circuit direct to the Rx to cut off the ignition (3V, about 1 Amp.)? Such a system would eliminate the weight of one servo and micro switch and reduce drain on the flight pack. It would be perfect to operate it from the throttle circuit, but any one will do."

Well Bruce, such circuits do exist, and we've published two of them in recent months. One was by Fritz Mueller, to which you will find an update this month. It originally appeared in January 1983. Another circuit, this one by Floyd Carter, appeared in the April '83 issue. They are slightly different in circuitry, but both accomplish the same thing; they work off the receiver pulse to operate a relay, which in turn can do either "ON" or "OFF" switching as desired.

Unfortunately, the circuits involved are relatively complicated, and the savings in weight is not that great, actually on the order of grams. In this case, when turning something off is the only requirement, there is another approach...not any less primitive, but it will save the weight of a servo. It involves the use of a Push-On/ Push-Off switch, a type of switch which works exactly as it's name indicates. One could be rigged to operate so that a momentary application of FULL control of one of the channels would operate this switch from "ON" to "OFF."

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rated at 3 amps which will certainly do the job; No. 275-1565. There is also a smaller one, No. 275-1555, that merits a second look. In use, they can be mounted adjacent to the servo so that the arm presses on the button, or remotely with pushrod operation. Try one Bruce, they are guaranteed to turn you on...er, off!

Talking about ski country, you guys up there sure are lucky, getting that nice long building season every year. Even Mitch, who lives up in Washington gets a chance to build. Us poor Californians are forced to fly all year long...DARN!

ELECTRONICS CORNER BOOKSHELF

For those of you who are interested in electronics in general, Radio Shack has recently released a new book which you will find useful and interesting. It is entitled, of all things, "Getting Started in Electronics," bears part number 276-5003, and is reasonably priced at \$2.49.

The book starts off as basic as you can get...back there with Ben Franklin, but rapidly gets into modern solid state electronics and describes many of the components and much of the language used in current(!) electronic equipment, much of which we see in R/C. Actually, except for a few IC's such as servo amplifiers, encoders, and decoders, which find uses only in R/C equipment, all of the other components and most of the circuitry we use is common to electronic equipment in general.

The book is illustrated only with sketches and line drawings, but they are all clearly done and are a great help in understanding the subjects they describe. It'll serve as a good reference, and even includes some circuitry which might find it's way into your modeling, such as light flashers and voltage level indicators.

Some of the Radio Shack components are over-priced, though they do make up for it in availability, but this is one product that is well worth the asking price! •

Gossamer Continued from page 21

An airfoil with a reflexed trailing edge (S-shaped camber line) is stable. A wing made with a reflexed airfoil will fly stably alone as a "flying wing." Some of us have built and flown control line combat or RC flying wings with symmetrical airfoils (which should have zero stability), but don't forget the elevator! Because we balance the plane with the CG ahead of the center of lift, we must use up elevator in order to fly level. That up elevator acts like a reflexed trailing edge, and we have a stable flying wing.

In a conventional airplane, the down-load on the tail replaces a reflexed trailing edge on the wing, making an airplane with an unstable wing section stable as a total system. Here, however, the "reflexed trailing edge" (stabilizer and elevator combination) is way back and separated from the wing by the aft fuselage (the tail moment arm). An aerodynamist refers to a large horizontal tail area times a big tail moment arm as a large "horizontal tail volume coefficient."

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cient." The larger the horizontal tail volume coefficient, the more stable the airplane. (It is called tail "volume" coefficient because it consists of an area times a linear dimension.)

Free flight modelers, however, use lifting tails. How can a lifting tail look like a reflexed trailing edge and produce longitudinal stability? The answer lies in the fact that the tail doesn't actually need to have a negative camber (reflex) or a negative angle of attack so as to produce negative lift. It can provide stability if it has positive lift but less lift per unit area (less loading) than the wing. Stated another way, the forward surface must operate at a higher lift coefficient than the aft surface in order to provide a stable airplane.

What about canards? The same laws apply. The forward horizontal surface or foreplane (I refuse to call it the tail, because tails are behind) must have greater surface loading (greater incidence and/or more camber) than the aft surface, the wing. However, we can

make that forward plane as large as we want (and move the CG way forward to keep it stable).

If we make the forward plane the same size as the rear plane, we are halfway between a conventional airplane and a canard. Now we don't know which is the wing and which is the "tail", so we simply call it a tandem airplane. Tandems can also be made completely stable, again, by the same rules. The forward wing must be more heavily loaded than the rear wing. Therefore, if the areas of the two wings are equal, the CG must be ahead of the halfway point between the forward wing's 25% chord point and the rear wing's 25% chord point (mean aerodynamic centers). The farther ahead the CG is, the more stable the airplane with any configuration (if we have enough elevator to keep the nose up).

So, knowing that I can make any configuration stable, what configuration did I choose for my ultra-slow RC flying machine? The problem turned out to be far from simple. I wanted to eliminate

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the landing gear and to hand launch it, thus making it lighter and consequently slower. I wanted to make it a safe airplane; one which would strike a person without injury. The low kinetic energy is part of that solution, but I didn't want a meat slicer up front either, so I wanted it to be a pusher airplane. It should be very light, have lots of lifting area, and operate at a very high lift coefficient, in order to fly as slowly as possible.

Someone said, "A flying wing ought to be a good choice, because it has no fuselage and no tail, therefore it would be much lighter". Yes, but lightness is only part of the slow game. Actually, a flying wing is one of the poorest choices for an ultra-slow flying machine. The problem is that because a flying wing has to have a

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reflexed trailing edge (low net camber) to be stable, flying wings are stuck with low maximum lift coefficients, and therefore, they have to fly faster for a given area and weight.

Why not use a conventional wing-in-the-front pusher configuration? At first glance, two reasons why not: 1) it is difficult to balance a pusher without a big fuselage nose moment arm, and long noses weigh ounces, increasing the minimum flying speed; and 2) a normal, aft stabilizer flies with a little download. The wing has to lift not only the weight of the airplane but the download on the tail, therefore, higher wing loading and higher minimum velocity.

Let's change that parasitic tail into one that contributes some of the lift so we can fly slower. So how about a canard? The foreplane of a canard lifts. But no, a canard doesn't look optimum either because the canard foreplane must operate at a higher lift coefficient than the wing for stability, which means that the Cl of the wing must be less than we could otherwise make it, to keep it below the Cl of the foreplane. Less unit lift in the wing results in higher minimum flight velocity again. For minimum speed we must get maximum lift out of the biggest area, the wing.

There remains the tandem configuration. A tandem with two equal wings must balance about 40% (from the front) of the distance between the mean aerodynamic centers of the two wings. The power plant I intended to use, a .10 with prop, muffler and two-ounce tank of fuel, weighed twice as much as my Cannon Super Micro RC gear with three servos and a 250 mah battery. Again, I had a balance problem with a pusher design. I couldn't get the CG far enough forward unless I put the RC gear in the front of a long (heavy) nose. Did I give up on the pusher idea and go tractor? Not yet. The safety of a pusher was important to me on this project, and

clean (non-goopy) airplanes are nicer, too.

Most designs consist of a series of compromises. This one was no exception. A pure canard wasn't promising, and an equal-wing tandem design wasn't good for different reasons. So, I built the *Gossamer Slow Poke Mark One* as a compromise between the two, a pusher canard with a very large foreplane (or a tandem with a front wing smaller than the rear wing). I still couldn't balance it without a fairly long nose moment arm, using a .10 engine, but it looked like it would balance with a G-mark .03 engine. To get the thrust needed to fly at the very low L/D available near Cl max, however, I put a Kress Technology, Inc. GP 020 Geared Prop Drive Unit on the G-Mark .03. This raised the power plant weight to 3.6 ounces, but left it below the .10 power plant weight.

For a very slow model, a gear drive is an efficient way to go. We don't need much power. Remember, power is thrust times velocity, and our velocity is very low; however, the drag of the big wing at the high lift coefficient is also high, so we need considerable thrust. Big gear-driven props provide much more thrust than direct drive, small props on the same engine; nearly 50% more thrust with a 2:1 gear reduction. For more data on this subject see Bob Kress' article, "Geared Props for Schoolyard Scale" in the July 1982 RCM.

The prop should be as low pitched as you can buy (usually four inch pitch). Even four inches is twice as high as it should be for ultra-slow models; but if there is adequate power and torque, a four-inch pitch is OK. It is, of course, a fact that to fly ultra-slowly (near the stall) requires more thrust than to fly the same plane somewhat faster. As the velocity decreases, the lift coefficient must increase to keep lift equal to weight. Unfortunately, the drag coefficient increases very rapidly at the higher lift coefficients (high angles of attack). The higher drag coefficient has more effect on the total drag than the decrease in velocity has. In other words, the lift-to-drag ratio is much poorer at high angles of attack. There is a most economical (max range) speed to fly any airplane, but it is neither the fastest nor the slowest speed the plane can fly.

Let's look at filling the requirements for a high lift coefficient. Lots of camber in the airfoil, but optimum model high-lift sections don't always look like full-scale high-lift sections, especially when we are trying to fly ultra-slowly, because of the very low Reynolds number (no relation) of the very slow flying model. For very low Reynolds numbers, we need a thin airfoil and a sharp leading edge (see article by Ted Off on page 23 of the February 1975 *Model Builder* magazine). When we have lots of camber on a thin section, we end up with "undercamber," like a bird's wing.

We can do better than a simple, highly-cambered section, though.

Continued next month . . .

with any .1 volt change. It would be easily and accurately read.

Things being what they usually are, the values we are interested in for R/C work are not as neatly even mathematically, but the same principles can be used. We thus expand a portion of the meter's scale to indicate only the nominal voltage to be read, plus or minus a practical small percentage. This has been done by Ace R/C in the design of its "Voltmaster", a precision Expanded Scale Voltmeter which has the following voltage ranges:

- 4-Cell — 4.5 to 6.0 volts
- 6-Cell — 7.0 to 9.0 volts
- 8-Cell — 9.0 to 12.0 volts
- 10-Cell — 11.2 to 15.0 volts

To closer simulate the actual working conditions of the batteries under test, the "Voltmaster" also provides a load, selectable between 200 or 500 milliamps, which can be applied as desired, at the press of a button.

The Ace R/C Voltmaster, like most Ace equipment, is available in both assembled and unassembled versions. If yours is the former, you need only to read the few ideas presented here, the operating instructions furnished by Ace, and you are on your way to additional Ni-Cd battery reliability.

If you've obtained the kit version, you are only about one evening's work from that same point. The kit is relatively simple to assemble, the instructions are clear and concise. All of the components are mounted on a single high quality printed circuit board, and except for the physical orientation on one integrated circuit and a couple of diodes, only correct soldering techniques need be observed.

I will pass along a couple of suggestions learned from many hours over a hot soldering iron. When installing components with printed-on identification, or values, install them so the markings are up and visible for later checking in case of problems. In the case of resistors, it is best to place them so the color markings read from left to right, or top to bottom, for the same reason.

In the assembly of the Voltmaster, shrink tubing is installed in a couple of steps . . . you are instructed to apply heat with a cigarette lighter. Yeeck! For a neater and cleaner job, and for non-smokers, use your Monokote heat gun.

Later on, you are to secure the meter in the case; the recommended method is to glue it in with silicone rubber. My choice for all such jobs is Sonictronics, double-stick, "Crazy Tape". It holds just as well, with none of that sticky residue running out and getting into every place it is not supposed to. Also, very importantly, it secures instantly, no need to wait for any goop to cure.

And last but not least, when soldering to this and all other plastic case meters, use a heat sink (an alligator clip will do nicely) between the solder joint and the meter case. This will prevent the melting

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of the plastic around the terminal if you get a little heavy handed with the soldering iron. And oh, it is a small iron you are using, right? My Voltmaster was assembled using a 12-watter, which provides more than enough heat for the small components involved.

Following the parts identification and location information, and the step-by-step instructions, your Voltmaster will be complete before you know it. Calibration is required, but the procedure is simple and requires only a voltage source, which can be simply a fully charged 4.8 volt battery, and an accurate voltmeter. The Voltmaster will be only as accurate as this calibration step, so if at all possible, use a digit voltmeter for this step. The whole procedure is clearly explained in the instructions, requires less than five minutes, and needs to be done only on one range, the use of low tolerance resistors throughout assures accurate calibration on all of the other ranges. Calibration of the battery load function is automatic, and not otherwise required.

Circuitwise, the Voltmaster makes use

of a dual op-amp, one half of which is connected as a voltage follower, and the other as an imbalance detector. The incoming voltage is compared to an internally generated reference voltage, and the difference causes a proportional current flow in the meter. The results are extremely good accuracy, dependent on the initial calibration, and a high degree of stability.

Connections to the Voltmaster are made through spring loaded connectors on top, which may be readily changed as the need arises. The versatility of the instrument can be increased by having a set of cables with the proper plugs to mate with your R/C system, as well as ending in small pins which can be inserted in other connectors or placed directly against the contacts of uncased cells. The connectors are color coded to minimize reverse connections, and it is a good idea to also color code leads and cables. No damage will occur to the Voltmaster or Ni-Cds in the event the leads are reversed.

Though the Voltmaster is not exactly delicate, all such instruments should be

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treated with care and respect, which involves not throwing them unprotected into the bottom of the toolbox. I found my local camera store a good source of small leather or plastic zip-up cases, one of which was purchased in just the right size to hold the Voltmaster and its associated leads and cables.

Actual use of the Voltmaster, as well as some important information about the characteristics and idiosyncrasies of Ni-Cd batteries are included in the Ace R/C instructions, and need not be repeated here . . . with one exception; the statement made therein that "it can't do its job if you leave it at home or in the flight box". Amen!

There is one caution however, for those of you still flying with alkaline battery powered equipment. The Voltmaster can be used to test those batteries also, though it'll be a little tight on the four-cell range. However, use the R/C equipment itself as a load, and not the internal load of the Voltmaster. The drain is too high for alkalines, which are designed for lower current drains. At the high drains involved, the cells will all test bad, and are also being drained at an unacceptably high rate.

Learning to use the Voltmaster is simple; getting to use it habitually might not be. You might receive some inspiration from the knowledge that if used as recommended, this inexpensive instrument is someday going to save you an

airplane. And it'll all be worth it, won't it?

Wheelair Continued from page 53

have a straight horizontal cut at the bottom of the cowl from station F-3 aft.

The firewall (engine mount), is cut from 1/16 plywood. Note that its edges should taper to match the fuselage aft contours. Attach the engine to the firewall, first making the holes for the three attaching pins. Put the pins into the engine crankcase and push them through the firewall. Cut the protruding pins so they extend through the firewall about a quarter of an inch and bend them over to lock the engine tightly in place. Put a coat of model cement or epoxy over the bent pin ends. DO NOT use any of the super glues for this. If any gets into the engine you have a disaster on your hands!

Make the three body frames according to the patterns on the plan. The uprights and the cross pieces are lap jointed at the corners rather than buffed to get more glue area at the joint. F-1 may be a little confusing on the plan. It is made exactly like the other two, but it has a balsa block forward of it which is later carved into the forward top of the cabin and a block aft which helps hold the CO₂ filler nozzle. Also the top cross piece of F-1 is deeper than those on the other frames and will later be partially cut away to accommodate the filler.

Cement the fuselage frames onto the sides and add the fuselage bottom panel which is only forward of the wing. Hopefully, the wing structure is already complete so it can aid the fitting of the fuselage bottom to the sides. Now rough cut and hollow the block for the nose. Make sure it fits into the sides and bottom but don't cement it in place until the nose gear wire has been bent and installed in it. Fit the two blocks in the top of the forward cabin, forward and aft of F-1. Cut the clearance required for the filler. Thread the engine assembly through the fuselage/former assembly and cement the filler and its support blocks in place at F-1. AGAIN, DO NOT use any of the super glues here, they can easily get into the filler through capillary action and ruin

things. Be careful not to get any kind of glue or cement into the engine system anywhere.

Cement former F-4 in place between the fuselage sides and add the two 1/16 by 1/8 longerons at the very top edge of the sides. Now cement the firewall to F-4 after cutting some slight notches into the aft surface of F-4 to allow for the engine retaining pins so the firewall can fit flush with the former and the fuselage sides. Cement the bottom of the CO₂ tank to the bottom cross piece of F-2.

At this point it is probably a good idea to try the engine and make sure it can be filled and run.

Now add the fuselage top skin. The grain of the top skin should be crossways to the length of the fuselage. The aft bottom of the fuselage sides are now brought together at the extreme back end. They will have to be cut away where the engine system fuel line tubing loops near the engine, and for the engine cylinder head also. There will now be two roughly triangular shaped gaps between the bottom edge of the engine cowl and the lower aft end in the fuselage sides. Cut and fit two pieces of 1/16 sheet balsa to fill these gaps.

Cut out two engine cowling side blocks to fit aft of the firewall and install them and a rectangular piece of 1/16 sheet between the firewall and the propeller. Now carefully finish shaping the fuselage. Sand the noseblock to a smooth rounded contour. Sand the bottom and top edges of the fuselage to a radius as indicated around the F-2 and F-3 body frame patterns. Carve the forward top cabin block to shape. Sand the aft engine cowling to fair with the firewall contours.

Now cut out the instrument panel former and install it in the front of the cabin and add the 1/32 sheet combing on top of it. Color the area forward and above the instrument panel flat black. Add the 1/32 thick sheet balsa engine air inlet to the top of the fuselage.

Give the entire fuselage assembly a careful sanding to get it as smooth as possible. Give it a couple of coats of sanding sealer and a coat or two of dope. Do the same things to the tail boom plugs.

Cover the model with Japanese tissue. The original Wheelair 111-A was red and white. The basic surface color was white, so the wing and tail surfaces of the model in the photos were covered with white tissue. Movable surfaces and leading edges of the wing and horizontal tail was red and these were double covered with red tissue on the model as were the vertical fins, leaving white the horizontal stripes on the two verticals.

The registration "NX31223" is cut from red tissue. The letters are .8 tall, .6 inch wide and have .1 inch stroke widths. They are doped onto the outboard wing panels, right top, and left lower surface.

The fuselage sides below the windows was painted white with pigmented dope. The fuselage top and bottom, the tail boom assemblies, and the wing tips were colored with "Staedtler" red felt pen for acetate.

Install thin clear plastic windows and

windshield before the wing is cemented to the fuselage.

Final assembly consists of cementing the wing to the fuselage, the tailbooms to the wing, and the horizontal and vertical tails to the tailbooms. Make sure everything is done as accurately as possible. The original model tended to turn quite tightly to the left on its initial flight and required right rudder to correct the flight pattern, so be careful not to get any left rudder bias into your assembly. It might also be advisable to only lightly cement the horizontal tail in place so it can be shifted if necessary for pitch trim.

About 3/32 of washout is indicated in the side view of the wing. This seems to work out OK on the model, and is also about the way this wing structure tends to warp when the tissue is shrunk and doped. If your model turns out with significantly more or less washout or if the two wings differ, warp the wings in the heart of a hair dryer or over the stove to match the plans. (If you do it over a gas stove, keep a hand between the flame and the model and don't burn yourself... then you for sure won't burn the model up by accident!) the model should balance at station F-3.

Another nice thing about the Brown CO₂ engine is that it can easily be adjusted to run at low power settings for test flying. If you have an area of tall grass available, otherwise over an area of smooth ground, try gliding the model power off. It should glide in a smooth straight path to land about 12 to 15 feet ahead of you if launched about four feet high. If it dives, set the horizontal tail a little more for airplane nose up, and contrarywise if it stalls. Now set the engine so it runs at a very low speed. It should be putting out just enough power to stretch the glide. If the model turns drastically, check for warps or warp the verticals against the turn. If the turn gets worse with an increase in power, insert a sharp blade between the motor crankcase and the firewall and add a thin shim of side-thrust. Gradually adjust the engine for more and more power until your Wheelair 111-A will climb. Maximum duration will be obtained at moderate power settings which are also less risky in terms of aerodynamic characteristics. •

Workbench . . . Continued from page 7

tact Larry at 10274 Briar Creek Lane, Carmel, IN 46302, 317-844-1562 (after 1800 hours), or Dan Brett, 8902 E. 575 South, Zionsville, IN 46077, 317-846-0766 (1000 to 1900 hours).

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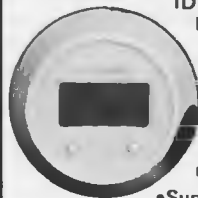
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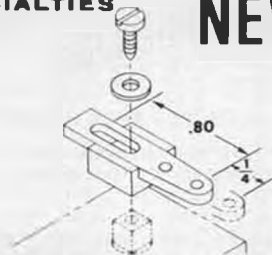
The Free Flight Society announces that the Fourth United States Indoor Championships will be held on June 18, 19 and 20, 1985 at the Niagara Falls International Convention Center Arena. Events scheduled are as follows: Hand Launched Glider, F1D, AMA Stick, Manhattan, Bostonian, Ornithopter, Autogiro, Pennyplane, Novice Pennyplane, ROG Cabin, Unlimited Speed, Peanut Speed, Easy B, Paper Stick, Peanut Scale, AMA Scale, and the MIAMA Peanut Grand Prix. The ceiling is Category III, at 70 feet. Entries must be in by April 24, 1985. If not enough entries are received, THE CONTEST WILL BE CANCELLED!

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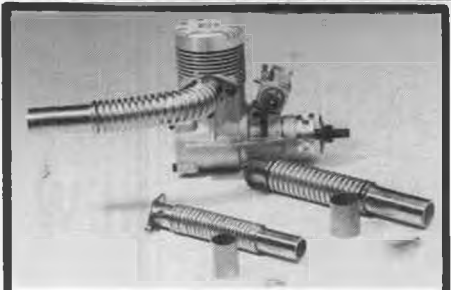
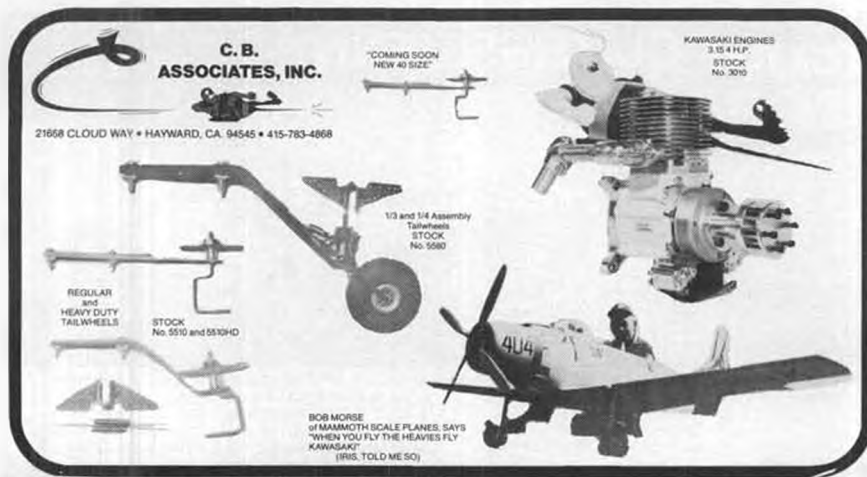
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he came to New York from Ontario in 1927, met his wife to be while she was editing magazines with titles like *Gang World* and *Underworld Romances*. From 1940 to 1942 he wrote radio scripts for "Mandrake the Magician," also wrote dialogue for the Hap Hopper comic strip. In the 40's he also began a series of sports and adventure books for teenagers, which, at the age of 80, he still writes today... when he's not playing tennis. OK, so what did he do in the '30's?

Would the pen name George L. Eaton be enough of a hint? Yes, Charles S. Verral, alive and well today, was the author, under the pen name of Eaton, of the many, famous Bill Barnes Air Adventure novels



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that appeared in the magazine of that title and which later became *Air Trails!*

Bud Overn, of Santa Ana, California, sent us the above information, along with a clipping from the *New York Times*, in which there was a story about Verral's 80th birthday party, with a Bill Barnes theme, that was put on for him by some of his friends. Guests were dressed in '30ish attire or aviator outfits. Slides of magazine cover paintings by Frank Tinsley were flashed on the wall. Suspended in the atrium of the host's town house was a giant Bill Barnes airplane, and a live, radio-style reading of a never broadcast show was performed by his friends and neighbors.

Mr. Verral still writes in the third floor den of his home in New York where he

turned out many of the Bill Barnes adventures. On the wall of the den can be seen the original full-size oil painting for the November 1934 issue by Frank Tinsley...of the "Scarlet Stormer!"

Bud presented to Mr. Verral a Bill Barnes Air Adventurer T-shirt, which he happens to have available in Small, Medium, Large and Extra Large at \$11.50 postpaid (Bud Overn, 1043-C, E. Chapman Ave., Orange, CA 92666) Cal. residents add 6% sales tax. You can also obtain a Silver Lancer rubber stamp for \$8.45, postpaid from George Ardwin, 60 Ely Ave., Box 56, Sabina, OH 45169.

MISLOCATED

In Bill Simpson's report on Pattern at the '84 Reno Nats, he somehow moved Chip Hyde from Yuma to Tucson, Arizona. Walt Husted writes to say that he and other "Yumans" are proud of young Chip, and would like to have him back.

OK...we just beamed him over...He's yours again!

DEBONDER OFFER

For a limited time, Pacer Technology & Resource, Inc., Campbell, California, is offering a free 1/3-ounce bottle of its Z-7 Debonder to every purchaser of a one-ounce bottle of Slo-Zap/CA. Slo-Zap gives you up to two minutes to get loose parts in perfect alignment before it locks everything in place. "It's a high viscosity, maximum gap filling, maximum fillet forming, slow curing cyanoacrylate adhesive that is well-suited to large surface area jobs such as wing sheeting, laminating sections, fuselage doubler construction, and many more."

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AEROPLANE MONTHLY

The following is a PR release that should interest aviation and scale model buffs.

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"The current issue includes a full-scale report on Oshkosh 84, with pages of exclusive photos in color and black-and-white; a 'preservation profile' of a Focke-Wulf Fw 44j Stieglitz: 'Wings of Peace'... a series on between-the-wars airliners, and many other features of the kind which make *Aeroplane Monthly* unlike...and unequalled by...any other aviation journal.

"Annual subscriptions in the USA are \$25 (airfreight service) or \$45 (airmail), obtainable from John Barrios, Business Press International (USA), 205 East 42nd Street, New York, NY 10017."

T.O.C. Continued from page 13

- Dave Brown, USA
 - Douglas Ferguson, USA
 - Tony Frackowiak, USA
 - Steve Helms, USA
 - Gunter Hoppe, West Germany
 - Dean Koger, USA
 - Ivan Kristensen, Canada
 - Wolfgang Matt, Liechtenstein
 - Giichi Naruke, Japan
 - Hanno Prettnner, Austria
 - Steve Rojecki, USA
 - Werner Schweiker, West Germany
 - Steve Stricker, USA
 - Jeff Tracy, Australia
 - Dave Wilson, USA
 - Tsugutaka Yoshioka, Japan
- In addition, the following alternates were invited and were on hand:
- Jim Kimbro, USA
 - Michael McConville, USA
 - Franz Mayr, West Germany

The aircraft flown by the contestants varied from the popular Laser 200 to Steve Stricker's "PT-17," an ancient design that is

definitely not a contender in full scale aerobatic competition.

The Director of the 1984 Tournament of Championships was Mr. Phil Kraft (USA). Phil's invaluable experience includes both R/C and full size aviation. He is a former National and World Champion and former T.O.C. competitor, as well as a designer, builder, and pilot of the well known "Super Fli" aerobatic airplane. Phil is probably best known around the world as the founder of Kraft Systems, manufacturers of radio control equipment.

Chief Judge for this as well as all past Tournaments was the genial Dr. James M. "Doc" Edwards (USA). Doc's career in modeling spans over thirty years; he has competed successfully in R/C aerobatic competition and presently owns and flies a full size Pitts Special.

The other judges were:

- Steve Nelson — USA
- Geoff Franklin — England
- Henry Haigh — USA
- Dave Lane — USA
- Isao Matsui — Japan
- Travis McGinnis — USA
- Don Panek — USA
- Gordon Price — Canada
- LaMar Steen — USA
- Bill Thomas — USA
- Bob Upton — USA
- William C. Weaver — USA

The flight maneuvers are all stated in the rules, and are based on the international "ARESTI" schedule for full size aerobatic aircraft competition. For the T.O.C., the schedule is broken down into four different programs: Known Compulsory, Free, Unknown Compulsory, and Four-Minute Free.

The 1984 Tournament Of Champions was not without it's surprises. The first shocker came when the news was released that Hanno Prettnner's Steen "Skybolt" aircraft did not meet the rules and that Hanno would not be flying this year. This was the subject of much discussion by the multitude of spectators, many R/C flyers themselves, and of course a variety of opinions were heard. In general, it was ultimately admitted by everyone that rules are rules, and that they have to apply equally to everyone.

Franz Mayr, from West Germany, International Alternate, was entered as the next eligible.

The second surprise came on the morning of Thursday the 8th, the first day of competition flying, and it came in the form of wind! Twenty-five miles per hour, with gusts up to thirty-five, the radio said. We did not need to hear the radio reports, as we felt the cold wind and lost hats and everything else that was not tightly secured. We all knew that it was too windy for safe flight.

The next morning, things started EARLY, as flying was scheduled to start at seven A.M. in order to try to make up the lost day. A little wind made many of us fear for the worst, but it soon calmed and we enjoyed a comfortably cool day and similar for the remainder of the weekend.

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while also trying to gauge the competition, ended after three rounds with the following standings:

1. — Kristensen — 13,581.90
2. — Rojecki — 13,579.39
3. — Stricker — 13,429.24
4. — Matt — 13,340.30
5. — Schweiker — 13,252.20
6. — Koger — 13,228.71
7. — Frackowiak — 13,143.60
8. — Naruke — 12,861.70
9. — Akiba — 12,834.10
10. — Helms — 12,803.40
11. — Brown — 12,549.70
12. — Hoppe — 12,468.40
13. — Bonetti — 12,400.74
14. — Britt — 11,333.30
15. — Mayr — 10,677.20
16. — Yoshioka — 10,152.20
17. — Bertolani — 9,639.63
18. — Ferguson — 9,540.10
19. — Tracy — 8,392.89
20. — Wilson — 7,915.71

The first day's results are studied with great interest by contestants and spectators alike, as this is the first indication of the possible outcome. Though everyone knows that it is still early in the game, and most anything is still possible. The first five places, the big money winners receive special attention, and the low difference, 2.51 points between first and second places is noted. Nor is the difference that great between the others of the top five; 150 points between two and three, and 88 between three and four, and between four and five. The first seven places have all accumulated over thirteen thousand points, while all through thirteen have over twelve thousand points. We are all anxious to see what tomorrow brings...and those of us who are not in this Champion class wonder how, or if, they sleep!

Saturday, the second day, proceeded pretty much like the first, good weather and more terrific flying. There is more pressure on the contestants though, as they know that today's performance is crucial and will determine the standings. The top five will fly tomorrow for the big money; places six through twenty will be announced at tonight's banquet and for them the 1984 T.O.C. will be over. The second day's flying, after three more rounds, resulted in the following standings, with points and prize money as indicated

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1. Stricker — 14,535.14 (Biplane)
2. Rojecki — 14,373.52 (Biplane)
3. Kristensen — 14,241.70
4. Hoppe — 13,864.50
5. Matt — 13,855.50
6. Frackowiak — 13,805.90 — \$5500
7. Schweiker — 13,574.50 — \$5000
8. Koger — 13,498.31 — \$4500 (Biplane)



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13. Wilson — 12,869.02 — \$3000 (Biplane)
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15. Mayr — 12,255.50 — \$3000
16. Britt — 11,879.32 — \$3000 (Biplane)
17. Tracy — 11,257.81 — \$3000 (Biplane)
18. Yoshioka — 11,112.30 — \$3000
19. Bertolani — 10,205.53 — \$3000 (Biplane)
20. Gerguson — 9,821.60 — \$3000

Giichi Naruke of Japan received the \$5000 Best Model Aircraft Award, a judge's decision that was probably not

questioned by anyone, as the Super Chipmunk entered by Mr. Naruke was flawlessly constructed, painted, and decorated.

The significant changes after two days of flying are the switching of positions one and three; second place remained constant. After that, with the exception of Frackowiak in seventh place who moved up one notch, everyone seemed to slip one or two places, with some repositioning down towards the bottom. The most important change of the day was Gunter Hoppe, who took a giant step for the Germans, moving eight places, from twelfth to fourth. No one, least of all the contestants can say that any of the preceding days have been "little"; but tomorrow is certainly the "BIG" day!

Sunday morning dawned clear and cool, with no sign of the winds that had plagued and worried us on previous mornings. The pit area looks strangely empty, as only the five finalists and their airplanes are present. There is a different atmosphere at the field... it is time for the flyoff, truly the nearest thing in Radio Control to the Moment of Truth. The contestants check and recheck their equipment, talk over the flight maneuvers with their helpers, study the sky, take that nervous walk to the bathrooms, till finally, the officials call the first flyer, we hear an engine and the first airplane takes to the air... to fly for \$30,000.

After six hard-flown rounds... and a lot of suspense while the final scores are tabulated, the five finalists are announced, points and prize money as indicated:

1. Rojecki — 17,385.65 — \$30,000
2. Stricker — 16,944.49 — \$15,000
3. Kristensen — 16,383.10 — \$10,000
4. Matt — 16,178.10 — \$6500
5. Hoppe — 15,177.60 — \$6000

In addition, Steve Rojecki also received the \$5000 prize money for the highest placing biplane, and the 1984 Tournament of Champions is officially over.

Officially, but not actually, as there is a lot to talk over yet. One of the first subjects is the matter of biplanes. With the ten percent bonus to be gained by flying a biplane, most of us expected to see twenty biplanes; ten percent is a lot to make up by flying skills alone, especially in a group of talent such as was present here.

In actuality, only nine biplanes flew; other contestants, Ivan Kristensen amongst them had brought one, but expecting more of the high winds experienced at the start of the weekend, opted to fly their monoplane as they are supposedly less affected by the high winds. As it turned out, under the prevailing wind conditions, and with the pilots present, there is no doubt that the biplanes dominated the field. For example, had Kristensen flown his primary entry, a Starduster, assuming of course, the same scores throughout, he would have garnered a total of 18,021.41 points... more than either Rojecki or Stricker. Conversely, had the latter two been flying monoplanes, their final scores would have been 15,805 and 15,404.07 respectively, therefore dropping them down to third and fourth places.

Conjecture will continue of course, as there are enough proponents of both single and double-wing design to keep the discussion going. It will be interesting to see what occurs at the next Tournament... as well as to see whether Hano Pretner will continue in this class of competition and if we will once again see him flying in the skies of Nevada.

Airfield entertainment included flight exhibitions by the "Eagle Aerobatic Flight Team," flying their colorful 260 horsepower Christen Eagle I unlimited competition biplanes. The team, comprised of Charlie Hillard, Tom Poberezny, and Gene Soucy, each a champion in his own right, flies an exciting program of wingtip-to-wingtip formation maneuvers that has the crowd alternating between wild applause and gasps of awe.

Just as exciting, though flying a smaller size of machines, are the flight demonstrations by the Kalt R/C Helicopter Team, of Japan. Headed by Yoshiaki Nagatsuka, the team performs all manner of near impossible maneuvers, including a seldom seen rotor-to-rotor hover of two machines, one of which is inverted at the time. The helicopter team's flying was also much enjoyed and appreciated by the crowd.

The crowd... it is hard to believe that an event such as this, that is not open to the general R/C public, can generate such widespread interest. But it does! To see the best of the best fly, spectators were present from all over the world, I personally spoke to fliers from South Africa, New Zealand, Argentina, as well as to countless Europeans. All here to see "toy" airplanes; isn't ours a wonderful hobby?

The Circus Circus Tournament of Champions is held semi-annually, on alternate years with the FAI World Radio Control Aerobatic Championships. Thus the next such event will take place in Las Vegas in November of 1986; Circus Circus Hotel will probably accept your reservations now!

Choppers . . . Continued from page 25

"opened up" to the relative wind. See Figure 4. Note the large angle between the plane of the rotor disk and the incoming relative wind. This large exposure of

the disk to the relative wind increases rpm for only a short time because the flare also kills the forward airspeed, which reduces the airflow through the disk. When the forward airspeed is gone, it's now back up to the inertia of the rotor blades to keep the rpm of the disk, and this is precisely where tip weights come into play. The more tip weight you have the longer the rpm will keep up which makes the collective pitch "cushion" at the bottom more effective. But going too far with tip weight will ruin cyclic response and feel in normal flight, so running blades of pure lead isn't the answer, either...

The flare is so critical because it determines how soft ground contact will be. Flaring too hard will result in "ballooning," where you're left at two or three feet with zero airspeed and zero rate of descent, totally dependent on rotor inertia to cushion the descent that develops as rotor speed bleeds off.

Not flaring hard enough will leave you with the ground still coming up at the helicopter at the end of the flare, necessitating adding pitch prematurely to help stop the rate of descent.

The amount of wind present is primarily responsible for determining how easily the forward groundspeed can be reduced to zero. With 10 knots of wind, the groundspeed will be zero when the actual forward airspeed of the ship is 10 knots. On the other hand, when the wind is calm, the helicopter's airspeed must be zero to give a zero groundspeed touchdown. So for a practical example, let's say the forward airspeed of the model helicopter in autorotation is 20 knots. With calm wind, you must flare hard enough to bleed off 20 knots of airspeed to get zero groundspeed, but with a 10-knot headwind, you only have to flare "half as hard" and bleed off 10 knots of airspeed to give a zero rate at touchdown. What this all means is that the harder the wind blows, the softer the flare will be. When there is no wind, the flare will be harder.

The other variable of the flare is that its effectiveness changes with forward airspeed. With a fast forward airspeed the aft cyclic input is very effective, and it's easy to balloon in the flare. There is also a tendency for the flare to parallel the ground for several seconds as forward speed bleeds off, which erodes precious rotor rpm needed for the touchdown. See Figure 6.

With slow forward airspeed, the aft cyclic input will become "mushy." "Normal" amounts of aft cyclic will not break the rate of descent, so more than normal cyclic will have to be given to keep the flare effective (Fig. 7). You want to shoot for a forward airspeed which is "just right" (obviously). As there is no airspeed indicator for us to look at while the ship is coming down, we have to rely on experience to visually judge the proper forward speed depending upon the wind that's blowing. When the wind is calm, the forward speed should appear faster, and the glide will be shallower. When the wind is blowing, the forward speed should appear

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slower, and the glide will be steeper.

Because no two autos are alike, there has to be a chance to "feel out" what the flare will be like. We do this by starting the flare at about five to ten feet off the ground, depending on conditions. The harder the wind is blowing, the lower the flare will be initiated. Gently give very slight aft cyclic, and watch for results. If there is no apparent reduction in the rate of descent, flare a bit harder. Conversely, if there is a reduction in the rate of descent, wait a split second for more airspeed to bleed off before adding more aft cyclic. This cross-check should be continuously going on through your mind at the speed of light. As the forward airspeed decreases in the flare, more and more aft cyclic can be put in without ballooning. The flare is progressive. It starts very softly and gets harder and deeper (tail low) as the forward speed slows.

At the end of the ideal flare the rate of descent should be zero, the groundspeed should be zero, and the tail stinger should be three to six inches from the ground. From this point forward cyclic should be given to level the ship, and shortly thereafter collective pitch should be brought in to cushion the touchdown. Easy, huh?

LEARNING TO AUTOROTATE...SET THE PITCH PROPERLY

The most critical aspect of the pilot learning autos is setting the low end pitch properly. Too much negative pitch (-2 to -4 degrees) will give excessive rates of descent and extremely touchy fore-aft cyclic on the way down. Also, the flare becomes more critical because of the high rate of descent.

Too little pitch (0 degrees) will give a lower rotor rpm to start with. The extra lift from more pitch (from -1 to 0) will give a very shallow rate of descent, which will call for a very soft flare. With a soft flare, rotor rpm will not increase, so at the bottom of the flare, less rotor rpm will be available to cushion the touchdown.

I have been doing my autos with GMP's Cobra, with and without tip weights. I wanted to prove to myself that autos could be done realistically and easily, without having the ship forced out of the air because of "excessive" negative pitch. The Cobra weighs eight and three quarter pounds. I fly from sea level to 1,000 feet

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elevation. I am running only one degree of negative pitch at low collective. This gives me a very realistic glide, with plenty of time to judge the rate of descent and execute the flare. If you are flying between sea level and 1,000 feet, run no more than two degrees of negative pitch for your initial autos. If you fly at higher elevations than these, you can get away with even less pitch. Just keep in mind that as elevation increases, rotor rpm will increase for the same collective pitch setting. So if you're doing autos in Denver (5,000 feet) an educated guess tells me that between 0 and -1 degree of pitch would give excellent results. In full size birds, rotor rpm increases about 1% per 1,000 feet of altitude.

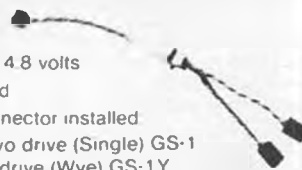
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PRACTICE THE ELEMENTS

Gain altitude, circle around into the wind, bring the throttle to full low smoothly. Maintain straight and level upon entry and establish a steady state autorotation in the descent. Flare high at first to get used to what the flare does. At the end of the flare, increase throttle/collective for a power recovery and go around again. *Don't use throttle hold at all.* As you get used to the autos, make your power recoveries lower and lower. After a while you'll be able to bring the power in and terminate the auto six inches to a foot off the ground. Practice these power recovery autos until you feel perfectly comfortable with the entry, descent, and flare. While you're doing this, learn to judge the glide in various wind conditions, and note how the flare changes with differing combinations of wind and forward airspeed.

LEARN TO USE THROTTLE HOLD

The next important step is to learn to use the throttle hold before you ever go for a full down. Set up for the auto at a comfortable altitude and enter by lowering collective, then snap the throttle hold switch on. Continue the auto to about 20 feet. At this point give some aft cyclic to break the rate of descent, and snap the throttle hold off. *You want to be able to easily snap off the throttle hold at any time during the auto.* If it doesn't look good, snap off the throttle hold and do it again.

GOING FOR IT

After the elements of the auto are sec-

ond nature, and you can easily use throttle hold, there's nothing left to do except go for the full down. Choose a day that has a moderate breeze (4 to 8 knots), because the wind will make it easier to zero out the ground run. It is almost impossible to damage your bird if you plop in from a foot or two as long as your touchdown is level, and there is little or no forward motion.

Always do some practice autos first to get a feel for the current conditions, then do it! If you've "done your homework," the full downs will almost be uneventful. But after you've done the first one you'll do another, and another, and another...they are fun to do!

TIP WEIGHTS

All of my initial autos with the Cobra were done with an unweighted set of stock blades. Each weighed 120 grams ready to bolt to the head. With these blades autos were good, but there wasn't any spare rotor inertia at the bottom. If the flare was not timed perfectly there was a tendency to "plop in" the last six inches. Nothing serious, but you could tell that the disk was done flying at that point. Robert Gorham can do beautiful (what I call kissy-kissy) full downs with the same combination, but it's due to the added rotor rpm that comes with running much more negative pitch. Again, we're not after that style of auto, especially for the pilot who is new to them.

To help with the inertia of the blades for the last six inches, I milled out a set of blades and epoxied 25 grams of tip weight in each tip. Each blade weighed 140 grams, ready to go. I used HobbyPoxxy Formula One to secure the weight, then sanded the excess epoxy off with a combination of sandpaper and a file. The epoxy isn't the easiest thing to sand, but it is strong, and does an excellent job of securing metal to wood. If installed properly, tip weight is not dangerous, and I have no hesitation to use it. I've used it for years in my Kavan JetRangers. Anyway, this amount of lead turned out to be just right for beautiful, realistic full downs, giving enough inertia to give soft landings even if the conditions were not perfect. A truly super combination. One final note on tip weights: When you use them, the overall blade weight is not quite as im-

portant because the 25 grams of lead out there keeps things going no matter what the rest of the blade weighs. But it is still to your advantage to get a heavier set of blades if you have a choice.

OVERVIEW

I hope this article has been successful in conveying a practical, step-by-step approach to do full down autorotations. It was prompted by a scene this summer where a prominent flier was teaching another accomplished pilot (other than autos) to do full downs. The expert flier changed the setup for autos through the back of the transmitter, then proceeded to do several beautiful full downs to check it out. All set, right?

Although the trainee's machine was never broken, he (the trainee) tipped it over several times at the bottom of the auto until he got one to stay on the skids. The mistakes? They were all classic.

The expert flier had dialed in his normal negative pitch. OK for him, but way too radical for a student. Because of this, the entries were violent, the descent featured overcontrolling on fore-aft cyclic, and never got close to steady state. The flares were very erratic because the trainee had never really practiced flares before, and there were quite a few close ones where the throttle hold was snapped off at the absolute last moment before a total catastrophe. The more I think about it, it's a wonder that the machine ever made it through without sustaining serious damage.

Approach autos with the respect of a new challenge. *Learn the elements, and don't go all the way until you do.* Above all, learn from others' experiences. I know I did.

Ferryboats . . . Continued from page 45

ty's Staten Island Ferryboats have transported about one billion passengers a total of five billion passenger miles without a single accident-caused fatality. In addition, the ferry boasts a 95% on-time record and the commuters, especially, appreciate this amazing accomplishment.

Actually, ferry service between Staten Island and Manhattan is about three hundred years old. The Leni Lenapi Indians made their crossing in canoes, and by 1640, the Dutch and English settlers had begun using flat-bottom raft-like boats for ferrying passengers and produce. A public ferry service began in 1708, and in 1817 the first steam powered boat was placed in service. By the late 1850's, the double-ended ferry was introduced. Although it is closer to New Jersey, Staten Island became part of New York City in 1898, and after a disastrous accident, New York City assumed ownership of the Staten Island Ferry in 1905 and promptly modernized the service with five new boats named after the City's five boroughs; Manhattan, Brooklyn, Bronx, Queens, and Richmond (Staten Island).

In 1937 three new ferryboats entered

service; Mary Murray, Gold Star Mother, and Miss New York. These 2165 gross tons boats set the pattern for all future Staten Island Ferryboats, and could accommodate 3013 passengers and 26 vehicles. The overall length was 267 ft. and maximum beam was 66 ft. A single 4,500 hp reciprocating compound steam engine enabled the design to attain 18.5 mph, which was outstanding for a ferryboat at that time. The draft was 12.5 ft. A crew of 14 could operate these \$925,000 vessels.

As the population of Staten Island increased during the post-war years, more ferry service was needed, which resulted in three more boats in 1951. The Pvt. Joseph F. Merrell, Verrazzano, and Cornelius G. Kolf were designed to carry 3016 passengers, and 40 vehicles. With an overall length of 290 ft. and a maximum beam of 66 ft., each 2285-ton ferryboat was powered with a single 4,000 hp Skinner Uniflo steam engine, with which it attained 18.5 miles per hour. These \$2,190,368 vessels were operated by a crew of seventeen. Draft was 15.5 ft., which proved a bit deep for the shallow water at the terminals.

Three more ferryboats joined New York City's Staten Island Ferry fleet in 1965. These were the John F. Kennedy, American Legion, and Gov. Herbert H. Lehman, designed by the firm of Kindlund and Drake. The new boats were 294 ft. long overall, with a maximum beam of 69 ft., and could carry 3,533 passengers and 45 vehicles. These 2109 gross tons vessels were the first Staten Island Ferries to be powered with diesel engines. In fact, four diesel generators produced electricity which was directed to eight electric motors; four geared to each propeller shaft. These were the only Staten Island Ferryboats not fitted with a single continuous shaft running through the vessel and connecting both propellers. This 6,400 hp powerplant drives the \$3,884,000 ferryboats to a speed of 18.3 mph. A crew of 14 operates the boats which have a draft of 13.5 ft.

The construction of the Verrazzano bridge across the Narrows between Staten Island and Brooklyn diverted considerable vehicular traffic away from the ferryboat service, however, the pedestrian traffic continued to increase and the demand for this glorious five-mile ferryboat ride remained. The ship designing firm of George G Sharp Inc. designed the next Staten Island Ferries, the Andrew J. Barberi and Samuel I. Newhouse. The author, as the Chief Draftsman of George G Sharp Inc., was involved in the design of the new boats. Because of the drop in vehicular traffic, the new 3,335 ton ferryboats were designed to carry 6,000 passengers, but no vehicles. With a length of 310 ft. overall and a maximum beam of 70 ft., these ferry boats are powered by four diesel engines geared to a continuous propeller shaft, developing 7,000 hp and can attain 20 mph. A 15-man crew can operate these \$30,100,000 boats.

Today, six Staten Island ferryboats remain in active service: The Barberi, Newhouse, Lehman, Kennedy, and American

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Legion, with the Verrazzano in standby service. Of all the Staten Island ferryboats, the one which remained in operation longer than any other was the "grand old lady" Miss New York; veteran of 38 years of service with the World's Most Famous Ferryboats, and one which truly contributed to that fame and earned that coveted title.

Model Builder will publish a construction feature for an 1/8-inch to the foot scale, or 1/96 size model of the "grand old lady" of Staten Island Ferryboats, the Miss New York, complete with ferryboat slip and terminal. Don't miss it!

ACKNOWLEDGEMENT

The author extends his sincere appreciation to the Honorable Edward J. Koch, Mayor of the City of New York, and Leonard Piekarsky, Assistant Commissioner, New York City Department of Transportation, Bureau of Ferry and General Aviation Operations, for their assistance by providing technical and historic information as well as photographs which were most helpful during the preparation of this project. We also thank Roger T. Crew, Jr. and The Mariners' Museum, Newport News, Virginia. •

El Primero . . . Continued from page 27

koted glider. There were many others in the bunch that were worthy of mention, but the prizes were limited to three.

Round One of the contest was a three-minute duration with runway landing. The runway was, in my opinion, a little on the small side and was very hard to hit. The pilot had to make his approach from the downwind side through qualifying "gates" in an effort to make the landing more "realistic" or scale-like. For this last item, the pilot earned a 25-point landing. He earned an additional 25, 50, or 75 points for landing within the marked runway. With the gentle breezes blowing a little bit sideways to the centerline (about 10 to 20 degrees), the final approach was a real trial of a pilot's landing skills. I believe there were less than a dozen landings within the runway for the three rounds.

The air during the first round was fairly calm and void of any strong lift. The open flight order caused many to "wait and see"

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how the air was shaping up, and as a result, the last 15 minutes of the allotted time was buzzing with activity.

The beginners were having a heck of a time coping with the stress of competition. Many had experienced fliers launch their planes for them. At least three or four of these beginners had flying coaches calling out verbal instruction over their shoulders. This caused some added confusion as coaches would say for instance, "Give it some down," and the bewildered flier would pull "down" on the transmitter stick, making matters worse as stall after stall ensued. If it weren't so serious and the threat of crashing so real, it would have been funny! As it was, many crashes did happen, but in almost all cases, the damage was very minimal if there was any at all!

This last observation should really be noted. The *El Primero* design is very TOUGH! I saw guys tripping on the loose ends of the crowd control rope and falling on their models, crashing into trees with horrible sounds coming from deep inside the foliage, hitting power poles, fences, and each other; models did cartwheels on the ground and dorked away with glee, BUT in all the mayhem, only one plane suffered major damage...the fuselage broke in two after a very steep dive into the ground. Surely this contest was the acid test of the durability of the *El Primero* design. Yours truly joined in the fun when he hit the power lines at one end of the

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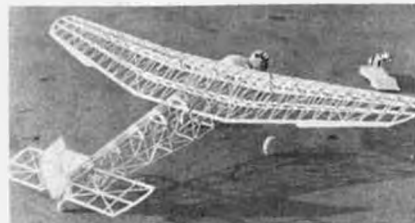
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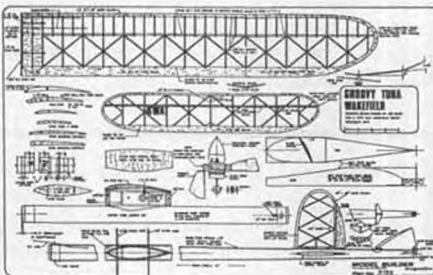
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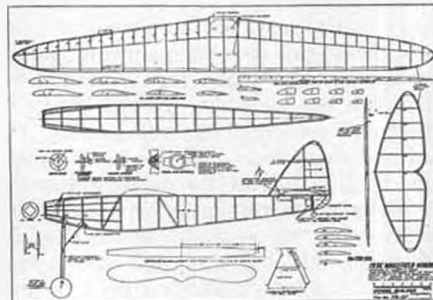
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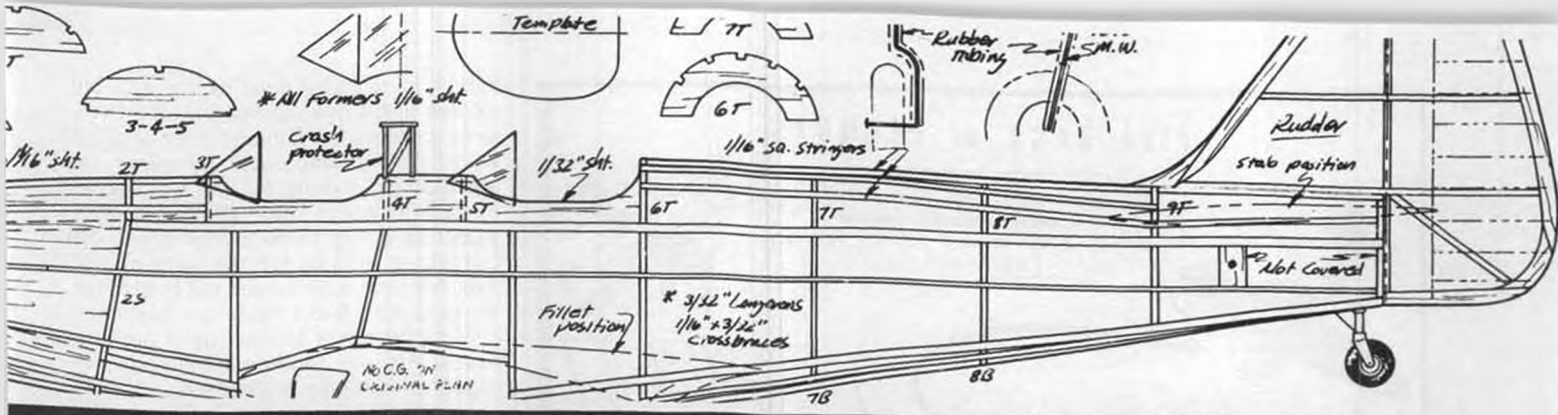
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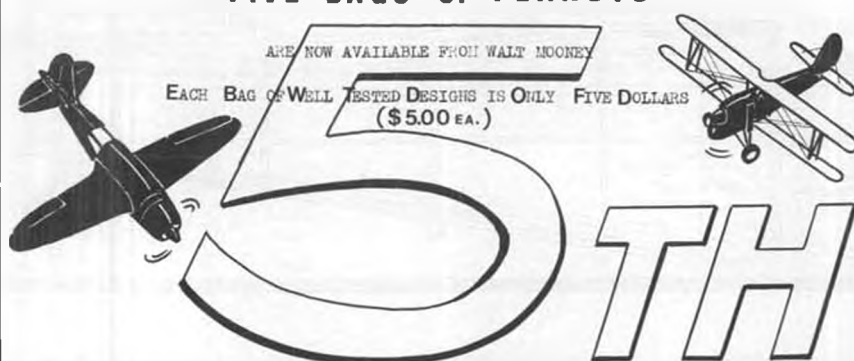


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field and came crashing to the ground out of control. Damage report: scratched Monokote on the top of the canopy and the bottom of the wing at the root.

The one thing that kept running through my mind as I witnessed all the could-have-been disasters was what John Cameron Swayze used to say on those old Timex commercials: "It takes a licking and keeps on ticking." Nothing could be truer for the *El Primero*. There may be better flying two-meter gliders on the market, but there are none stronger!

As long as I'm off on a tangent about the

durability of the *El Primero*, I might as well go over its flying characteristics. After that I'll get back to the contest, okay?

The *El Primero* is a stable, gentle flying glider. Turns are graceful and controllable when the servo throws are kept at half-rate on the transmitter (or limited at the control horns). The glide slope (often called L/D) is remarkably good, with long, flat glides commonplace. Ability to thermal on lift that is light or strong is very good. Be sure to put washout in the wing tips though, especially if you are a beginner, or you will see a tendency of tip stalling. Actually, this is true of all gliders with tapering wing tips.

For the purpose of the one-design contest, no modifications to the model were allowed. I would personally recommend the addition of spoilers. This isn't shown on the plans, but it would be a good idea for those who fly contests where spot landings are required. I came in too hot on all three of my approaches during the contest and wished that I had spoilers to help kill that long, flat glide! Spoilers would just make those tight landings that much more predictable.

During Round Two, the sun really started to get warm. The breeze came up a little (2-5 mph) and the thermals started popping. Not MANY thermals, mind you, but some. A few lucky fliers found what little thermal lift there was and went nearly out-of-sight for five-minute maxes, but most had 1-1/2 to 2-minute flights from the HD hi-starts (myself included!).

Round Three saw the wind pick up some more and the thermals virtually disappear. Many seven-minute maxes were recorded, however.

There was a very nice wave forming over a row of trees nearby which could be used like a slope in the 5-10 mph breeze. Several fliers took advantage of this meteorological phenomenon, yours truly among them, and recorded seven minutes on the score sheets. This was the round where I managed to fly into the power lines on my landing approach. I didn't even notice them until the plane came to an abrupt halt in mid-turn and fell out of the sky like a dead leaf. I thought I was nowhere near them! After the dust settled, there was

hardly any damage done to the ship, but my ego hurt a little, so I paced off the distance between the landing zone and the wires. The distance was 69 paces, or about 50 to 55 yards. No way was I going to hit them again! There was one positive aspect of hitting those darned wires, because I was running over the seven-minute max, my time score turned out better than it would have had I made my landing!

The third round finished up at approximately 1:30 p.m., and more than one flier suggested holding a fourth round! This contest was obviously enjoyed by all. Sadly, all good things must eventually end, and this event was now officially history.

Awards were announced, pictures were taken, and several of the contestants and helpers adjourned to the local Cocos restaurant for lunch.

TOP SIX FINISHERS

1. Sam Niece.....	2396.72
2. Dan Metz.....	2391.64
3. George Ritter.....	2355.48
4. Dave Johnson.....	2277.94
5. Bill Forrey.....	2245.44
6. Dave Ingram.....	2234.68

CLOSING THOUGHTS

A very heartfelt thank you must be extended to the DUST club of Palm Springs, and to Buzz Waltz for a contest that was probably the most fun for the largest number of fliers in my experience. I will long remember this one!

Some day very soon I would like to host a one-design contest for the *El Primero* ... in fact, I'm going to make it my goal for 1985. So if you live within traveling distance of the great LA "Basin," plan on attending. I will announce dates and locations later. Stay tuned!

OSAA Continued from page 17

Best Static Display (Sig Mfg. Co.)—Jerry Gardner, Ft. Smith, AK, Pitts.

Best Civilian Aircraft (John & Donna LaComb)—Bob Nelitz, Greemore, Ontario, Canada, Clipped Wing Taylorcraft.

Best Electric Powered Aircraft (Astro Flight)—Addie Naccarato, J-3.

Marathon of Flight—Harry Dickinson, Pomona, CA, Piper Tri-Pacer.

Best Ultralight (Erich Dern)—Erich Dern, Panama City, Panama, Pioneer "Flightstar."

Longest Distance Traveled, Mel Barber, South Africa, Douglas DC-3.

Best Glider Trophy (Roland Sommer) Roland Sommer, Germany, LS4.

There is definitely a lot of truth to the old saying that time flies when you are having fun! In this case, when you arrive Thursday, with the long weekend stretching out in front of you, it seems that you have all the time in the world to look closely at every one of the many airplanes present, to discuss ideas and techniques, and to renew old acquaintances and possibly make some new ones. But before you know it, it's Sunday, you are taking pictures of the winners, saying goodbye to friends old and new, and the crowd is beginning to thin out, as many start the trip

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home to face the realities of another Monday morning. I always like to think though, that Mondays are not quite as blue for the model builder who spent his weekend piloting a machine, which he sweated over and created, through the intricate maneuvers that modern R/C technology, and our own expertise now makes possible. Everyone who brought and entered an airplane at QSAA's Fly-In must have a little bit of Walter Mitty or Waldo Pepper deep inside . . . and is richer for it.

Talking about old friends, two of QSAA's hard working pioneers are taking a well deserved rest. Pat and Tom Bunker, Secretary and Treasurer since the beginning of the organization, asked to be relieved so they could devote some time to their personal modeling activities. Of course they were both present this year, not only to "Fly and Tell," but also to help out when and where needed all weekend long.

Replacing them are Nettie Smith as Secretary, and Dave Wilms as Treasurer . . . I wonder if anyone told them it is an eight year hitch? Anyway, for information on QSAA membership, open to anyone anywhere, or about attending the 1985 Fly-In, contact Nettie at 4731 Tamalpais, Las Vegas, NV, 89120; (702) 451-9983. For Nettie, Dave, Rex, and all of the other hard working QSAA members, I only have one question: After an unqualified success such as this, what can you do for an encore?

We, and a lot of our friends, will be there in October 1985 to see!

Dear Jake Continued from page 7

a modeling buddy of mine to Reader's Digest, but when I called and asked them what they had done with my story they said they couldn't remember.

Jake

★ ★ ★

Dear Jake:
I've got a few questions for you, but they're so basic that I would be embarrassed to see them in print. Do you have a home address I could write to?
Shy in Chicago

Dear Shy:
You can reach me at:
Home for the Comparatively Lucid,
All Things Considered
1316 Winding Way
Thousand Oaks, Ca 90003

★ ★ ★

Dear Jake:
I decided about six months ago to try indoor microfilm modeling. Since then I've had one disaster after another and I'm completely frustrated. I just can't get the hang of handling microscopically small balsa and covering films about as durable as a soap bubble. What should I do?
Ready to Quit in Reading

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Dear Ready to Quit:

Why don't you take up something easier, like watch repair.

Jake

★ ★ ★

Dear Jake:

What's the secret for success in the U-control speed events?

Circle Burner in Cicero

Dear Circle Burner:

The secret is to go faster than anybody else.

Jake

★ ★ ★

Dear Jake:

Are there any standard eligibility criteria for Old Timer Free Flights? I've seen pre-1938, pre-WWII, and pre-1943. Which is it?

Want to Know in Wantaugh

Dear Want to Know:

No one under the age of 25 whose first model airplane was radio controlled is eligible to fly Old Timer Free Flight.

Jake

★ ★ ★

Dear Jake:

I have been a free flight modeler all my life. It has been my only hobby. Now, I have discovered my wife has worms. I am considering taking up fishing so we could enjoy that hobby together. What do you think?

Hesitant from Howell

Dear Hesitant:

Fishing is dull. I think the two of you should take up raising racing pigeons. You build the coops, and let your wife provide the food supply.

Jake

Playboy Continued from page 43

of dope works well for me. Use regular Butyrate until the covering reaches the desired taughtness, then use plasticized dope for the remaining coats.

The engine used in the 1/2A Texaco Playboy was a Cox 049 Black Widow. The engine has four additional head shims (glow head gaskets) for a total of five. This engine turns a cleaned up 8x4 Top Flite Super-M prop at about 7000 RPM. It runs

well on fuel containing five percent nitro. This engine, prop, and fuel combination will run about five minutes. The altitude gained with a Playboy will test your eyesight.

If you want a longer engine run, which will result in a slower climb, exchange the Black Widow tank and backplate assembly for one from a Golden Bee. This combination will slow the engine to 6000 RPM and increase the running time to almost seven minutes. Whatever you do, stay out of the clouds!

Come on and join the 1/2A Texaco mania. Build a 1/2A Texaco Playboy Sr. and try for the winner's circle. •

Buttercup Continued from page 19

these points and add hinges. The lightweight but warp-free tail surface construction is interesting, and not seen before by this writer. Note that the 1/16 x 1/4 stiffeners lie between the two outer layers of 1/16 sheet. The outside edges are pulled together and glued, forming a symmetrical section.

Nothing complicated about the wing. Additional rigidity could be obtained by sheeting the under side of the leading edge back to the front spar, undercutting the ribs by the sheeting thickness to accommodate the sheeting. To complete the D-tube effect, add webbing from the spar to the top sheeting. Install webbing before adding the top sheeting. Note the continuation of the top fuselage stringers onto the top of the wing center section.

The fuselage is a simple box of long-erons, uprights, and cross-pieces. The non-functional wing strut attach points, not shown on the fuselage, are at the intersections of the two non-vertical uprights at the front and back of the door panel.

For those who want to enlarge the plans to quarter-scale, you're on your own, as the article gave no indication of the span of the original. Plans for a F/F or U/C version were in the same issue, and if these were one-inch scale, it came out to 25 feet, which could be about right. Would someone help us on that?

Whatever size you decide on, Buttercup will be easy to build and fun to fly! •

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PHOTO BY DOUG SHANE

Voyager
PHOTO BY PAT STORCH



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track attack

The army knows a good thing when it sees it

It was only a matter of time before the U.S. Army picked up on off-road buggies as a new force in weaponry. Quick, rugged, light, and durable, the Fast Attack Vehicle is now in a prototype stage . . . being tested in battlefield and commando situations.

And who else but MRC-Tamiya, the ruler of off road buggies, could bring a copy of this new breed of road warrior to you in such menacing detail.

Part military . . . part racer . . . all performance

The Fast Attack Vehicle (FAV) combines the military concept of stealth with off road toughness. Its RS-540 motor generates the kind of power and speed you need to take the competition by surprise. This off-road commando features a 186mm super wide track wheelbase, a low center of gravity, and front and rear trailing arm suspension systems. Nerf bars on either side prevent rollovers. However, should you flip it, a roll bar protects the vehicle from damage.

Other strategic features include front and rear-spring type shocks, a sealed gear case

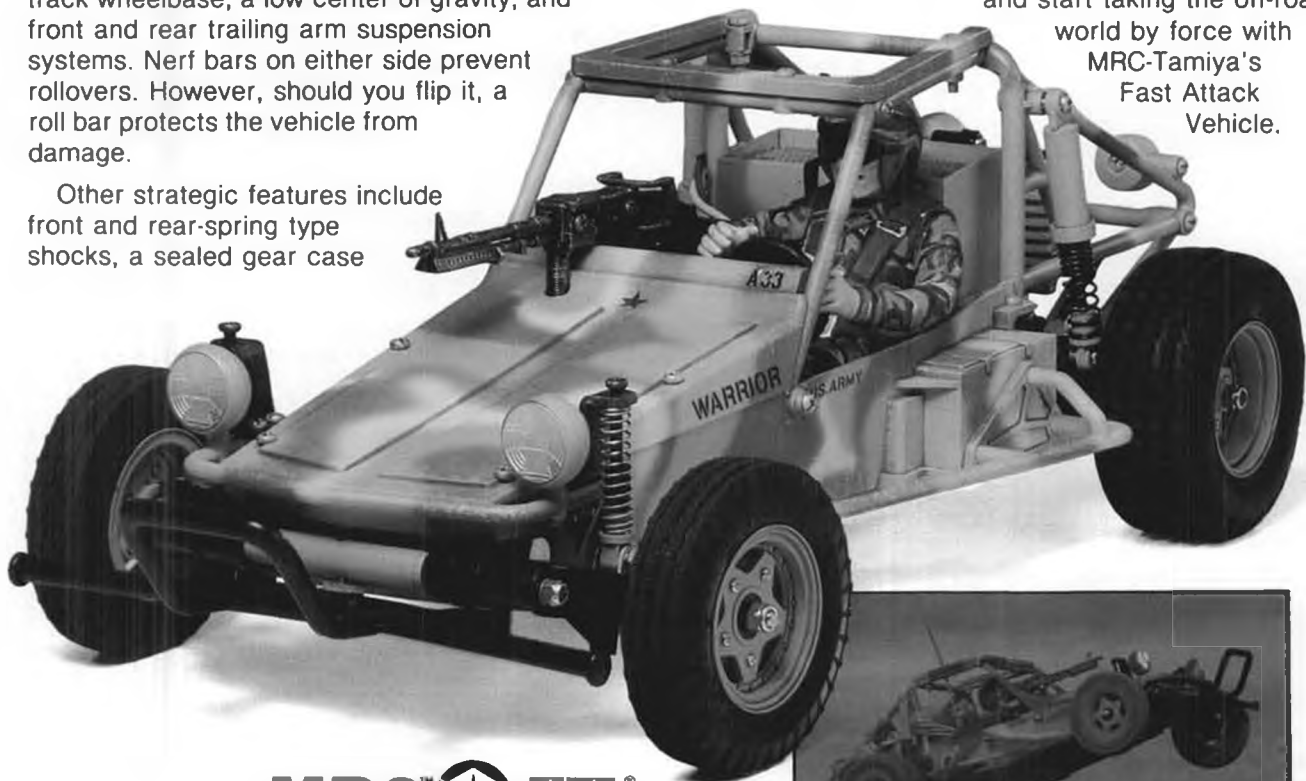
MRC-Tamiya's fast attack vehicle takes the competition by force

with heavy-duty off-road differential, hexagonal universal joints, heavy duty high impact plastic body, and superbly realistic detailing. But the best part is when you add the driver in combat fatigues and mount the intimidating M-60 machine gun. Anyone still trying to keep up with you at this point will quickly put up the white flag.

It Puts All The Weapons In Your Hands

Speed is always an effective weapon. And our FAV won't let you down. It's even been built to accept our Black motor, ball bearings, and oil-filled shocks. Use the camouflaged body to stay out of sight. Then spring to action and gun your vehicle to the front of the pack. The competition won't stand a chance.

It's a "track attack" like never before . . . and you're in command. So get to your hobby dealer today, and start taking the off-road world by force with MRC-Tamiya's Fast Attack Vehicle.



Model Rectifier Corporation
2500 Woodbridge Avenue, Edison, NJ 08817
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2-channel radio control required (not included).
Uses 6 or 7.2 volt, 1200 Mah batteries (not included).