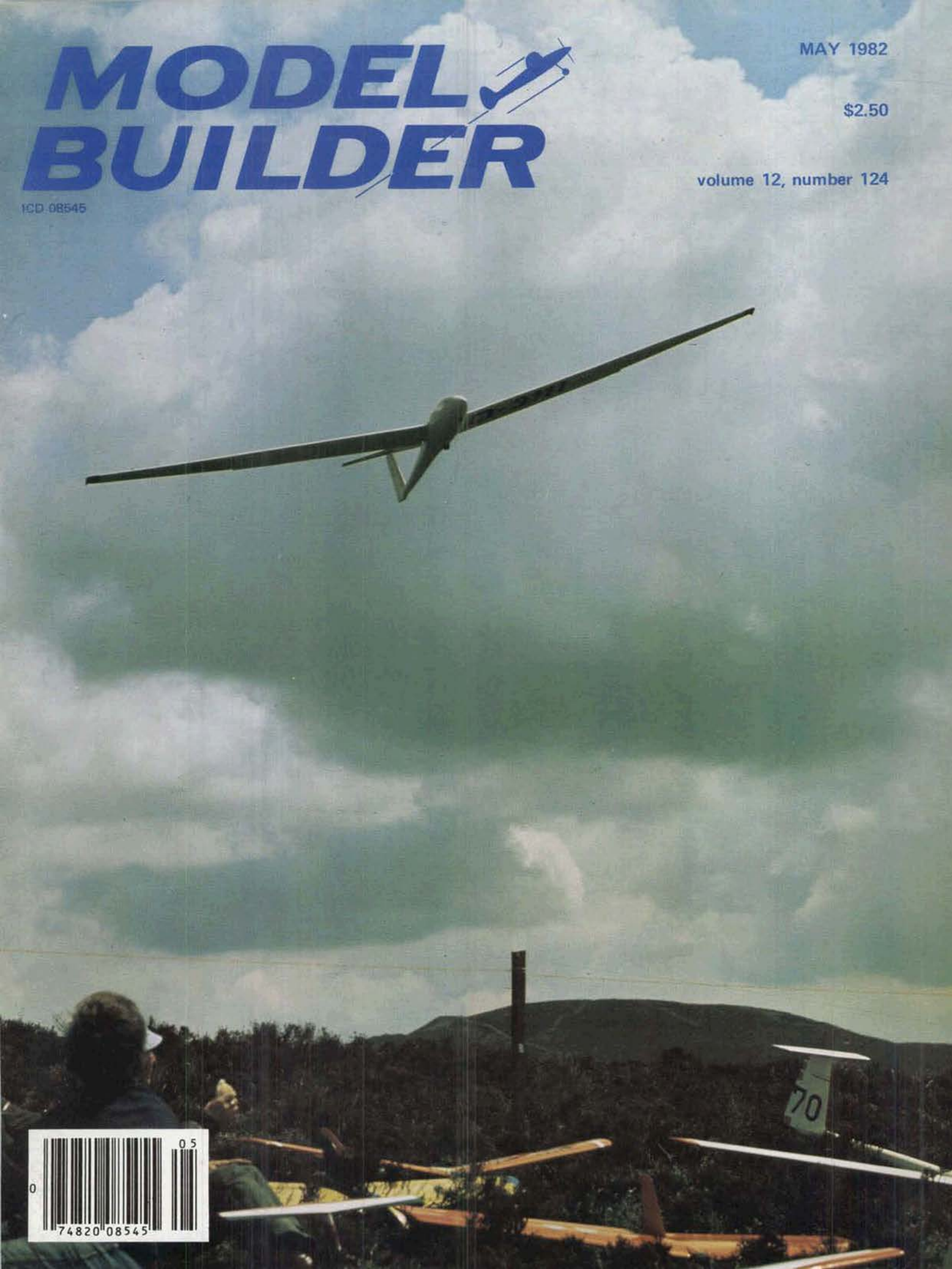
MODEL BUILDER

MAY 1982

$2.50

volume 12, number 124

ICD 08545



0 74820 08545 05

New KP7C MK III Systems... The Best is Now Better

Kraft's 7C Series systems have long been the choice of expert flyers and contest participants worldwide – both dual (KP7C) and single (KP7CS) stick models. The new MK III editions now offer these added features:

- Four-Channel Servo Reversing Switches
- Dual Rates & Roll Buttons
- Choice of High Performance Rugged Reliable Servos, including the new KPS-24
- Wide choice of Plug-In Frequency Modules

Discover advanced performance for yourself – the best really is better.

KRAFT

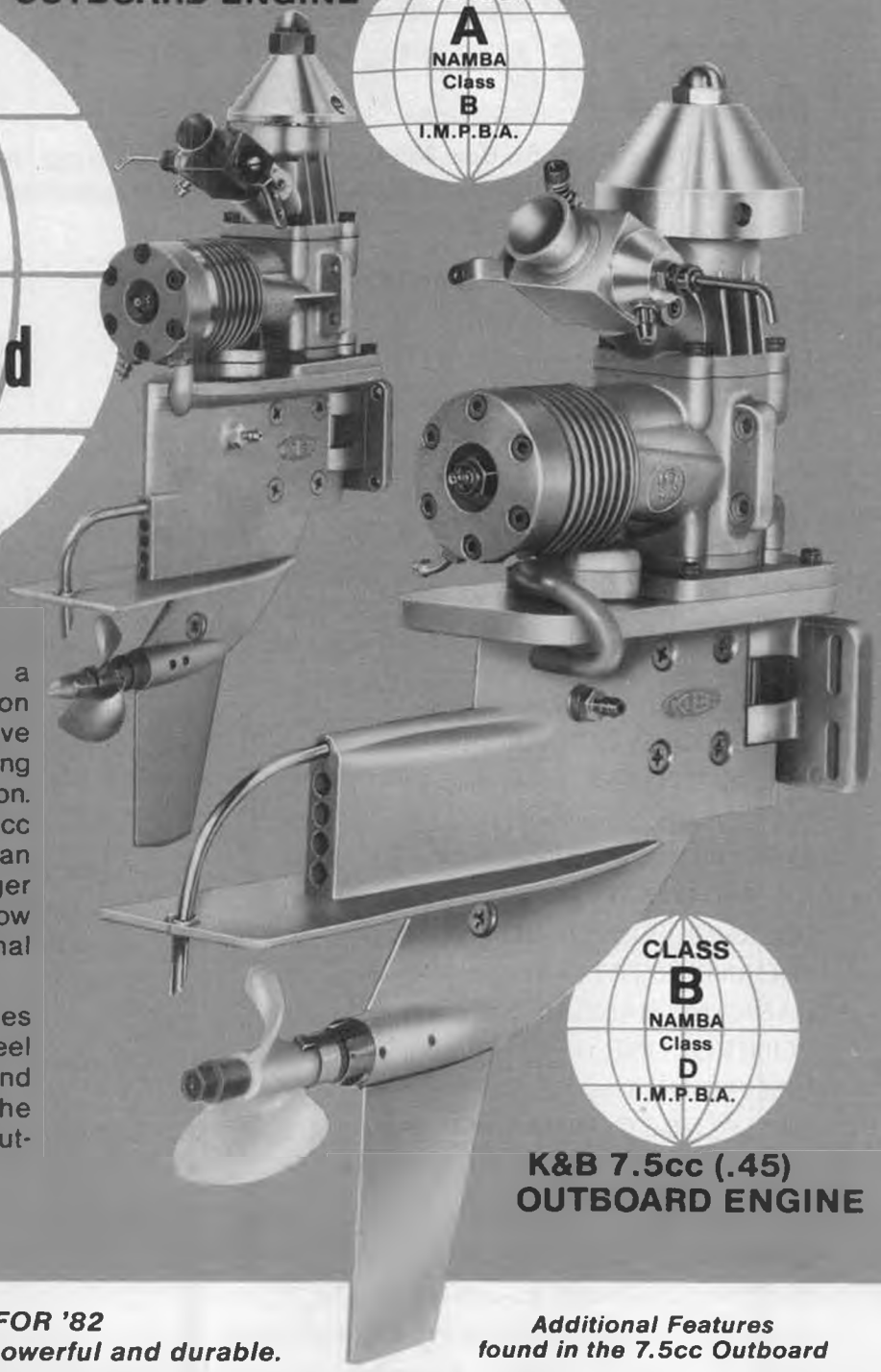
See these competition systems at your local neighborhood Kraft Dealer

Kraft Systems Inc. • 450 W. California Ave., Vista, CA 92083 • A Subsidiary of Carlisle Corporation Since1972

The Best of 2 Worlds . . . K&B 3.5cc and K&B 7.5cc

K&B 3.5cc (.21) OUTBOARD ENGINE

CLASS A NAMBA Class B I.M.P.B.A.



CLASS B NAMBA Class D I.M.P.B.A.

K&B 7.5cc (.45) OUTBOARD ENGINE

The 3.5cc Outboard proved to be a success from the time of its introduction in 1976. In the K&B tradition we have continuously sought for means of improving it. This newest engine is the 4th generation. Last year we also introduced the 7.5cc Outboard. Larger and more powerful than its brother, it was designed for larger boats. It incorporates all the know-how found in the 3.5cc plus many additional features.

Both are tough, water-cooled engines with K&B's Quintuple Porting, Flywheel designed for cup electric starter, and Underwater Pick-up. Each offers the superior control characteristics of outboard drive.

NEW FEATURES FOR '82
All of which make them more powerful and durable.

- **Con Rod** - machined from high tensile strength aluminum stock. Bushed at both ends.
- **Heavier Wall Sleeve** - harder and stronger - brass alloy minimizes distortion during machining as well as during running.
- **Honed Piston** - honed after the grinding operation . . . resulting in a perfectly round piston that automatically extends the life of the ABC piston and cylinder fit.
- **K&B's own Super Bearings** - developed by our R&D - will withstand 30,000 R.P.M. plus, without shedding ball retainers.
- **Propeller Shaft Assembly** - the prop shaft assembly and mating part of the lower end casting is threaded for ease of replacement of drive cable or prop shaft assembly . . . eliminating the need to disassemble the lower end.
- **A Longer Skeg** - for increased stability.

Additional Features found in the 7.5cc Outboard

Mounting Hinges - slotted for up and down engine adjustment • A Long Skeg - for increased stability. • Propeller Shaft Assembly - the prop shaft assembly and mating part of the lower end casting is threaded for ease of replacement of drive cable or prop shaft assembly, eliminating the need to disassemble the lower end halves. • Built-in Silencer - decibel reading can be lowered to as much as 80 decibles with the insertion of baffles (five furnished with engine) into the exhaust chamber • NEW K&B All Metal Carburetor - easy to adjust for idle and top R.P.M. • K&B's Own Super Bearings - will withstand 30,000 r.p.m. plus . . . without shedding ball retainers.

On the ground, on the water and in the air K&B continues to be "The choice of Champions"

K&B MANUFACTURING
12152 WOODRUFF AVE., DOWNEY, CA 90241

MODEL BUILDER

MAY

1982

volume 12 , number 124

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

CONTENTS

FEATURES

CONSTRUCTION

Cover: One way of frightening the opposition! Mike Gay makes a wayward landing approach over the model pound during the Clwyd Scale Glider competition, held at Moel Fammau, Wales, on June 28, 1981. Model is a 1:5 scale Schempp-Hirth "Janus" two-seater, built from John Fletcher's plans, and using one of the GRP fuselages of his manufacture. Normal controls plus flaps. Photo by Keith Thomas, Frome, Somerset, England.

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

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

Change of address notices must be received six weeks before date of issue that new address takes effect. Send old address with new; old label preferred. Post Office will not forward copies unless you pay extra postage. Duplicate issues cannot be sent.

Second class postage paid at Costa Mesa, California, and additional offices.

Track tune your racer from the driver's stand with the new Futaba 3FG.

Changing track conditions can send RC cars scurrying into the pits for a linkage adjustment that could take laps to complete.

The driver with Futaba's 3FG doesn't panic though, because he has Total Control on his side.

A flick of a lever and the adjustable dual rate takes over.

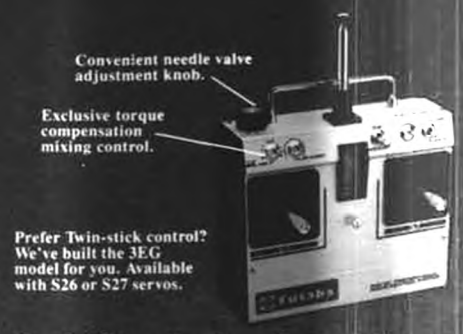
Increase or decrease steering servo throw while maintaining full lock-to-lock control. The 3FG gives you a choice, on the track.

An oversteering, sliding car instantly responds to the pre-set steering ratio and is dialed-in again.

The 3FG system was developed by and for serious racers. In addition to rate control, you'll also find servo reverse switching, electronic trim, mixing and throttle fine tune in the handsome brushed alloy case.

The 3-channel 3FG system is available with a wide range of servo options, too. Ultra mini S20 servos are perfect for 1:12 scale electrics, while boat and gas car racers favor the watertight, heavy-duty S27's.

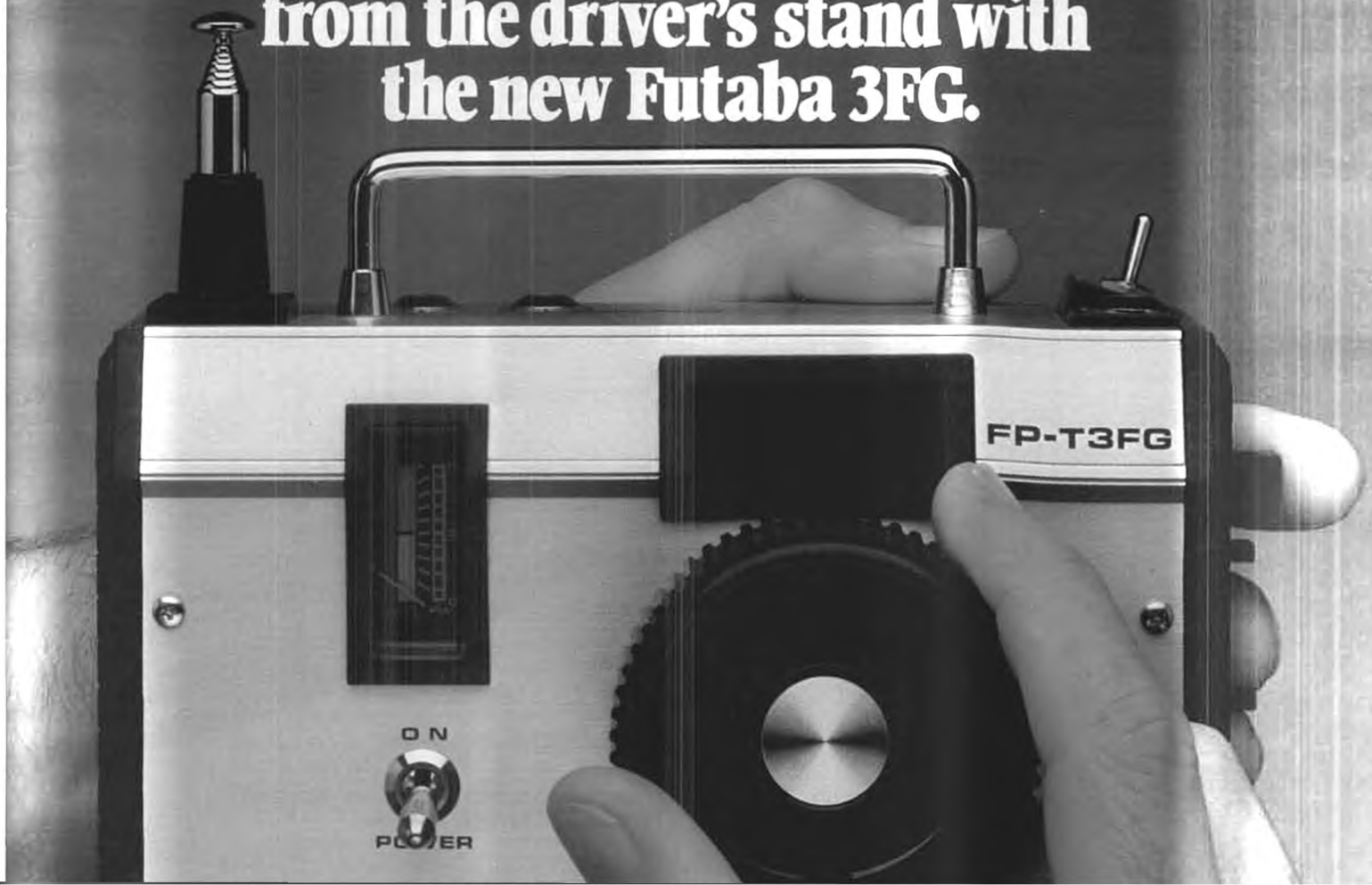
Gentlemen, choose your servos.

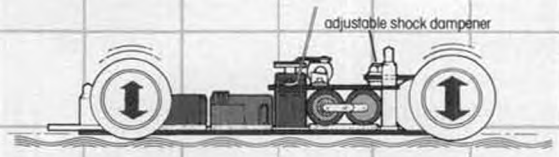


And for total performance, the 3FG can be ordered with high-torque, coreless motor S24's and rechargeable NiCad batteries.

Futaba

555 West Victoria Street, Compton, CA 90220



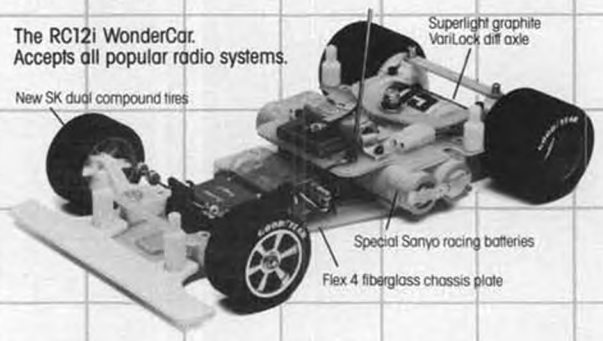


While the tires of the amazing RC12i follow the contours of the track, the central chassis, radio equipment and batteries remain stable for phenomenal cornering power.

Nobody knows more about building winners than the Team. In just four years our RC12E won an astounding 10 National Championships, winning in every class of competition indoors and out.

Now there's a brand new winner from Associated, the RC12i. We call the RC12i the WonderCar, because it has handling and road hugging characteristics second to none.

The RC12i grips the track with our unique Flex 4 chassis, a totally new design featuring shock-dampened front and rear roll rates and a trailing link controlled beam axle. That gives the RC12i a suspension without springs, to isolate the radio and batteries from excessive vibration for maximum traction on every track surface.



FLASH! NEW ASSOCIATED RC12i FLAT OUT-CORNERS THE COMPETITION

And the RC12i isn't all that's new from the Team. Special "SK" dual compound front tires, graphite VariLock diff axles, Reedy Indoor rewinds, plus McRae Can-Am, Brabham F1 and Lola T600 bodies are just a few of our latest speed secrets.

Keep up with all the action with your free subscription to Racing with the Team. Call or write today.

The IMSA Champion Lola T600 GTP, our newest 1:12 scale body shell. New McRae and Conquest Can-Am bodies also available.

Associated Electrics 1928 East Edinger/Santa Ana, CA 92705/(714) 547-4986

1981 ROAR Nationals! Boston – Mike Lavacot/Team Associated wins Indoor Modified. Reedy motors win All modified classes for 4th year in a row.

Announcing:

THE IMPROVED MARK II KOMANDER

SIG
KIT RC-32

Engine: .40 to .50 cu. in.
Wing Span: 62 in.
Wing Area: 640 sq. in.

BUILDS KWIK

A FINE SPORT MODEL

FOR 4-CHANNEL
R/C EQUIPMENT

Designed by CLAUDE McCULLOUGH

Pre-Cut Foam Wing
Sleek Bubble Canopy with Molded Framing
Jet Style Molded Plastic Cowling
Handy Printed Fuselage Sides and Bottom - Build Directly on the Wood
Sheet Balsa Wing Covering
Sheet Balsa Tail Surfaces
Pre-Bent Torsion-Bar Landing Gear
Rugged 5/32" Formed Nose Gear
Step-By-Step 36-page Photo-Illustrated Instruction Book
SIG Quality Balsa and Plywood
Hardware Package Contains:
Molded Control Hinges
Nylon Control Horns
Nylon Nose Gear Bearing
Nylon Nose Gear Steering Arm
Tuf-Steel R/C Links
Aluminum Motor Mounts
Nylon Screws for Bolt-On Wing Attachment

$59.95

NEW! Re-designed Fuselage Structure
NEW! 36 Page Photo-Instruction Book
NEW! Full Wing Center Section for Better Fit, Seal and Appearance
NEW! Separate Fuel Tank Compartment

THE KOMANDER IS ONE OF OUR OLD FAVORITES AND THE INSTRUCTIONS HAD GOTTEN A BIT DATED. DESPITE THIS, IT HAS CONTINUED SELLING STEADILY FROM THE WORD-OF-MOUTH ADVERTISING OF SATISFIED FLIERS WHO LIKED THE GREAT FLYING CHARACTERISTICS. NOW WE HAVE COMPLETELY RE-ENGINEERED THE KIT BUT DIDN'T CHANGE A THING ON THE OVERALL CONFIGURATION. WHEN A DESIGN HAS AS MUCH APPROVAL FROM THE FLIERS AS THE KOMANDER, YOU DON'T TAMPER WITH THE AERODYNAMICS. FOR AN AILERON TRAINER OR A RUGGED SPORT FLIER, IT'S HARD TO BEAT!

HERE ARE THE OTHER STEPS IN THE "LEARN TO FLY RC THE SIG WAY" PROGRAM

STEP 1 - PICK A STABLE HIGH-WING DESIGN

THE KOMANDER IS ALSO STEP 2 IN SIG'S TIME-PROVEN PROGRAM

$49.95 KIT RC-51

KADET MK.1

KIT RC-49 **$54.95**

KADET MK.II

KIT RC-46 **$39.95**

KADET JR.

STEP 2 - INTERMEDIATE

$59.95

KAVALIER KIT RC-39

STEP 3 - ADVANCED

$59.95 KIT RC-35

KOUGAR

STEP 4 - EXPERT

KIT RC-29
Balsa Skin **$69.95** Plywood Skin **$72.50**

KOMET

See your dealer first! To order direct, add $1 postage under $10. Postage free over $10. No C.O.D. Send $2.00 for latest catalog of kits, accessories and supplies by SIG and other major companies.

SIG MANUFACTURING CO., INC. ..... Montezuma, Iowa 50171

from Bill Northrop's workbench

WHAT'S IN A NAME?

Back in the early days of aviation, a young inventor had developed a small, lightweight pusher biplane that flew extremely well. Being a resident of a small town along the coast of Lake Michigan, near Milwaukee, Wisconsin, he had the desire to fly across the lake and land near Grand Rapids, Michigan, a distance of about 130 air miles . . . not much now, but a long distance in those days. He wanted to do this not only to prove the worth of his aeroplane design, but also to establish a small nitch in the history of aviation. The irony of it all is the fact that though he never succeeded in making the flight, he still established a name that will never be forgotten in aviation circles.

Not wishing to risk his life and aircraft in the lake, this young man made numerous test flights over land. These tests proved that the aircraft had the range to accomplish the feat, but one problem repeated itself on each test . . . the jets in the carburetor would clog up from dirt in the fuel, and cut off the engine after 50 or so miles of flying.

Numerous attempts at filtering the fuel through various substances, although improving the situation to some extent, never really eliminated the problem. As clean as the fuel was when it went in the tank, there would always be enough dirt particles picked up in the airborne fuel system to eventually build up and block the carburetor jets.

Through an unfortunate automobile accident, the young man was forced to curtail his own flying, and so he had to pass up the opportunity to fly across Lake Michigan. But now his desire to solve the dirty fuel line problem was even stronger, and he kept at it during all his spare time for about two years.

Finally he came up with a filtering device that was inserted in the fuel line just before its entry into the carburetor. Instant success! Several aircraft and engine manufacturers had learned about his experiments, and when they heard the news, they clamored for the device. The young man's fortune was now made, and though he is not remembered today, the fuel line filter and the name he gave it has truly gone down in history . . . the Great Lake Strainer!

That's probably the longest lead-in to a free plug that I've ever written. But anyway, Tom Keeling, of T & D Fiberglass Specialties recently ordered a set of plans to Frank Comyn's Great Lakes Trainer, which was featured in our March '82 issue. This truly quarter-scale model should be real popular, and Tom is going to make it a little easier for a lot of scratch builders by producing a fully detailed figerglass cowl for it. Write or call Tom at 30925 Block St., Garden City, MI 48135, (313) 421-6358, and tell him we sent ya.

WHO'S HE?

A lot of new generation R/Cers may not recognize the name, but many of those who flew in the '50's and 60's, and very early 70's remember Vern MacNabb for his Citizenship radios. (My old push-button 465 mHz radio made millionaires out of the battery companies, but it always worked well, and I never had to stand in a long 27 line to wait my turn to fly.)

According to Art and Charlotte Johnson, editors of the Gold Coast Radio Controllers Newsletter, Delray Beach, Florida, Vern just completed a Super-Tigre 60 Bluehead powered Top Flite P-47. The eight-pound bird looked good on its first flights. The radio? A combination of Futaba, Kraft, Ace, and Heath-Kit components.

TWO CENTS WORTH

In answer to my "two cents worth" at the end of Dave Thornberg's rib-cutting article in the March '82 issue, comes the following from Erv Rodemsky, Indoor World Champ.

"Your 'Editor's Two Cents' worth, following 'Thornberg at Large,' March '82, is exactly the same system that I've used for cutting ribs with this exception: use the metal from a TIN coffee can instead of aluminum. It has these advantages: easy to cut with big scissors or tin snips; the razor or Uber Skiver won't dig into the edge and ruin your nice filed and sanded curve; and the flash from the brad holes is more durable, sharper and thinner than aluminum. Two-pound coffee cans flattened out will give a long enough piece of metal for everything short of 1/4-scale. For those really big jobs, sheet metal shops have tons of galvanized duct material that is a little thicker than a tin can."

Erv Rodemsky
26 Warmspring
Irvine, CA 92714

"I went to this sex therapy conference on Saturday, and you know, that's the first time I've ever gone six hours straight without once thinking about model airplanes."

MISSING PERSON

Ralph Hunt, Box 21B, Dassel, MN 55325, saw his cousin Lloyd Hunt's name in the Mystery Model portion of Tom Hutchinson's January '82 "Free Flight" column. They haven't been in touch for many years, and Ralph would like to contact Lloyd. So in case Lloyd doesn't happen to see this, will someone please give him the word?

NAG, NAG, NAG

Not what you think! In this case, it stands for National Air-Racing Group, and NAG Publicity Director Chuck Aro spotted our January '82 cover featuring Skip Ruff's Byron P-51, done up in the paint and markings of Bill Destefani's Unlimited race plane, based in Bakersfield, California.

To quote part of Chuck's letter:

"I also read through the article by Jim Gager on pylon racing with some interest since I'm involved in full-scale air racing.

"To those readers who might also be interested in full-scale air racing, you might suggest they contact the National Air-racing Group (NAG).

"Membership in the National Air-racing Group is $9 per year (additional family members are $3 each).

"Each month, NAG publishes a newsletter filled with news, information and photos of air races, airshows and warbirds for its members, and following an air race, the NAG RAG includes the complete race results, including all speeds and times of each heat.

"NAG members can also train and serve as pylon judges and other race officials at air races.

"The National Air-racing Group is a non-profit fraternal organization with some 700 members around the world, including race pilots, crews, race officials, promoters and race fans.

"A check in the amount of $9 (plus $3 for each additional family member) made out to NAG, Inc., may be sent along with the name, address and phone number to Frank Roncoe, Treasurer, at 11973 Los Arboles, Sunnyvale, CA 94087,

Continued on page 104

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.

Kraft Systems has just announced availability of a new servo, the KPS 24 and KPS 24R (reverse). Many new features are incorporated in the design, such as three O-rings to insure the internals stay dry, two ball bearings for complete support of the output shaft, and an eight-ohm motor coupled with a high quality, sealed, carbon button type of pot for top servo performance (45 oz. in. of torque, 0.30 sec./60 degree transit).

All Kraft systems may be ordered with the KPS 24's, and they will work properly with *any* Kraft system from the Series 72 to the present (excluding the "A" series). The accessory pack includes mounting hardware, plus five additional, different output arms/wheels for various linkage setups. One servo wheel is blank so that holes may be drilled for conditions requiring special pushrod angles/geometry. Kraft Systems, Inc., 450 W. California Ave., Vista, CA 92083.

★ ★ ★

For all modelers who have been around for quite awhile, the name "Bill Barnes" should set off a few chimes. With assistance from the Bill Barnes Fan Club, Gordon Codding has, working from original drawings and sketches by Frank Tinsley, who created the Bill Barnes designs, re-created the "Transports" and early fighter designs such as the "Stormers", and "Snorters" in 1/4-inch and one-inch scale. Most drawings contain ribs, formers, and in some cases, working landing gear. For a listing of the "Bill Barnes, Air Adventurer-Famous Fictitious Flyers Series," send a SASE to: Gordon Codding, 3724 John L. Ave., Kingman, AZ 86401.

Ford Ranger R/C Pickup truck, in 1/10-scale, from MRC/Tamiya.

★ ★ ★

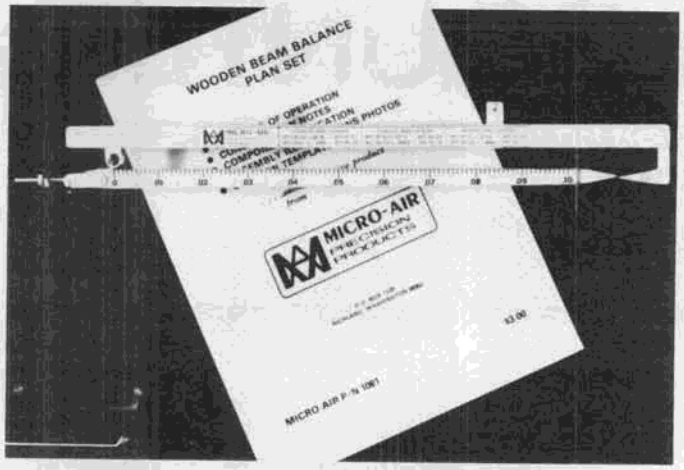
Byron Originals has announced a brand new catalog/brochure of over 60 pages in color, containing details and specifications of its complete product line, plus product reviews of many items. Send $5, refundable against your

Astro Flight's 075XL electric power flight system.

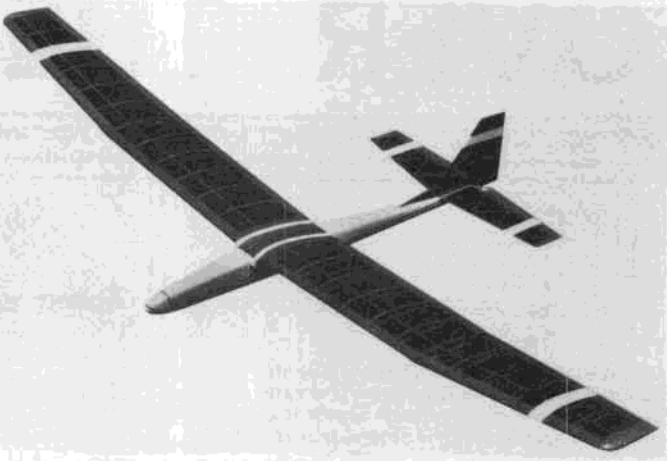
Radio operated self-righting is feature of this catamaran by Pop Up Mfg. Co.

Sig's updated Mark II Komander.

Dumas Hot Shot 45 for K&B 7.5 outboard.



Wooden beam balance plan set by Micro-Air Precision Products.



Sig's new "Riser" two-meter R/C sailplane.

first order to: Byron Originals, Box 279, Ida Grove, IA 51445. Watch for new items from Byron Originals this year!

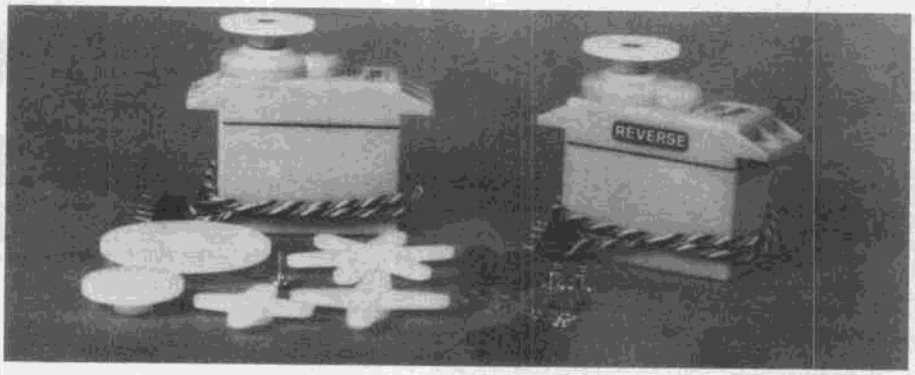
★ ★ ★

Not really a model airplane, but an outgrowth of modeling expertise and knowhow is the *WANDERER* from International Ultra Light. This latest design from Mark A. Smith spans 34.5 feet and cruises along at 50 mph on 15 horsepower! If you have been dreaming of flying an ultra-light without getting bug stains on your teeth, send $10 for the data packet; photos, three-view drawings, and information on this "kit" to: International Ultra Light, P.O. Box 255, Escondido, CA 92025.

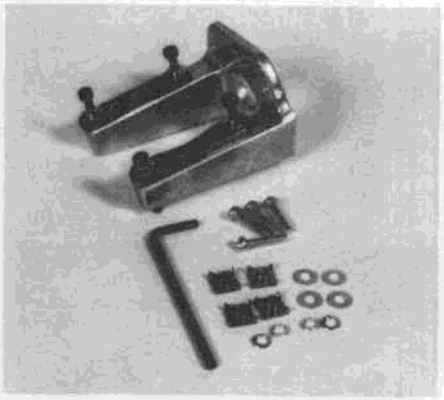
★ ★ ★

Astro Flight, Inc., pioneers in silent flight, has available for the price of your sending an SASE, a list of popular kits, suitable for conversion to electric power and the recommended Astro system. As an example, the Astro 075 XL with eight 1.2ah NiCds is the recommended system for the Ace Alpha 15, Astro Flight Fournier RF-4, Bridi Big Bird, the Flyline Fairchild 22, and Mark's Models Wanderer 99, to name a few. Ask for a copy of *Astro Flight News, January 1982*, listing new Astro Power Systems, including the new line of chargers and Colbalt motors. Astro Flight, Inc. 13311 Beach Ave., Venice, CA 90291.

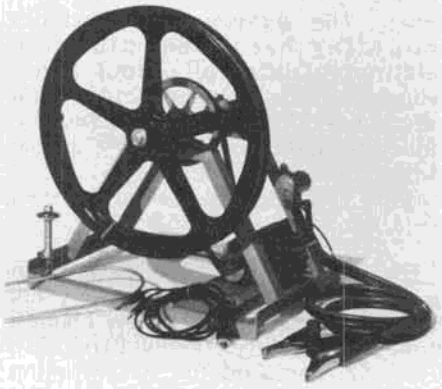
Continued on page 73



Rugged, powerful KPS-24 is Kraft Systems' latest servo.



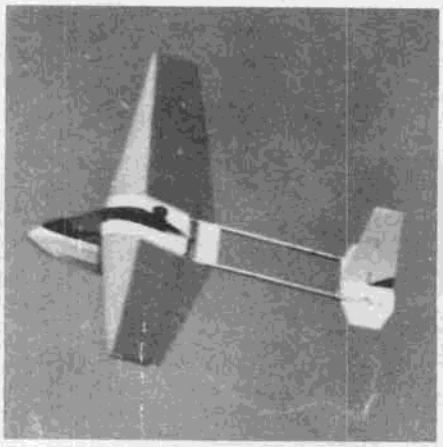
I. M. Products aluminum motor mounts, from Circus Hobbies.



Line retrieving sailplane launch system by Davey Systems Corp.

Airtronics Frequency Scanner, for 72 mHz.

Free Hippo T-shirt comes with Your Dick Hanson 'Tipo Hippo' pattern ship.



"Wanderer", powered ultra-light featuring enclosed cockpit. International Ultra Light.

Dallas HIA. Top Flite's "Metrick" Two-Meter sailplane.

Dallas HIA. Midwest's "Soarer" Two-Meter sailplane.

R/C WORLD

Text and photos by Larry Renger, Jerry Dunlap, and John Elliot

HIA SHOW
by LARRY RENGER

Dallas! There is a name that conjures up all sorts of images. Football games with gorgeous cheerleaders, oil, cattle, huge TEXAS size hats and boots, the Kennedy assassination, WIDE open spaces, J.R. and his happy family, more WIDE open spaces, and people who say "Howdy" a lot, all flash through my brain. The reason for all this is the fact that I was fortunate to be able to attend the 41st annual Hobby Industry Convention and Trade Show held in the Dallas Convention Center from January 31 to February 3 of this year.

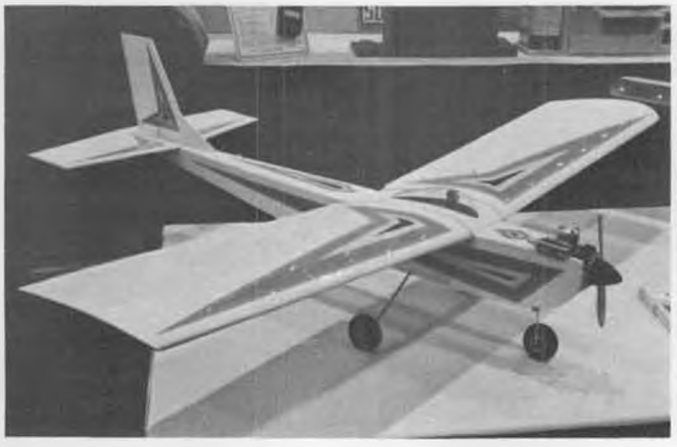
Although I went with the purpose of reviewing the show for my employee, Mattel, I did manage to keep an eye out for interesting goodies and information relevant to the hobby, and especially to the sport model aircraft enthusiast. It is interesting to note that this is not an especially great show for the modeling enthusiast, in that the orientation is toward the crafts end of the business, and most manufacturers of interesting R/C goodies make their big pitch at Toledo. As you will see, however, there was plenty of interesting stuff to look at, even though it was a small percentage of the overall show. The HIA show not only runs for four full days plus two days of HIA business meetings and workshops, it takes up two floors of the Convention center with booths and numerous other functional rooms as well. Ed Sullivan would have loved it . . . a really, really, big, big shew!

Let's start reviewing the interesting items with the aircraft, then move on through engines, tools, and materials. Most offerings were new versions of standard types of aircraft, but both Cox and Hasegawa hit the market with entries in the ultralight area. Cox has produced the "Phoenix" ultralight R/C powered hang-glider. It features 64 inch wingspan, aluminum construction frame work and rip-stop nylon wing. Power is the Tee Dee .09 as shown, but it will fly

Dallas HIA. Leisure Dynamics/Cox "Fibrini" electric powered R/C sport model.

Dallas HIA. One of many fine indoor models from Two Worlds International.

Dallas HIA. Hot new .21 from HB Engines.



Dallas HIA. A smaller Cowboy! Craft-Air's Cowboy 15, a docile trainer.

Dallas HIA. Joyce Mallerman (left) and Betty Boyle show off Sterling's new Piper Vagabond.

Dallas HIA. MRC's big foamie Cessna Skyhawk for .35 engines.

Dallas HIA. Midwest ARF foamie J-3 Cub, for .09 to .15 engines.

Dallas HIA. Leisure Dynamics/Cox Phoenix Ultralight R/C for .09 to .11 engines.

Dallas HIA. Intermatic spray unit, with many plastic parts.

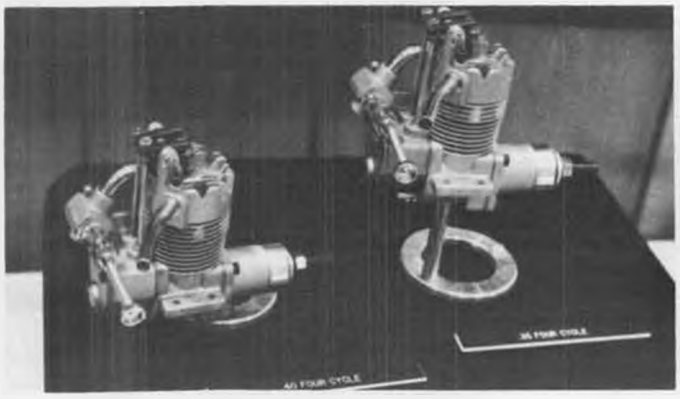
with any .09 through .11 cu.in. engine. Construction is in the ARF class, and you can control it with either 2 or 3 channels of radio. They had a continuous running film of the Phoenix flying. It seems to be a smooth and docile model, probably not capable of more than a carefully executed loop. I would hate to get into a negative "g" situation for long and let that airfoil reverse.

Hasegawa also showed a powered hang-glider, the "MontBlanc". It was powered by an Enya .09. Unlike the Cox model which may ROG, the Hasegawa is strictly hand launched. The radio is tucked unobtrusively up under the canopy (wing? sail?). The "MontBlanc" has a 75.5 inch wingspan and features a frame made of fiberglass tubing and aluminum hardware. The sail is pre-cut and sewn. They also point out that you can fly it either as a powered craft or as a slope glider.

Somewhat off the track, but also from Hasegawa, is its new 1/40th scale Hovercraft. This is an unusual project which uses a .19 to .25 size engine to provide the lift and an electric motor to provide

Dallas HIA. Hasegawa 1/40-scale Hovercraft for .19 to .25 lifting engines. Electric propulsion.

Dallas HIA. Pactra's spray can colors to match Monokote's film colors!



Dallas HIA. Enya's .40 and .35 four-cycle engines.

Dallas HIA. Olfa Rotary Cutter, an extremely sharp pattern cutting instrument.

Toys for Tots. Santa arrived by Goodyear blimp "Columbia" to collect donated toys. Mel Santmyers' Tomahawk in foreground. Vera Jordan photo.

propulsion.Operation requires a 2 or 3-channel radio system. It really looks like it would be a fun way to clean the leaves off your driveway! The box claims that the model works on all surfaces, solid or liquid. Definitely a year-round type of model.

Another new aircraft offering from Cox is the "Fibrini". No, I haven't any idea about the significance of the name. The model, however, should survive the peculiar name choice, because it is a really slick, sporty, electric R/C sport model. With its shoulder wing configuration and smooth lines, this is clearly a model intended to do more than lumber around the sky. The model is ready to fly, less radio. I presume that if you use the Cox/Sanwa equipment, the installation is virtually instantaneous. Performance as shown on the films was pretty sporty. Color is bright red; could they have had Ferrari in mind? Wingspan is 40 inches, and the airfoil is flat-bottomed. Styling, as you can see, resembles a combination of the old "Sport Trainer" U/C RTF and a "Warlock .05."

With Cox undergoing the significant changes it has in the last year or so, it was a pleasure to see that they are still making and marketing their previous three "foamie" models; the "Sportavia," "Piper Dakota," and "Cessna Centurion." I have flown or observed all three of these aircraft and they are uniformly good fliers.

As long as we are into the charms of polystyrene expanded bead foam (or popcorn plastic, if you will), let's look at a couple of other manufacturers. Cox is not the only manufacturer to display an extensive line of foamie ARF airplanes. MRC was featuring its absolutely humongous "Cessna Skyhawk." This mountain of foam takes a .35 engine and is large enough to fly politely as a trainer with all that power. Wingspan is over 6 feet! The airplane comes with engine, all control rods, hinges, and control horns factory installed. Tank and nosegear are installed, spinner, prop, glow plug, and muffler are all included in the kit.

N.W. Expo. MB's power boat columnist Jerry Dunlap, (left) with Expo Chairman Bob Pfeiffer. Jerry supplied photos and report on this first annual affair.

Toys for Tots. Silver tongued Sam Wright talked for two straight hours during air show, keeping public properly informed. Vera Jordan photo.

To back up the "Skyhawk" as flagship of its line, there are two smaller trainers, the "Trainer Hawk II" for .15 power, and the "Eagle", which comes with an .049 Testors engine already in place. To please the glider set, there is the "Young Star", which also includes an .049 engine and power pod to back up the slope and high-start capability. For the more advanced enthusiast, there are two high-performance models, the 1/10 scale "Messerschmitt" and "DeHavilland Chipmunk." The entire line of models speaks of quality molding and

N.W. Expo. Wayne Jessee and Phil Gerlicher (right) for Orline R/C Aircraft. Showed Deweyville Spcl., Sopwith Pup, and Buccaneer.

N. W. Expo. Jim Duffield (left) and Larry Van Osten, RCH car accessories, almost next door to Model Builder's office.

N. W. Expo Bob Dodgson and daughter, Heather, admire his handiwork on Camano fuselage.

N. W. Expo. Mark and Fran Schwing of EMS, showing new Eagle servo for 1/4-scale, 1200 mah battery packs, etc.

N. W. Expo. The voice of Kraft Systems, expert modeler, classic Ford automobile restorer Dan Lutz, shows new dealer display rack.

N. W. Expo. Ralph Roppo holding Roger Newton's sport 40 unlimited, and showing scale Bell 222 and Hughes 500D helicopters.

good engineering. The models are nicely pre-painted (so, by the way, are Cox's aircraft).

Last of the ARF foamies was the kit for Midwest's "J-3 Cub." Touted as a trainer, this is actually an excellent sport scale model which you can decorate beautifully in several configurations. Area is 300 in², and wingspan is 48 inches. Engine is rated at a .09 to .15, and controls can be anything from 1 to 4 channels. Jim Newman has demonstrated that this model makes a gorgeous "L-4" observation plane when painted in weathered "Normandy Invasion" markings. In addition to the pieces shown in the photo, the Midwest booth had a delightful version done up in the classic Cub Yellow format. Assembly of this model is clearly much simpler than for a classic balsa built-up model, but somewhat more work than the true RTF and ARF models.

While in the Midwest booth, one could not help noticing its new glider. Actually, the reason was that Ed Rogala kept pointing at it and talking about it. Otherwise, you could not have missed it, as it was the largest model in the booth and right out front. The new model is called the "Soarer," and is a 2-meter design. The design philosophy used in this aircraft is the classic "pack in all the area you think you can, then make it lift as hard as it can". This model uses a relatively low aspect ratio wing with an undercambered airfoil, and a very large lifting stabilizer for a total lifting area of 870 in². That gets the wing loading down to 6-3/4 oz/sq.ft. You can fly the model on 2 channels or add a 3rd for spoilers. Construction features full length, one-piece plywood fuselage sides, a bolt on wing installation, and the usual Midwest policy of filling those empty sapces in the kit box with useful hardware instead of tissue paper.

Another new glider was prominently displayed not twenty feet away in the Top Flite booth. This model also fits in the 2-Meter category, but is about as far

N. W. Expo. Paul Kinney for C.B. Associates, with Kawasaki, Kioritz engines, many BIG Bird control fittings.

N. W. Expo. Bob Benjamin has been elected to newly-formed international Society of Aviation Artists. Also wide interest modeler.

N. W. Expo. Bob Welch holds electric powered "Miss Budweiser". Many Tamiya and other car accessories.

N. W. Expo. Dave Redden holding forth for Tower Hobbies and its many in-house hobby items.

N. W. Expo. Bruce Batch, Paul Dunlap, and Bryan Batch, showing a wide assortment of hobby items. Yes, EK Logictrol still breathes.

N. W. Expo. Louise Cummings and John Gorham of Gorham Model Products, showing full range of choppers imported and domestic.

away in design philosophy from the "Soarer" as you can get. The glider is called the "Metrick" and was designed by Scott Christensen. The model is much smaller, with a wing area of 600 in² and a full flying, non-lifting stabilizer. The wing airfoil is semi-symmetric, having a modified Eppler 205 configuration with lots of "Phillips" entry. Construction emphasizes strength to withstand high powered winch launches and speed runs with heavy ballast. Wing loading is specified as being in the 7 to 8-1/2 oz/sq.ft. range. You could go as many as 4 channels if you opt for both spoilers and releasable tow hook. Deciding between the two gliders presents an interesting problem. You would have to examine your own flying ability, conditions, and any competition rules you fly under to make the choice.

A very welcome addition to the shelves of your local hobby shop will be the line of new indoor model aircraft being imported from Japan. They have several lines of models of varied levels of difficulty and, thus, performance. The most rugged are the "B-planes", a line of simple, all sheet balsa models featuring plastic prop, wire landing gear, and plastic wheels. Spans run just under 10 inches. Next up are the Mini-indoor Planes. These are living room fliers with a very thin plastic covering material provided for all but one in that series. The exception is known as the "Hummingbird", and it is tissue covered because it is a working ornithopter. It is cute, it really flies, and you get a moderate amount of the linkage and hardware pre-molded for you. Next up the line is the Tournament series of beginners indoors models. These perform impres-

Continued on page 100

N. W. Expo. Dave Schadel shows the 3-channel wheel "Championship Series" unit.

N. W. Expo. Hugh Milligan and daughter Fiona with Specialist radios.

N. W. Expo. York Daimond and Joe Yamada ready to answer questions about Futaba.

BUCKER JUNGMAN BU 131B

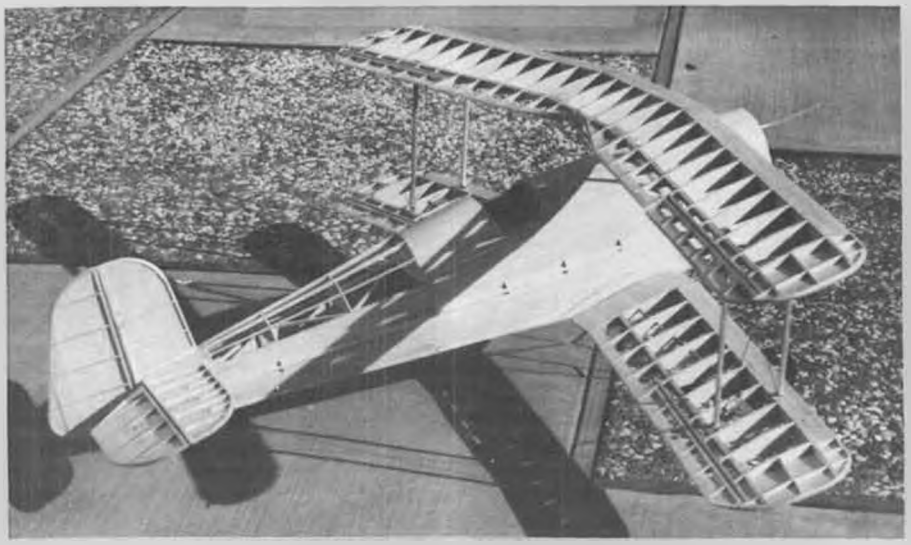
By GENE POND . . . Here's a lightweight BIG Bird in quarter-scale that will give you the realistic aerobatic capability you might only expect from a smaller model.

• The idea for this plane was born in the spring of 1980. I had wanted to build a new biplane to fly in IMAC competition. It had to be slow in flight and large enough to be highly visible. Also, it had to be fairly simple to build, yet have attractive lines.

I had been looking through full size aeroplane publications and various aeroplane books for ideas for a new plane. Then I found it . . . there it was, in Profile Publication No. 222, a Bucker Jungman BU 131B in Swiss markings, HB-URN. This particular plane was the property of a Swiss aero club, and had been converted to use the 180 HP Lycoming engine. The forward cockpit had been removed and forward turtle-deck modified to fit the new engine and cowling. The paint job was simple but good looking. It was yellow overall with light blue and white stripes on the fuselage.

This plane had been flown by Arnold Wagner, a Swiss pilot, to eighth place in the 1964 World Aerobatic Championships at Bilbao, Spain. Once back in Switzerland, Wagner complained about the inverted flight capability due to the flat-bottom wing section. In the winter of 1965-66 the Swiss aero club authorized the firm of Max Datwyler, at Bleinbach, to install a new set of improved-performance wings (symmetrical section) designed to improve inverted flight. With these new wings attached, inverted performance of HB-URN was increased dramatically. Unfortunately good things don't always last. While flying HB-URN, one of the Swiss club pilots attempted an outside loop from an altitude of only 600 feet. The plane crashed inverted, totally demolishing the plane and killing the pilot.

Now that I had decided on the plane I



Bones of the Jungman. Tail surfaces are a sheet core with ribs on each side. Construction is very basic, just lots of it! Original Jungman was two-seater.

Fiberglas cowl is formed over this carved foam male mold.

wanted to build, I needed a good set of three-views to work from. I found that Bob Holman's catalog listed one for the Jungman 131B in 1/8 scale, Catalog No. 2956. These three-views show two Jungmans, one with the original 105 HP Hirth motor in British markings, the other one in Swiss markings, HB-URN. Just what I had wanted!

I scaled the model 3 inches to one foot (quarter scale), which comes out to 72-3/4 inch span and 1400 square inches area. The model, with the Quadra engine installed, weighs 15 lbs, 4 oz.

I originally designed the model to fly with a Fox Twin. I had one of the first production run models. I had a little problem with break-in and misfiring, so I sent the motor back to Fox for updating. During the time the engine was in the mail, I installed a non-piped Webra .90 on a belt drive (Cline Drive). This flew the model very well, but lacked the vertical performance I desired. I debated about installing a tuned pipe on the Webra .90 to obtain more power. Then found out I would have to cut out half the side of the cowl to install the pipe, so I gave up that idea. Then I installed an original model Quadra, and performance improved considerably. The plane will now make a full vertical climbing roll before it slows down. There is more than ample power for sport flying the plane with either the Fox Twin or the .90 on a reduction drive. But as I built the model originally to fly in IMAC competition, I could still use more power than I now have, to go through the vertical maneuvers. I am now looking at one of the new Super Quadras . . . maybe this would give me the additional power I want . . . Hmmm.

CONSTRUCTION NOTES

FUSELAGE

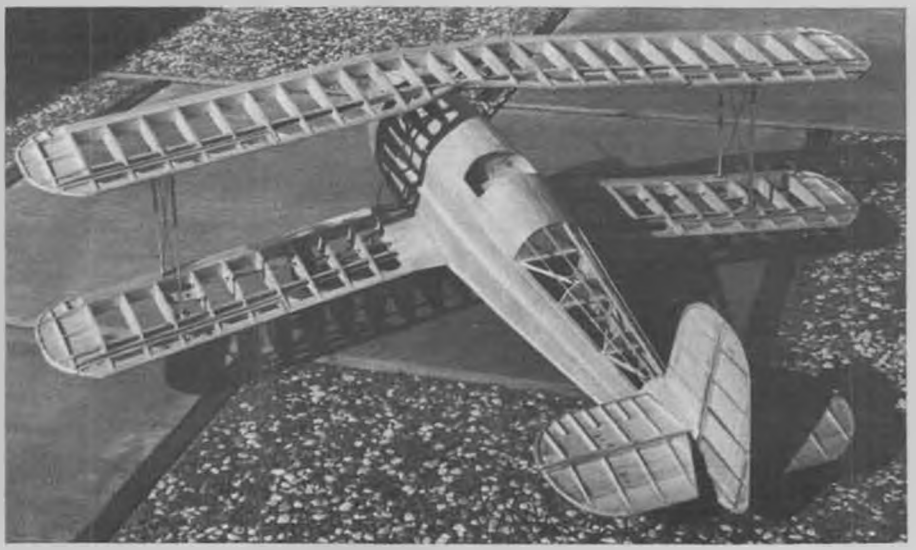
Cut out the 1/8 balsa side sheeting pieces and assemble pieces over plans. Mark locations of bulkheads and side framing on inside of sheet sides. Make sure you have one right and one left. Install 1/4 inch square longerons and vertical framing on inside of sheet sides. I used Willhold Aliphatic glue for all general construction, and epoxy glue for high stress areas. Install all fuselage doublers and wing saddle doublers. Crack fuselage sides and longerons at after end and bend in per top view of plan. Epoxy sides and longerons later, after fuselage assembly is completed.

Nail fuselage upside down on top of plans from F-3 to F-7. Block up after end back to tail post and square up tail post 90 degrees to board. Install 1/4 inch sq. cross braces and diagonal braces. Install 1/32 ply gussets on all cross braces to increase strength of joints.

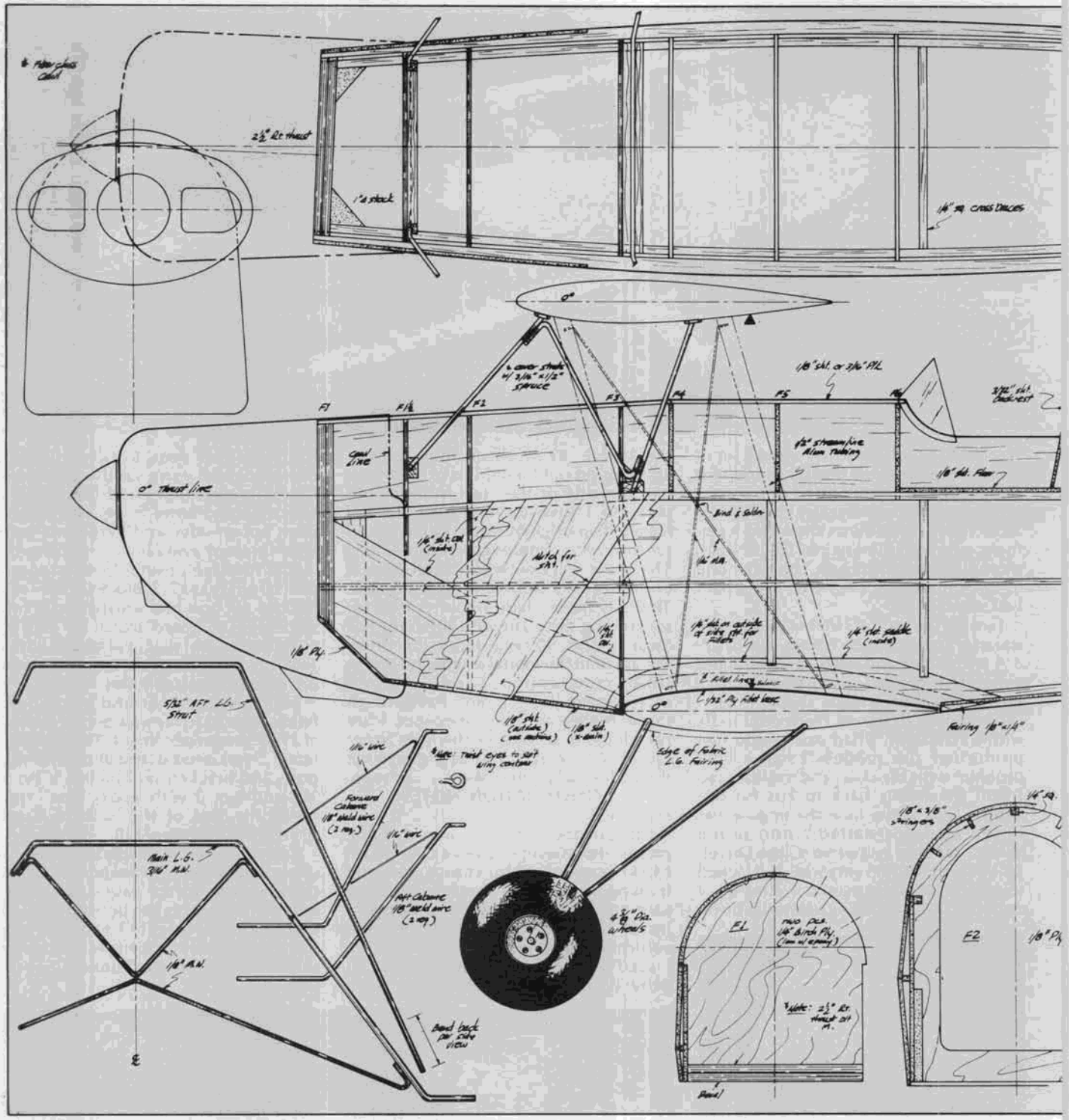
Turn fuselage over and install bulkheads from F3 to firewall. Set the firewall at 2½ degrees right thrust. This is important . . . you need it. Install cabane supports and brackets on bulkheads No 1-1/2 and No. 3 with epoxy glue. Now install the rest of the bulkheads and stringers from F4 to F110.

You can either plank the turtledeck or use rolled sheet. I planked the whole thing, it was not the easiest way to go, but I think it makes the best looking job. Install the 3/16 x 1/2 tapered side stringers. Notch out stringer for forward side sheeting from F3 to firewall. See the side view.

Another view of carved foam cowl mold. Wood bulkhead guides shaping.



Balsa and spruce are used throughout the construction. Only modification is removal of dihedral from both wings to improve rolling and knife-edge symmetry.



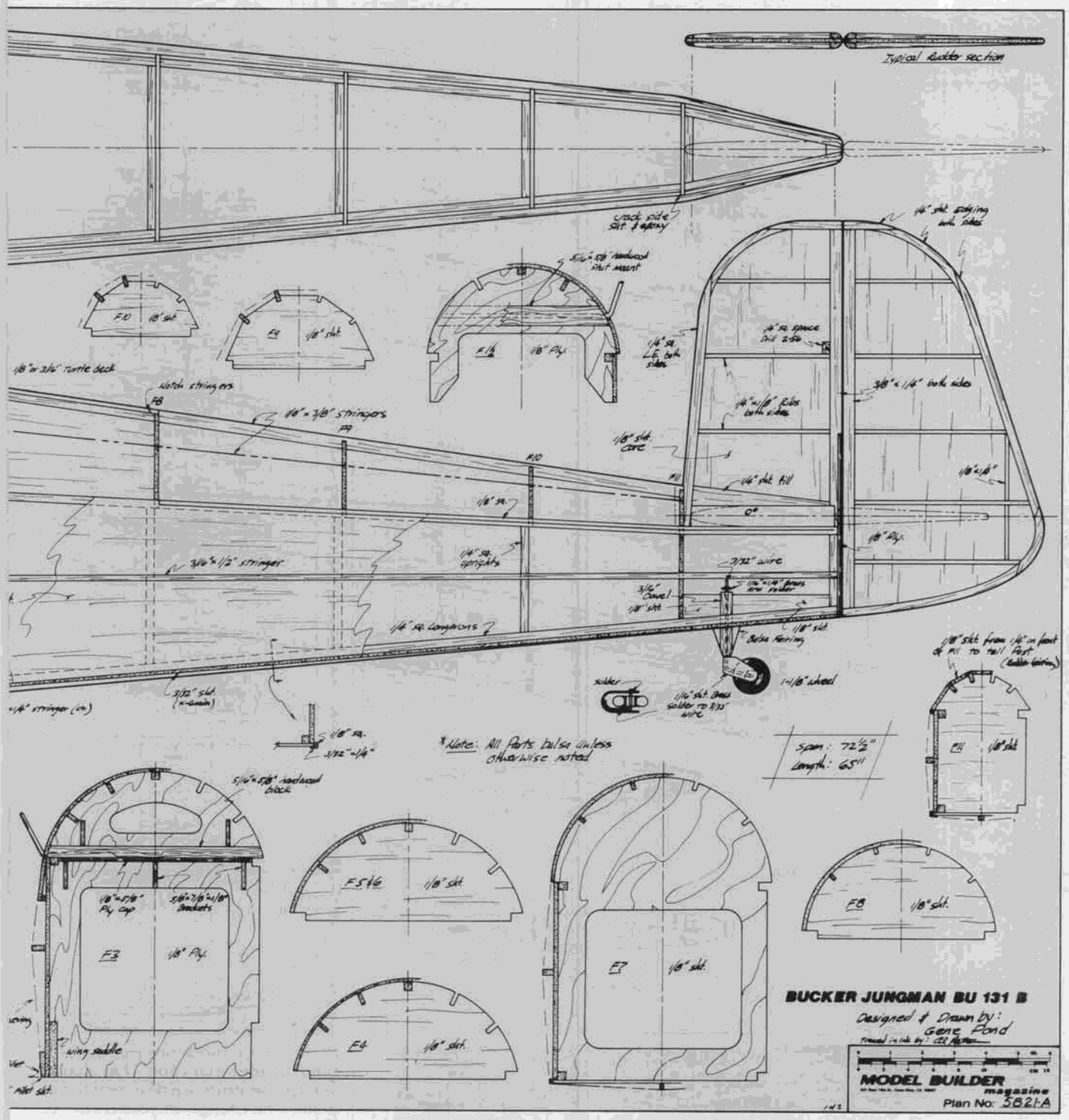
Install the 1/8 square fairing stringers on the fuselage sides top and bottom. NOTE: Before you install the fuselage bottom sheeting, see the Radio Installation notes. Install the tail wheel brackets and supports. Install the 3/32 bottom cross grain sheeting and bottom centerline stringer, along with 3/32 x 1/4 side fairing strips.

WINGS

I built the wings flat, with no dihedral. I reduced the wing dihedral to improve handling in point rolls and knife-edge flight. So far, it has worked out well. There is no adverse or positive roll factor induced by application of the rudder when the plane is in knife-edge flight. For those who wish to use dihedral, the scale dihedral is: top wing 1-1/2 degrees, bottom wing 3-1/2 degress. The wings are built flat over the plans and the ailerons are cut out after wings are completely assembled and finish sanded.

Start assembly by pinning front bottom spar down to plan. Block up bottom of trailing edge 9/16". Install ribs and top spars. Square up all ribs before gluing to spars. Install leading edge onto ribs. I used 3/8 x 3/4 stock for leading edge and cut it to shape after gluing to ribs. Shear web front and rear spars with 1/16 vertical grain sheeting. Note locations of 1/16 plywood shear webs at strut and wire attachment points on plan. Add wing tips and trailing edge fairing strips. Install dihedral braces. These are cut from hard balsa block and fit between top and bottom spars. Epoxy 1/8 shear webs on both sides of spars over the braces. Install leading edge and center section sheeting. Cap strip all ribs; pinch down and glue cap strips flat onto 1/8 sheet trailing edge.

Remove wing from plan, turn it over



FULL SIZE PLANS AVAILABLE—SEE PAGE 100

and nail it back down to plan. Install landing gear blocks, wing hold-down blocks, strut and wire attachment blocks. Finish sheeting on bottom of wing, install fairing strips and cap strips on bottom of wing. After wings are completed and finish sanded, cut out the ailerons. Add sheet facing to aileron cut out and leading edge to ailerons.

TAIL SECTION

The tail section is made of a center core of 1/8 inch sheet with a 1/4 inch sheet edging, 1/8 x 1/4 ribs, and 1/4 spars.

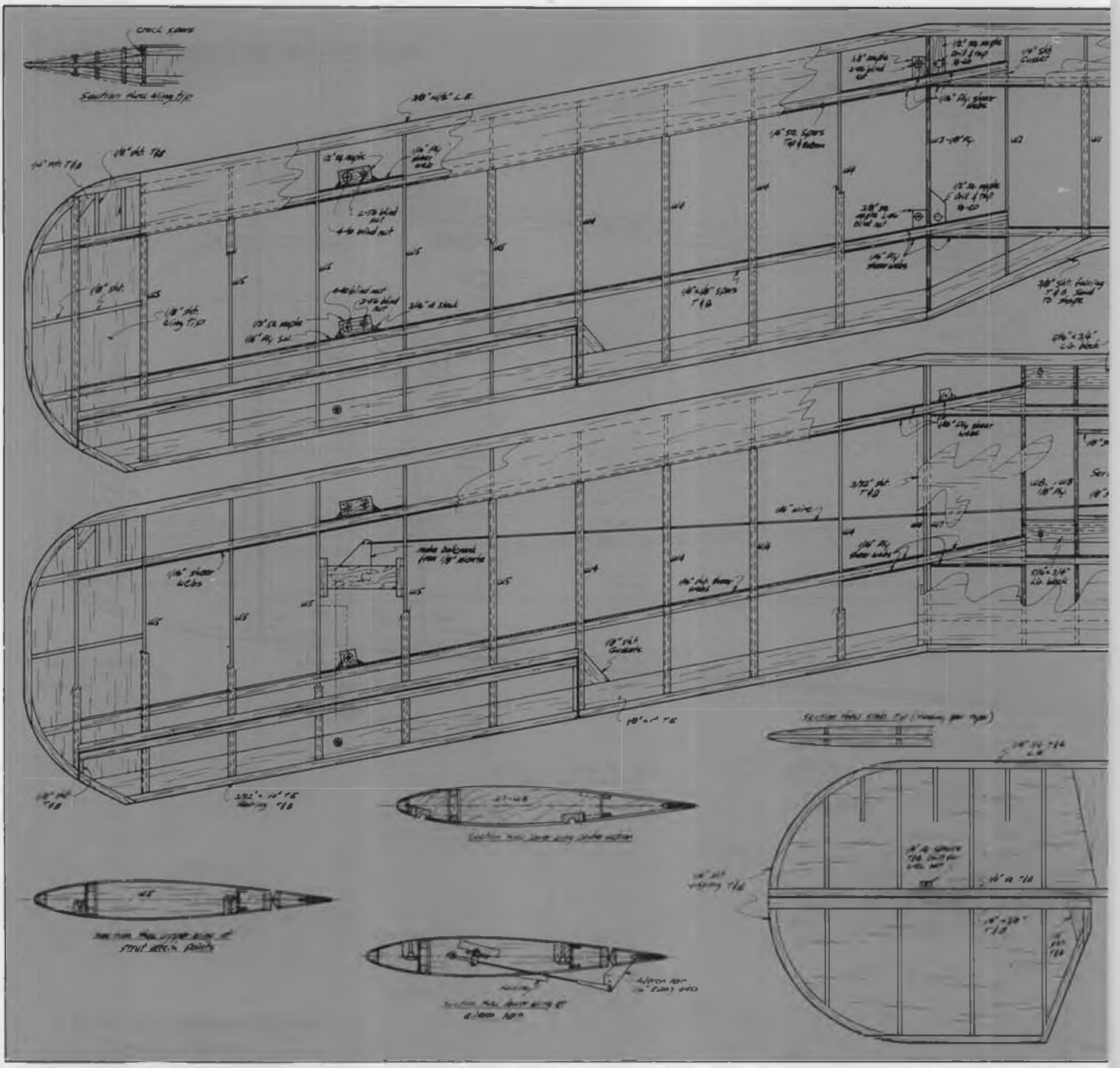
Start by cutting out 1/8 sheet cores. Transfer rib locations to both sides of cores. Pin cores flat to board and install edge fairing, ribs, and spars. After glue has set, turn surfaces over and pin back down to board and complete the other side. Add 1/4 inch square spruce blocks both sides for fin and stab stay-wire anchor points. Drill holes for 2-56 bolts. Sand surfaces to contour shown on plan. Inset 1/8 ply in bottom of elevators for elevator horns. Notch out tail post of fin and epoxy in 1/8 ply tail post, see fuselage side view.

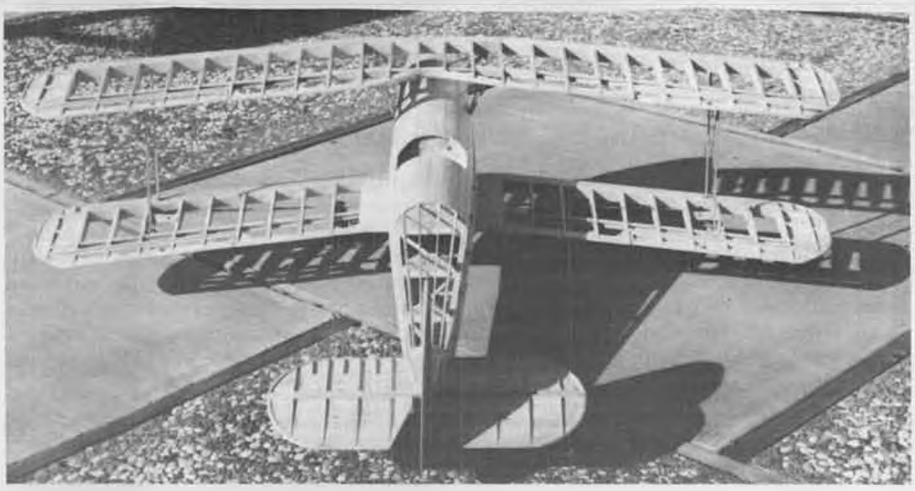
COVERING

I covered the entire model with Super Monokote and painted the fuselage stripes and cowl with K&B epoxy paint. The K&B epoxy paint matches the yellow Monokote very well. The model can be covered with any shrink type covering desired, or it could even be silked and doped. I used Monokote for ease of construction and to keep the weight down.

STRUTS AND RIGGING

I made two wood spacers cut to fit between the top and bottom wing to hold the wings in the correct position while I fit the cabanes and interplane struts. I used an incidence meter to



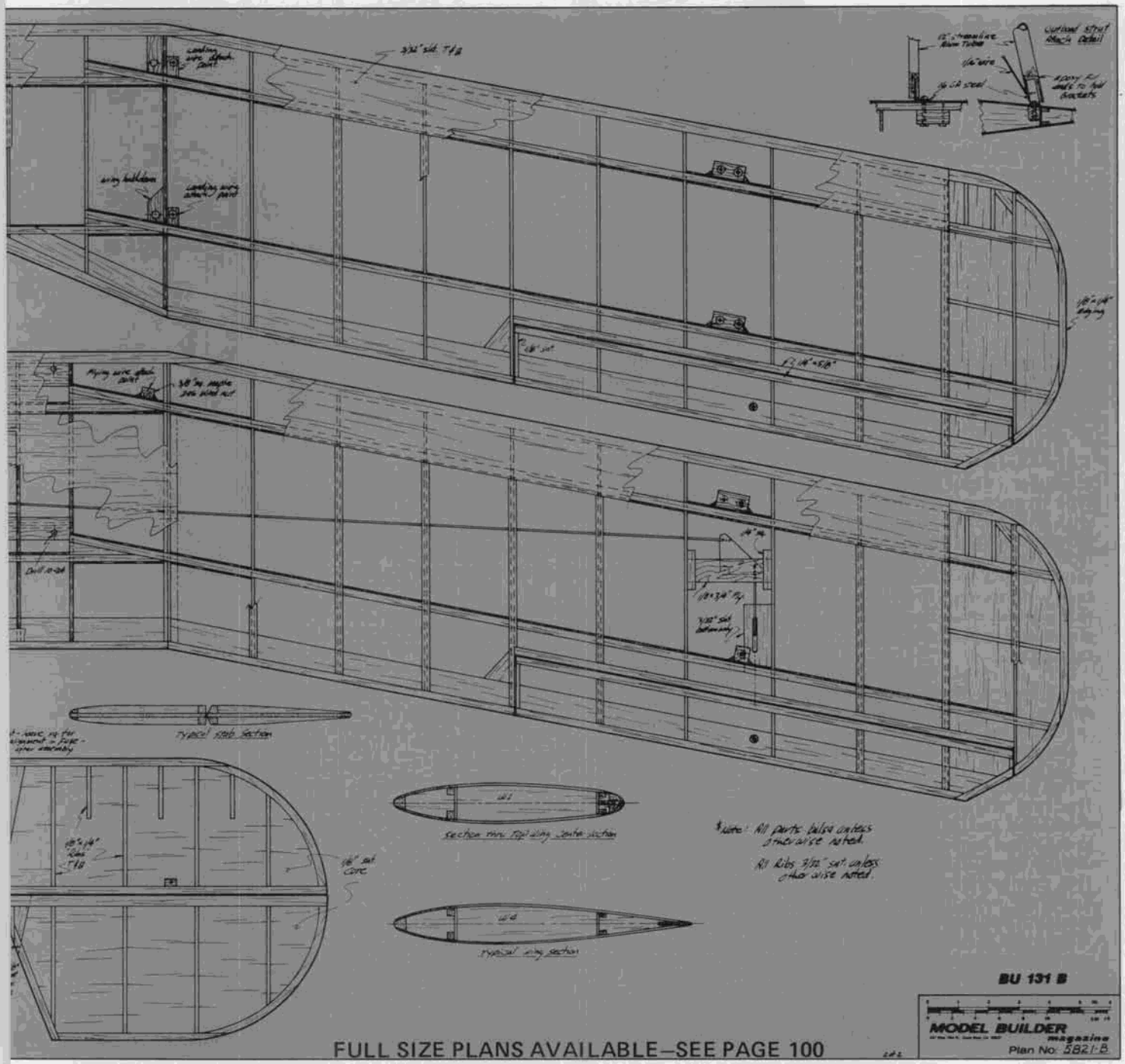


The Bucker Jungman at one-quarter size will take geared 90's, twin or single 1.2's, and Gene's is now powered by a Quadra, for that straight up power.

check the wings' incidence throughout strut and cabane installation. The cabane and interplane struts are designed to be adjustable, to change incidence or to remove wing warps, by use of washers inserted between ends of struts and wings.

Cabane struts are bent out of 1/8 inch steel welding rod, and are made in two halves to plug in from each side of the fuselage. After assembly and alignment of cabanes, cover struts with 1/8 x 1/2 spruce grooved out inside to fit on both sides of the struts.

Interplane struts were made from 1/2 inch streamline aluminum tubing with 16 Ga. steel bolting pads at each end. Interplane 'X' bracing was made from 1/16 music wire. Install the interplane struts after cabane struts are installed and secured. Fit the struts completely,



FULL SIZE PLANS AVAILABLE—SEE PAGE 100

make a dry run by bolting them in place to insure alignment before epoxying them. Remove struts and install a cotton dam about 3/4 inch down from the top end of the strut. Fill top ends with slow-setting epoxy and bolt struts back into wings. When epoxy has set, turn the airplane upside down and epoxy the bottom of the struts the same way.

Flying wires are functional (I have not flown the plane without them). Wires were made from 60 lb. test nylon coated fishing leader "STEELCORE" with "SEVENSTRAND" crimp type sleeves. Stay wires on fin and stab are 1/16 dia. music wire soldered into brass rigging pads. All pads were cut from .030 brass sheet.

Bend landing wire per plans. Wrap joints with copper wire and silver solder with hi-strength solder (Sta-brite). Cover landing gear legs with Super Coverite and paint with epoxy paint. I used four-inch Fox wheels on the original plane.

COWL AND FENDERS

I made a mold from one-inch styrofoam sheets laminated together to make a block 8 x 10 x 9 inches. Cut block to length of cowl. Make a ply bulkhead to outside of fuselage at No. 1-1/2, and one to outside of front view. Draw thrust centerline and vertical centerline on block. Glue ply shapes on each end of block. Shape foam to templates and fuse side view. Remove front template and round front to plan. Make radiators from sheet balsa per side and front view and glue onto shaped foam block. Coat mold with styromate . . . two or three coats will do it. Cover mold with two layers of six-oz. glass cloth. Add reinforcements in way of corners and radi-

Continued on page 72

Author/designer Gene Pond (yes, his brother is that S.A.M. character) with his Jungman.

FUEL LINES

JOE KLAUSE
P.O. Box 2699
Laguna Hills, CA 92653

PHOTOS BY AUTHOR

The Fox Eagle III .60 R/C engine swings the pendulum weight on the author's dynamometer. Torque gauge takes reading later.

• This is the last column of the mini-series on dynomometer testing. In the February issue, engine performance was discussed in terms of brake horsepower (BHP). This led to computation of BHP by using a dynomometer to measure torque and a tachometer to measure RPM. To compute BHP, simply plug those two figures in the following formula:

$$BHP = \frac{(\text{Torque in ounce-inches})\,(RPM)}{1008400}$$

The March column contained photographs of various aspects of a reaction type dynomometer. These, together with the accompanying text, should have provided a good idea of how this type of dyno works. This third part of the series, after a one-month rain delay, is a brief walk-through of an actual dyno test that will also show how BHP and torque curves are constructed and what they can tell us.

Let's get on with it. The engine used for the test is the Fox Eagle III .60 R/C engine. The test conditions were:

Temperature	68 degrees F
Dew point	32 degrees F
Sea level pressure	30.03
Test elevation	800 Feet

The fuel was 5% nitromethane, 75% methanol, and 20% Klotz KL-100 lubricant. After engine break-in, the Fox muffler was used throughout the test. This configuration and nitro content fuel is the most likely combination that modelers will use with the Eagle III.

During a dyno test, various loads are imposed on an engine. Each load test produces an RPM and torque reading. The loads are varied by using different size props. Ten different size props were used on the Eagle. With each prop the engine was peaked at full throttle prior to taking readings. In the accompanying photograph, you can see how the operating engine swings the pendulum weight. When everything stabilized, the amount of the swing was indicated by the pointer at the rear of the dyno shaft. Subsequently, a torque gauge was applied to produce the same indication, and then the torque was read from the gauge.

The ten prop-load tests produced the numbers shown in Table 1. If you care to plug them into the above formula, you'll come up with the ten BHP figures. It's a very easy computation . . . especially with modern-day pocket calculators. The time involved is almost insignificant compared to the actual engine test runs.

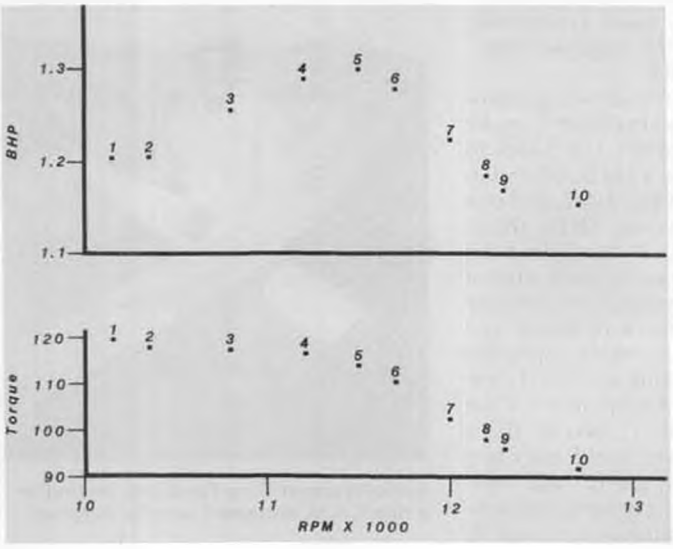
OK, let's graphically illustrate all these numbers. On the first combined graph, torque and BHP have been plotted against RPM. The number atop each plotted point corresponds with the test number from Table 1. If we connect these points with a line, we'll have the BHP and torque curves shown in the second graph. Voila! The fruits of a dynamometer test!

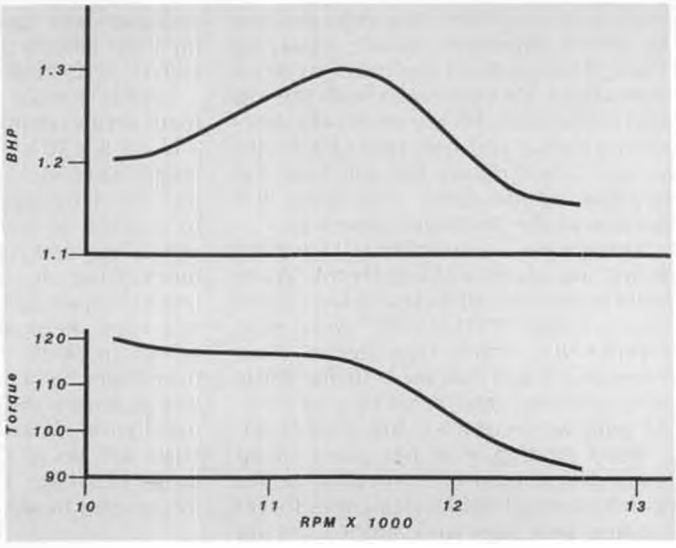
If you're thinking, "Big deal. What's so neat about a couple of snaky lines?" My answer is that they tell us quite a bit about the engine. The major things are: First, peak horsepower occurs at 11,500 RPM. That means you should use a prop that produces about a thousand less RPM on the ground. It will unload in the air and increase to the approximate RPM for peak BHP. To me, this curve is also a very vivid, visual reminder of the importance of using the right prop on an engine. Second, the BHP curve has a smooth transition. There is no sudden peak of power. It should throttle smoothly with a good, properly adjusted carburetor. Third, torque loss is very modest till slightly after peak BHP. Fourth, the curves give you solid meaningful numbers to help you to decide about whether or not to buy the engine. That's considerably better than nebulous hangar talk such as, "A real powerhouse."

Those are pretty good reasons for having the curves. Wouldn't it be nice if they were available for all engines?

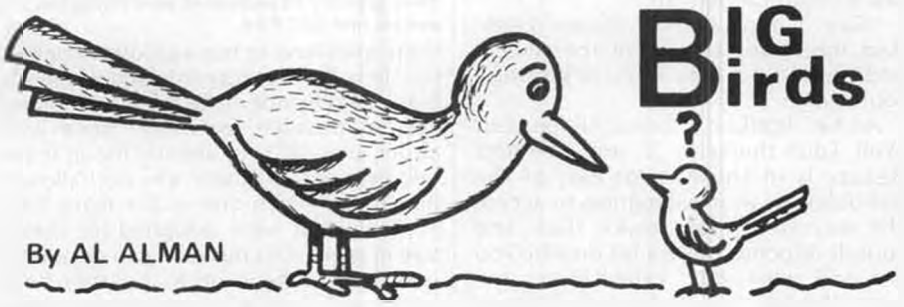
Guys, that's it for this series, except for a parting reminder. The best so-and-so displacement engine won't help a bit if you build a lead sled. Power's fine, but don't forget wing loading. As a brilliant aviation pioneer once said, "Simplicate, and add lightness."

Continued on page 66





Prototype of new Sig 1/4-scale J-3 Cub, built by Ken Breiting, Malcom, Iowa. Powered by Webra 60 speed at this time. Weighed 15 pounds at takeoff. Alman's Sig clipped-wing version will be tested with methanol and diesel engines for comparison, for coming product review.



PHOTOS BY AUTHOR

• My wife can't help but laugh at the way I lay in bed and read my model magazines. Actually it's not the way I lay that gets the guffaws, but how I read; I start at the back where most of the ads are. I can't believe that I'm the only one who does this because, after all, aren't those ads the stuff our "wish-books" are made of?

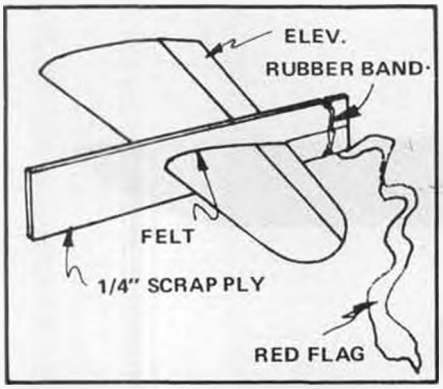
And as I pour over the myriad of advertisements, I usually get a case or two of the "peeves." Now you know what peeves are; everybody's got 'em (no Clyde, it's not one of the latest imported social diseases), and most of us have a list almost as long as our arms. The ones at the top of my list just happen to include some of these ads.

Now it stands to reason that no manufacturer is going to bad-mouth his own product, so naturally, any and all ads you read are gonna tell you how super-good the products are. We either have to go along with the pretty pictures painted for us by the superlatives, or we look for someone who has tried that particular item and find out what he thinks about it. However, with a new product it's often impossible to know how valid the claims are until we try it ourselves.

Okay, let's look at the ads for gasoline engines. All other things being anywhere near equal, there just ain't no substitute for cubic inches when you're talking power. And obviously, there are quite a few different engines available at this time. And just as obviously, each one of these engines has an optimum application, in terms of aircraft size and/or weight. Yet many of these engine people want us to believe that their powerplant is "*the* engine for all seasons and all reasons," and back up their claims by throwing nice looking RPM and horsepower figures at us. But as nice as these numbers look, they're absolutely meaningless. Why? Because without mentioning what specific prop was used, those RPM and HP readings don't mean a damn thing.

There's no doubt in my mind that the figures presented are quite accurate . . . the only problem (and it's a biggie) is

J. W. Jones (last month's trailer man) with his assembled Fleet. Flies with Kioritz power. Member of North Texas Miniature Aircraft Association.



Save those servos during transport with surface "Keeper". Takes strain off servo gears, etc. Cut from scrap 1/4-inch ply, line cut-out with felt tape. Slip over movable surface, strap with rubber band. Don't forget red flag!

that a small and very inefficient prop had to be used to achieve those very high readings. And that means if you used the same prop (assuming you could find out the size) or tried to match that HP, all you'd get would be a reasonably fast taxi, a lot of noise, and an absolute guarantee to become an accident just begging for a place to happen if you were foolish enough to try a takeoff.

This horsepower race has become a game of numbers that can be played by anyone who has a pocket calculator. I prefer to know how many pounds of thrust can be delivered with a specific prop; yet, even here it's not cut and dried, because static readings are one thing, but it's how *your* bird flies with a particular prop that's really the bottom line. Also, I'm never sure what kind of "fish scale" was used to obtain the thrust readings I'm being told about.

It all boils down to this: don't pay any attention to RPM and HP figures when the prop size isn't included with the other data; and do try at least two or three different props in the air to pin down what's optimum for *your* BIG Bird. I really don't understand why we get this idiotic treatment in advertising, because all the engines are darned good, and vast improvements over what we had to fly with just a few short years ago; these engines can easily stand on their own merit, now.

ALTERNATIVES

Okay gang, now that I got my catharsis out of the way, let's pick up where I left off last month. I don't know what's happened to our thinking about BIG Birds, but it has become stilted in many ways. The term, "Quarter Scale," is used by everyone to describe just about any BIG Bird . . . which, of course, is absurd. And the ridiculous idea that the only way to enjoy BIG Birds is to fly with a gas engine pervaded our ways and means; there *ARE* a number of viable alternatives to the gasoline burner, as you'll soon see.

I'm reminded of the conversation between Archie Bunker and wife Edith after they'd met a very obese classmate of hers at their 30th class reunion.

"Edith," sez Archie with a scowl on his face, "we both looked at the same guy. Howcum I saw a great big blimp and you saw a beautiful person?"

"Gee, I don't know," replied Edith. And then after a moment she smiled, and added, "But I think you're beautiful too, Archie."

Archie Bunker a beautiful person? Well, Edith thinks so . . . and why not? Beauty *is* in the eye (or ear) of the beholder, so *your* willingness to accept the way an aircraft looks, flies, and sounds depends quite a bit on who *you* are and what *your* expectations are. Even though the percentage of guys who lean toward scale is higher in the BIG Bird category than it is with those who fly the smaller stuff, you've still got one helluva lot of fellows to whom the name of the game is flying, and they're not at all embarrassed to be caught putting a non-scale or un-scale biggie through its paces.

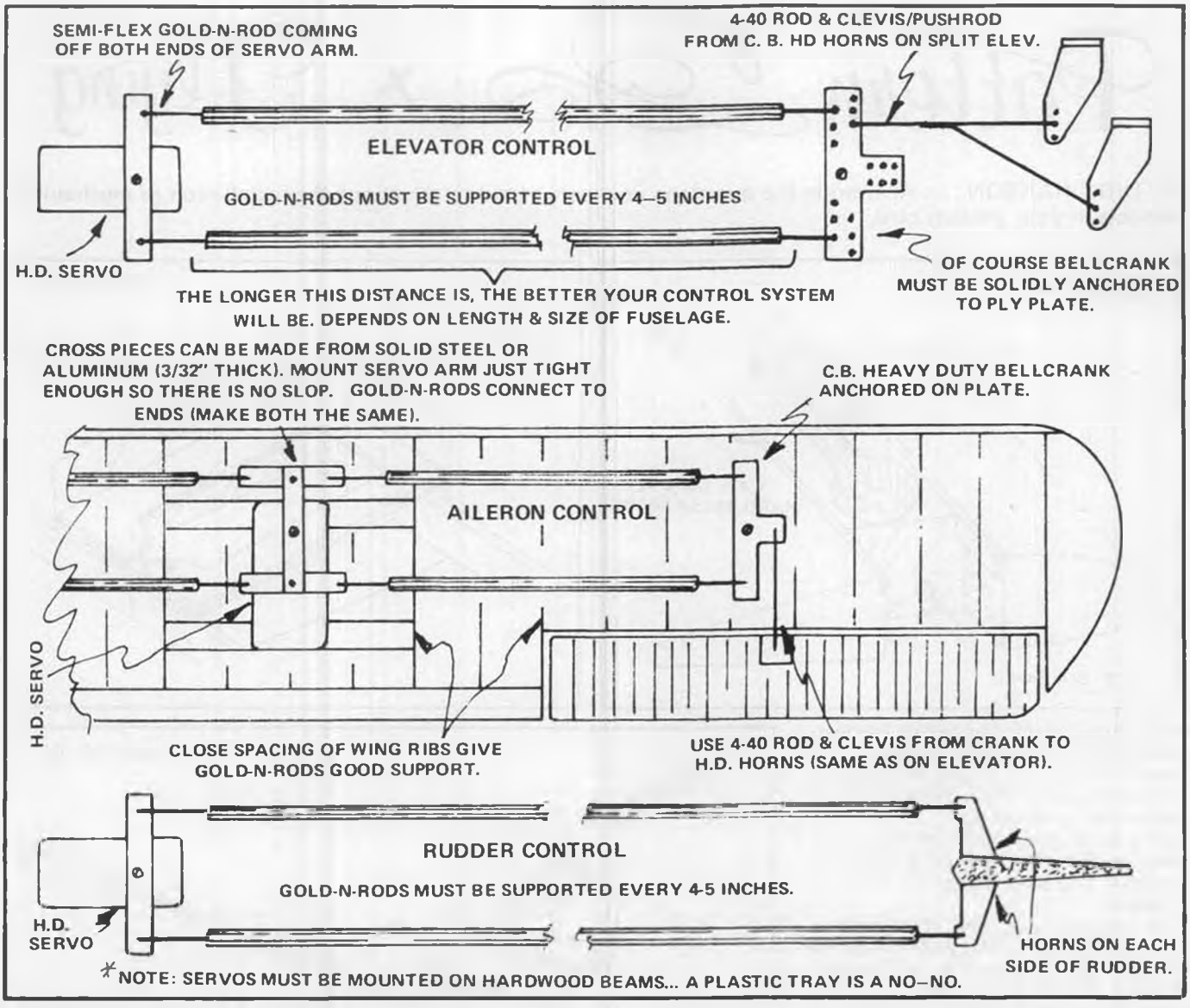
Although our BIG Bird movement is relatively new, we've already done an enviable job of establishing many myths and perpetrating at least the same number of old wives tales . . . which newcomers are blatantly told to accept as the gospel. Why, for instance, must these guys have to buy a gasoline engine for their first venture into the realm of biggies? Why not make the transition as easy as possible for them. Since just about every R/C'er already has at least one sixty and/or ninety, why not "allow" him to start with one of the many kits available that were designed for these size engines. Of course he can get a BIG one-lunger if he wants to, but then he's faced with having to re-engineer that same kit to insure it'll have the necessary strength and integrity to handle the increased vibration and the stress caused by virtually doubling its normal gross weight.

Terry Hodges, Farmer Branch, Texas, with his Webra 91 powered Balsa USA Cub. Smiling Terry says it's 14 pounds of pure flying fun, and his first BIG Bird.

Look . . . when someone first gets into R/C, he's usually told to start with a fair-sized, stable bird that will allow him to concentrate on learning. Well, what's wrong with this same approach for guys trying BIG Birds for the first time? They'll end up with a ten to fourteen pound airplane that's easy to fly due to the outstanding wing loading, and it can be built stock; a really relaxing project. In

Fort Worth's own Chuck Cunningham with his "30% Flybaby". Span 8 feet, 17 pounds, Quadra. Chuck is Chapter 21's Vice President.

Al Willaert, Carollton, Texas, with A&M Twin .90 Drive on Charlie Viosca's Big Stick. Power and sound awesome with 22x10 prop.



my club, the 114th R/C Aero Squadron, four different hard-core small airplane people took on a Balsa USA Cub or one of the Nosen Kits (the Citabria seems to be the favorite), built them with just a few small personal touches added, stuck a ninety up front, and had a ball. Terry Hodges is one of these fellow clubmembers, and as you can see from the photo, he's very happy with his choice. (I think a ninety is too much for these light birds, and that a good sixty will take care of the mild aerobatics.)

I'm well aware of the reasons given for going to, and using, gas engines. And I've been equally guilty of unnecessarily pushing these big engines in lieu of the smaller ones whenever an individual would mention that he's interested in BIG Birds. Let's take a good look at the "stout" reasons we're so quick to throw around with impunity.

1) Because they swing a larger prop at much lower RPM, gas engines sound much more realistic than the angry mosquito-like noise of the methanol burner turning its typically small prop.

This is true as far as it goes . . . but don't go away because there are a few important points to consider here. For openers, you won't be swinging a typically small prop on that sixty or ninety when it's residing in your nine-foot bird. Instead of an 11x7-1/2 or a 12x6, you're gonna be using something between a 14x4 and a 16x6, so the prop is going to be moving much slower with a lot of that objectionable high-pitched whine eliminated. Couple this with an effective muffler and low or no-nitro fuel (less of that sharp bark), and you've got a much more acceptable sound.

Then, there are a lot of guys who don't mind the sound of a methanol engine when it's turning so much slower with that bigger prop and are content to stay with that combination (don't forget what Edith said. . .).

And where is it written that you've gotta stay with methanol? Did you know that a diesel conversion for your engine is a very viable option, and will not only allow you to swing a larger prop more effectively than you normally would, but will easily match the highly touted realistic sound of gas engines. Davis Diesel Development has diesel conversion kits for most of the popular engines, and from what I can tell about my Fox Eagle III conversion, they should all work very well. I mounted the Eagle in my venerable Aeronca C-3 and made about a dozen flights on glow fuel before converting to the diesel configuration. I've only bench-run the diesel so far, but should have some interesting comparisons and data to present next month after I get at least an equal number of flights running on diesel fuel.

There are a few other considerations for power: have 77 Products convert your engine to ignition; or flying something like Bob Boucher's 90 inch, 8-1/2 pound, (really) Quarter-Scale Velie Monocoupe with an Astro 25 electric motor and reduction drive. The electric route would be a good way to go for the surprising number of R/C'ers who have an acute flying field problem due to noise.

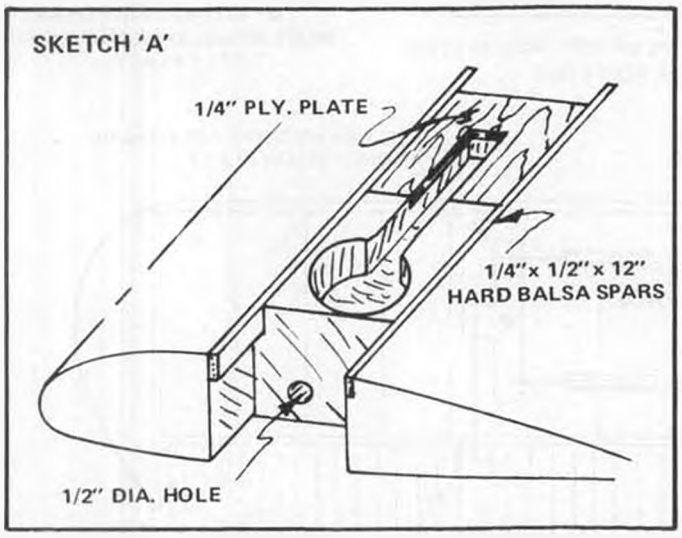
2) Gas engines are very inexpensive to run, which can make for a large saving over a year if you're a hard-core flyer.

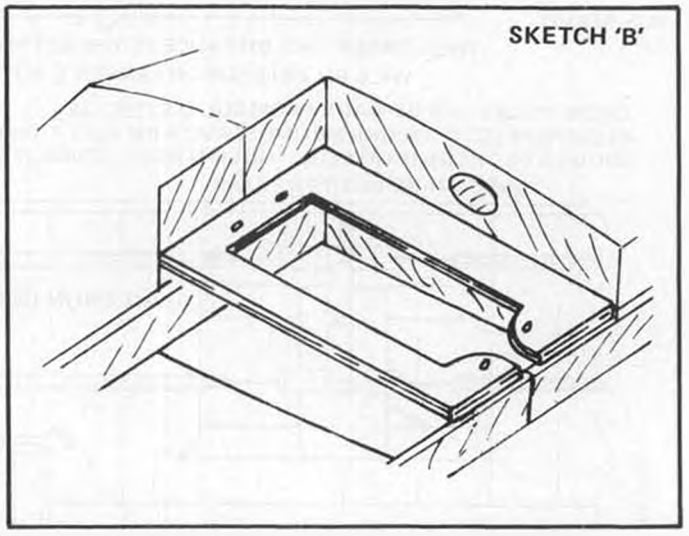
Even though too many of the figures I've seen and heard have been blown out of proportion, it's true that fuel for a gas engine averages out to be one-quarter of the cost for the same amount

Continued on next page

Pattern Flying

By DICK HANSON . . . Answering the questions you were afraid to ask about the installation of mechanical retracts in your pattern bird.





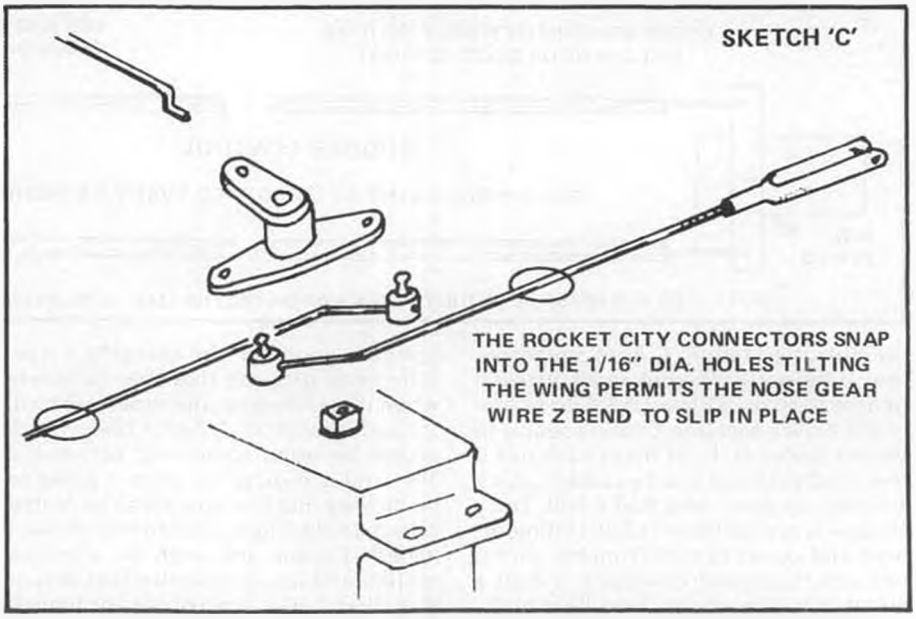
• Judging from the phone calls I receive, many fliers are a little frustrated by the work required to install mechanical retracts in pattern birds. Generally these are tricycle gear set ups.

We have tried many arrangements, but the one we are describing here is the simplest and most fool-proof setup we know of.

It requires only one 180° servo of moderate power and speed. We use the JR 203, the Futaba S-8, or the O.S. Cougar retract servo. These servos all operate in a similiar fashion, that is, they shift approximately 180° when switched. They are not adjustable as to travel (not proportional).

The mechanical retract systems which fit this setup are the Southern Pro (Dave Brown), the I.M. (Circus Hobbies) the Royal, the Violett, and probably a few others which don't come to mind at the moment.

The construction described here is for



Continued from previous page

of glow fuel or diesel fuel. However, that's not the whole story, either. Since most guys already have that sixty or ninety, they wouldn't have to fork over a bundle for another engine.

Also keep in mind that we're talking about building a bird that'll weigh between 30 to 50 percent less than its Quadra-powered cousin, which means that standard, less expensive hardware and landing gear can be used . . . *safely.*

And don't forget that 14 to 16-inch props cost less than 18 and 20-inch props.

Another point is the cost of the kit itself; those designed mainly for glow engines cost less than the ones designed specifically for chainsaw and blower types.

All of these very tangible savings add up and narrow that initial cost gap considerably, so much so that any differential is hardly worth considering. But even if that cost gap differential remained fairly large, with the cost of entertainment being what it is today, seven dollars for a gallon of fuel that'll give a weekend of flying fun ain't a bad banana in my book.

Regarding diesel fuel: even though it does cost almost twice as much as a low nitro mix, the diesel will easily yield *twice* the mileage per ounce . . . so practically speaking, it would cost the same as five percent glow fuel.

3) A gasoline-powered bird flies better than its glow or diesel-powered counterparts.

Now that's a bunch of horse-puckey; work out your wing loading and power loading formulas and see what you get. Because the wing loading of your lighter bird is so favorable, you're gonna end up with an effective power loading that comes mighty close to that of the much heavier aircraft. The wind here in the Dallas-Ft. Worth area is usually quite healthy, but even my lumbering, 15-pound Aeronca C-3 handles well; and I haven't noticed anyone else with a 15-pound BIG Bird having a tough time, either.

Okay, let me wrap this up (for now) by

foam wing aircraft. We have used it on Tipos, Curares, Magics, EU1-As, Phoenix, plus many other designs.

To eliminate possible wing fracture at the wheel well, we use the plate approach shown in sketch (A). The plate is epoxied to the spars. We have never seen one of these torn loose in even the most violent crash. It's also quite light.

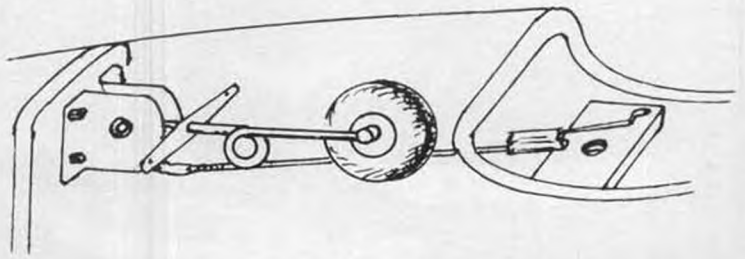
The servo installation is made easy by the plate setup shown in sketch (B).

Here's how the sequence goes. Refer to the sketches as required.

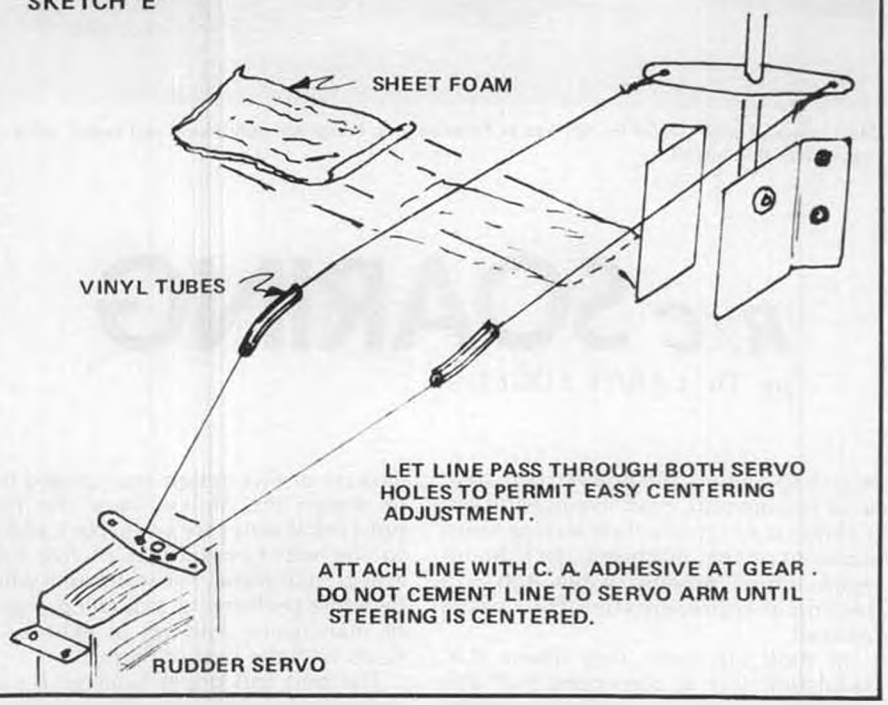
MAIN GEAR

1. Cut the servo location into the foam before sheeting the wing. See sketch (A) then cut a 1/2-inch diameter hole for the push rod.
2. The spars and plate are installed at the same time, See sketch (A) use epoxy.
3. After the sheeting is completed, cut away areas for gear and servo.
4. After wing is joined, make a 1/8 ply servo plate which is a push fit into the foam cutout. See sketch (B).
5. Next, make a cutout in the plate to fit your servo, See sketch (B).
6. Now screw the servo to the plate and push the servo down as far as necessary.
7. Using epoxy and a little filler (microballons), make a fillet all around the plate.
8. Remove the servo and brush epoxy lightly around the exposed foam.
9. Install main gear and retract servo. Use sheet metal screws.
10. Using threaded push rods, attach one to each gear and let the unthreaded end extend over the top of the servo.
11. Extend and retract the gear by hand and note the full stroke required to activate the gear and lock it solidly.
12. Using a piece of masking tape on the servo end of the pushrod, make a pencil mark which shows where the end should be. It should move to either side of the servo output shaft by the same amount.
13. Remove the pushrod and cut 1/8 inch longer than marked. Then, solder a Rocket City snap-in connector or use any comparable device such as the Goldberg or Dubro, but solder these, don't use the set screw.
14. Now bend the wires. See sketch (C) for approximate bends.

SKETCH 'D'



SKETCH 'E'



15. The push rods should require little or no awkward bends using this technique.

NOSE GEAR

1. The nose gear should be mounted to a perfectly flat plywood firewall using 4/40 Allen bolts and blind nuts.
2. With the wheel in place, actuate the push rod attached to the gear. It should lock easily in either position.
3. Now make a two-piece push rod using a sleeve to connect the two pieces. The shape of the wire will be as straight as possible with a 'Z' bend on the end to slip into the servo arm. See sketch (D).
4. Now hook up the steering, using woven, 15-pound fishing line. The gear should lock down easily by hand as the steering lines go taut. See sketch (E).

We have used this setup for the past five years on many birds with no failures except for the steering lines catching on the wheel. A thin foam pad cured this.

I hope you try this setup if you have stayed away from mechanical gear because you thought it was complicated. •

---

mentioning something that everyone seems to have overlooked . . . and that is a wonderful feeling called confidence. Now we all know that it doesn't come easy, and it's rarely present when worry or concern are close to running amuck. In case you didn't know it, one helluva lot of guys feel ill-at-ease with gas engines because they are an unknown to them, and because they're very much intimidated by those huge props. These same flyers feel more relaxed and comfortable with their "old" sixty or ninety because they're familiar with it and trust it. This all adds up to a nice secure feeling of confidence that makes for safe and

Continued on page 79

Bob Morse's quarter-scale F4B-2 is a real eyecatcher.

Bob Williams with two of his Shrikes at Torrey Pines. Wings are polyhedral and swept, with extremely thin airfoil.

One of Bob's Shrikes performing out over the calm Pacific Ocean.

R/C SOARING

by Dr. LARRY FOGEL.

• Jack Chambers and Bob Williams have a lot in common. Both live in Southern California and spend their waking hours close to flying machines. Jack builds wind tunnel models, while Bob is a technical representative for Cessna Aircraft.

In their off-hours, they design R/C sailplanes. Jack is convinced that thin airfoils are the way to go when operating in the low Reynolds Number regime. Less drag, greater speed, and therefore improved flight performance. That's not the whole story, but we'll take that up in a coming issue.

Recently Bob designed the Manta, a lightweight, beautiful aerobatic craft. Success of this design encouraged him to design the Shrike. Here the thin, polyhedral wings are swept back adding to the maneuverability of this high aspect ratio plane. I've watched it whizz by while performing a dazzling display of maneuvers. And yet in light air, it floats with the best of them.

The pod and boom fuselage is convenient to build; the boom being a fiberglass or graphite arrow shaft. Bob makes the pod flow into the boom by carving and sanding surfboard foam into the desired shape. Although you can flex the boom in your hands, there's no evidence of flutter at high speeds. Clearly Bob has a talent for putting together good designs.

★ ★ ★

It's tough to talk about some things. How do you tell your sixteen-year-old son who just started driving that you got a speeding ticket for going 35 mph in a 25 mph zone? And, why is your favorite plane in shreds as a result of, you should pardon the expression, a crash?

Most of use believe in causality. Every crash had a cause. First inclination is to blame the radio. Why not? It can't talk back, and this relieves you of any responsibility. Maybe the receiver quit, or the battery pack just gave up the ghost.

Or, could it have been pilot error? Was there a downwind stall prior to landing? Did you see that other model in time? Did you fail to flex the wings and carefully inspect the fuselage for structural damange after the hard landing?

Over the years I've had my share of crashes . . . and some *were* actually due to battery failure. But the most aggravating problems are caused by intermittency. Everything works fine . . . except once in awhile! Well, recently I've had just had just such a grueling experience.

Tangerine Soaring Champs 2-Meter winners. (l to r): Jim Smith 5th, Joe Ruth 2nd, Dave Elias 3rd. Kneeling (l to r): Chris Ruth 4th, and Ed Wright 1st. Phrophet design used by 2nd, 4th, and 5th.

Tangerine Scale winners (l to r): Dave Elias 2nd, Stan Pfost 1st, and Dan Langcaster 3rd. C.D. was Bud Moore.

Stan Pfost, Orlando Buzzards, launches First Place Scale Cirrus.

Bob Williams loaned the prototype Manta to me for evaluation. I installed my radio and threw it off the cliff. It felt just great. I was just getting it trimmed out when there was a hard down glitch, or could that have been turbulence, a tip stall or . . . Well, I quickly brought the plane in for a safe landing and range checked the radio. No problems, so I put the bird back into the air. After another few minutes of fine flying, the same glitch appeared again, but this time with a vengence. I turned the plane toward me, held the transmitter high overhead, shouted my frequency color . . . then watched the crash!

After the painful repair, I checked the receiver and servos by flying them in my old reliable floater. It went to maximum range without a whimper. I then put the gear back in the Manta, and for extra security, separated the antenna from the servos. Everything looked great once again.

At the flying site it range checked, so up into the air. It flies great. I love it. Then suddenly it's erratic, then completely uncontrollable. I tried and tried, but to no avail. Another crash!

Talk about being aggravated. Well, I stripped out the radio gear, but this time I had the receiver checked by the factory. It was returned with a note: "We replaced a diode that might have been intermittent."

"Aha!" I thought. "We've got it licked now."

After this repair and reinstallation, I started the check-out again, but this time I was lucky. It wouldn't range check, and the servos jittered madly. In attempting to turn it off, I jarred the battery pack, and suddenly we're back in business. It's working O.K. again. Some further probing finally revealed a cracked wire between the cells and the battery pack plug. In one position it was fine. But a slight jar was all that was needed to produce arcing and an open circuit. Evidentally some maneuvers stretched the wire. Others didn't.

An unusual failure mode? Maybe so, but now I've learned to pull on the wiring before each flight. It's like flexing the wings to make sure they will withstand the load. Better to have it break in your hand than in flight. My faith in causality has been renewed. I now look forward to flying the Manta through its full flight regime.

★ ★ ★

Each year, the Tangerine Soaring Championship draws competitors to Orlando, Florida. This year the high cost of travel cut the number of out-of-state entrants (although some came from as far away as California). The weather was made to order . . . three days of clear air with temperatures in the low 80's and five-knot winds. There were two-meter, open class, and scale events. Thirty-two pilots took part in the two-meter event, while forty-four signed up for the open class seven-minute precision/duration and ten-minute triathalon events.

Stan Pfost took first place in scale with his Cirrus. Dave Elias placed second with a Kestrel-19, while Dave Langcaster took third place with a beautifully built Modified Franklin. Three of the top five two-meter slots were captured by pilots flying the Prophet. Stan Pfost and Jack Hamilton ranked first and second in the seven-minute event with their 132-inch span Legionairs, while Chris Ruth won first place in the open triathalon event with his two-meter Prophet. Two of the top five pilots in this event were flying the Bird of Time.

Say, if you happen to be in Florida, don't forget to visit the Everglades National Park. Here's your chance to watch the real osprey, heron, egret, and pelican in flight and even fly your sailplane at the Flamingo Visitors' Center (with permission of the Park Ranger). I did just that, challenging those already in flight to consider this new species.

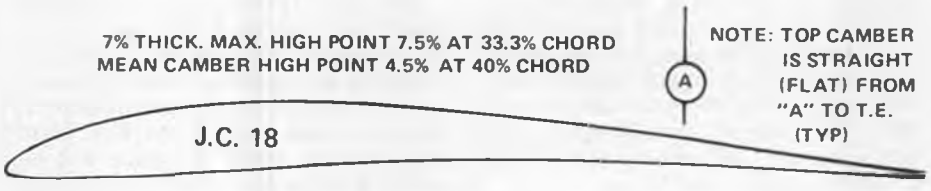
Don't forget your camera. It's easy to get good pictures of the birds when they're not in flight. They stand perfectly motionless. You don't have to say, "Hold it." But capturing them in flight is far more difficult. You'd better be quick on the trigger.

★ ★ ★

Some friends dropped in the other evening. After the usual chit-chat, we retired to my workshop in the garage to contemplate more serious matters. I pointed to the Windfree hanging from

Continued on page 94

Dan Langcaster with his Franklin primary which placed Third in Scale. All Tangerine photos by Frank Collins.



Jack Chambers' sailplane airfoil section, as mentioned in text. Leading edge radius is about the size of a standard round toothpick in diameter, and constant from root to tip, allowing for less washout being required in tapered wings. Trailing edge is a constant 1/32-inch thick.

Would you believe this Fairchild FC-2 was entered in Sport Scale competition by George Clapp? It has Precision Scale exactness.

1 TO 1 SCALE

By BOB UNDERWOOD

• *Dear Diary:* Friday, January 29, wasn't the best day at school, but it ended. Had a light supper with the family and headed for the airport. The Ozark flight was scheduled for 7:40 to Dallas. At 9:05 we left Lambert. Flight was rough due to storms nearby. Big thunderboomers. Arrived Dallas 10:45. Free transportation to motel ended 9:30. Rented a Horizon and drove to motel.

Saturday, January 30: Nice breakfast. Geoff Styles from AMA Headquarters rode with me to HIA (Hobby Industry) show and we spent all day talking about AMA with a million visitors. Great crew of local modelers helped Larry Bolich engage almost 600 kids in building AMA Cubs (Delta Darts) at booth.

Sunday, January 31: Real purpose of the trip begins. Nats planning session begins at 9:00. Around noon someone finds that Detroit airport is closed. Ah Ha! I check and find St. Louis is also closed. Twelve inches of snow on the ground; six foot drifts. So much for a 6:30 flight today. Attend an HIA gala with Headquarters group. Supposed to go out on a 10:30 flight tomorrow. Call wife and find that there is much *more* on the ground at our home 30 miles south of the airport. Cathy measures 18 inches in undrifted area. Ugh!

Monday, February 1: Take Micheline from Headquarters to DFW airport for her flight. Manage to get an 8:30 Ozark flight and land in St. Louis at 10:00. Great flight. Pilot says: "Good news . . . Bad news. The good news is that we are right on time. The bad news was that there are no gates open." About 45 minutes later we unloaded. Quick trip to Park-and-Fly to automobile. Dig it out and head home. No problems until we get to the subdivision. No way! Park on friend's Brake Service lot and walk mile home. Cathy and I get 20 inches of snow off driveway and five feet drifted on part of the roof. Things settled down for evening. More snow predicted Tuesday P.M.

Tuesday, February 2: Bunch of jobs done around home. Get out for some medicine and groceries. No milk or bread. Road crews have major streets clear. No school.

Wednesday, February 3: Snow began about 4:00 a.m. last night. Originally scheduled three inches. Noon news has just changed that from six to ten inches. No school. Thirty inches of snow? Wow! I guess I'll go build awhile. See you in June . . . maybe!

The Nats planning session in Dallas was most productive. This year all aspects of the Nats will be held at Lincoln, Nebraska during the first week of August Some changes have been planned, which include moving the R/C flight lines back so more air space will be available between the flight line and the airport area. About one-third of a mile will be available.

Some very radical changes have been planned to F/F, R/C, and C/L Scale events. In an effort to cut down on the time required to be in attendance for the competing modeler, the following schedule has been adopted. F/F Indoor scale will have a Monday turn-in at 10:00 a.m and fly from 4:00 till . . . Outdoor will turn-in at 9:00 on Wednesday and fly on Thursday all day.

In C/L and R/C Precision Scale (AMA), the models will be turned in on *Thursday* at 10:00 a.m. and may be picked up Friday evening. The Sport Scale and Giant models will be judged on Friday beginning with preview times at 10:00 a.m. The models *will not* be held in a cage area. They will be judged and returned. At turn-in time the model will be assigned a number and then numbers will be randomly drawn to determine judging rotation. C/L and R/C will both be flown on Saturday and Sunday in nearby areas. In R/C, we will check transmitters at the time the model is turned in. They *will not* be electronically processed for frequency, but will be visually checked for frequency, flag, etc. *You will need your transmitter at model turn-in time.*

The Sunday airshow will be the scale event. By this I mean there will be no need to end at a specific time such as the 2:00 p.m. in the past. We therefore have more freedom to complete our rounds. It was evident to most of the officials last year that the scale event attracted the lions share of the spectators *(it should have been evident 20 years ago! wcn).* Obviously, since they are scheduled on the weekend, this would occur. However, those who saw the *many, many* thousands present on Saturday will attest to the fact that scale draws large crowds. In addition, on Sunday, though the numbers were lower somewhat, they outweighed the airshow numbers even though they were in the morning during church times.

The decision was then made to advertise the scale events Sunday as the airshow, and allow us to more freely

Continued on page 97

Marilyn Hostetler displays the environmental license plate she bought husband Ray for Christmas. "HELI PLT".

Ron Gilman, Circus Hobbies, flew R/C helicopter for Lt. Col Enrique Harary, Chief of Baja Calif. Highway Patrol (left) at Mexicali.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

• Thought I'd start out this month by showing off one of my Christmas presents, even though this is the April issue.

California has an "Environmental License Plate Program", where you donate $25 and get to choose the letters or numbers on your plates. My wife and I had talked about getting personalized plates last year, then the subject fell by the wayside. Long about Christmas, Marilyn started giving me hints as to what my Christmas present would be. In the end she practically had to tell me! (I claimed she gave me poor clues. . .)

Anyway, I'm proud of her choice; the seven letter abbreviation for Helicopter Pilot, HELI PLT. So if any of you in the Southern California area see these plates, watch out . . . I fly better than I drive. . .

Last month I said I'd talk about helicopter contests. At least contests form the base. The article will cover a little bit of R/C helicopter history, too.

Let me say beforehand that the opinions expressed are my own, and I apologize in advance if you disagree. Due to my limited research material available, I've listed the last several years of major contests and the standings. To start with, here are most of the major contests from 1974-1981:

AMA NATS '74, Lake Charles, Louisiana.
15 entrants, 5 in expert, 10 in novice
Expert:
1. Ernie Huber
2. Mike Bosch
3. Aubrey Radford
Novice:
1. Horace Hagan
2. Ron Weinsch
3. Grady Howard

NRCHA NATS '75, Greenville, Pennsylvania.
Approx. 50-60 entrants, 70-80 Helicopters.
Expert:
1. Ron Weinsch
2. Dave Gray
3. Don Chapman
Novice:
1. Ray Hostetler
2. Wendell Hostetler
3. Tom Schwyn
Free Style: Faye Peoples

NRCHA NATS '76, Greenville, Pennsylvania.
62 entrants. 14 expert, 18 intermediate, 30 novice. 88 helicopters.
Expert:
1. Ernie Huber
2. Don Chapman
3. N/A (not available)
Intermediate:
1. Ray Hostetler
2. Bill Youmans
3. Dwayne Stevens
Novice:
1. Fran Wojcik
2. Dan Chapman
3. N/A

NRCHA NATS '77, Columbus, Ohio.
38 contestants, 17 in Masters, 21 in Sportsman.
1. Bill Youmans
2. Ralph Dalusio
3. Ray Hostetler
Sportsman:
1. Doug Elder
2. Wendell Hostetler
3. N/A

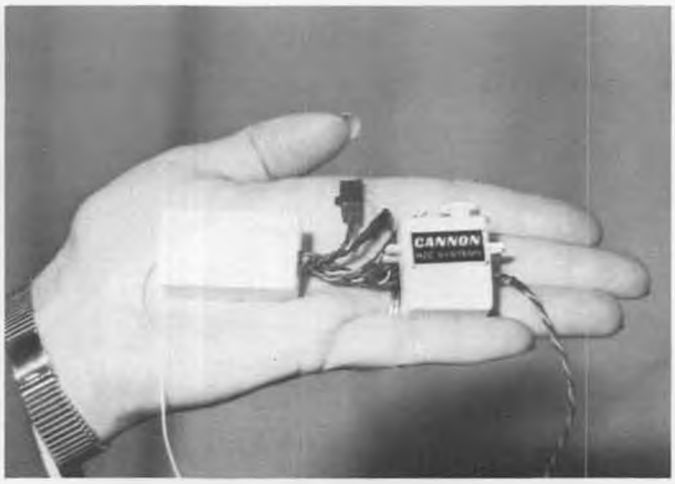
NRCHA NATS '78, Columbus, Ohio.
61 contestants; 175 helicopters.
Overall Pilot: Bob Pinto
Masters:
1. Ray Hostetler
2. Bill Youmans
3. Bob Pinto
Expert:
1. Bob Pinto
2. John Simone
3. Ralph Dalusio
Sportsman:
1. Jim Platt
2. Bill Jensen
3. Al Decanio
Novice:
1. Bruce Buchanan
2. Dan Sweazen
3. Rene Dikkes

AMA NATS '78, South Bend, Indiana.
22 contestants.
Expert:
1. Hubert Bitner
2. Mike Mas
3. Bob Pinto
Intermediate:
1. John Clark
2. Ralph Burch
3. George Croker
Novice:
1. John Buchanan
2. Steve Mintz
3. Peter Phillips

AMA NATS '79, Lincoln, Nebraska.
8 contestants.
Expert:
1. Mike Mas
2. Larry Jolly
3. Peyton Enlude
Intermediate:
1. Craig Hall
2. Warren Wagner
3. Bruce Buchanan

Continued on page 67

JR Apollo radio from Circus Hobbies. Lower price system still carries many features of more expensive line. Three versions.



Charlie Cannon's hand cradles Super-Micro airborne components from Cannon Electronics.

the Electronics Corner

By ELOY MAREZ

• The 1982 International Modeler Show (IMS) was the best ever! Like any new effort, it has suffered growing pains, but as of 1982, it can be said to have come of age, if the size of the constant stream of modelers and the number of displayers can be used as a gauge.

A stroll down any of the aisles was like a kid's visit to a toy store the first of December ... Which of the many goodies shall I ask Santa for? I would love to have the time to try one of "32 Parallel's" subs or hydros; that Kawasaki engine of C.B. Enterprises sure looks great; and I *must* have one of DaCa's new field boxes. But we'll leave further description of these and the many other interesting items to someone else, and concentrate on the R/C and electronics side of the 1982 IMS.

During this year's IMS, the AMA called a meeting of it's Frequency Committee, inviting also all R/C equipment manufacturers and importers, and the model press. During this meeting, a new group, to be known as the R/C Manufacturer's Association, was formed. It's purpose is to interface more closely with the AMA, thus ultimately with us, the R/C flyers. In the long run, this should provide a pathway for us into the R/C industry as a whole, through which we can make our opinions and requirements known. I was impressed by the apparent interest of the R/C equipment suppliers present as to our welfare, present and future. It is certainly nice to know that we represent something other than a trip to the bank to them.

The most exciting news out of this meeting, and of prime importance to all of us, is the fact that 1982 should bring us the additional frequencies that AMA and a group of very talented and dedicated folks have been working to obtain for us for some years. Without boring you with the bureaucratic details ... if everything goes in the expected sequence, as early as August of this year, we may be authorized to fly on the first 17, and run our cars/boats on the first 11, of a total of over 70 frequencies we will ultimately have. These are all in the 72 and 75 MHz range; aircraft on the former; non-flying vehicles on the latter.

There will be three parts to the phase-in program; the initial allocation, another increase in the number of available spots five years later, and the last batch to become available in three more years. The program is designed to permit manufacturers to develop equipment to meet the new technical specifications, for dealers to dispose of existing stocks, for us to wear out presently owned sets, and to provide protection to our existing frequencies, some of which will disappear ultimately.

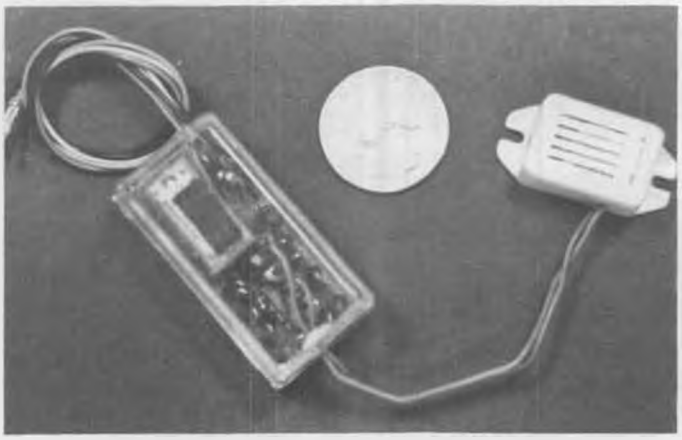
Ace R/C's Datamaster is combination Digital Pulse Meter and Servo Driver ... in addition to other capabilities.

About the time you are reading this, the AMA should also be publishing a more complete picture of the plan in Model Aviation; there is no need to duplicate it here. We recommend that you look for it, and study it carefully. It is a well thought out plan, based on thorough study by knowledgeable R/C manufacturers and flyers, and should assure us and those who will follow us as interference-free flying as possible for many years.

We would like to caution you not to panic, as has already happened. The equipment you are now flying will not become obsolete or unflyable the moment the new law becomes effective. There is still time for individual or club comment, which we recommend you do only after studying the more detailed information from the AMA. However, bear in mind that in comparison to the many commercial interests who also require and are always looking for frequency space, we R/C'ers, even banded together under the AMA, have very little clout. As individuals, we probably have none, when addressing the FCC. Your valid common sense comments to the AMA will be considered and acted upon in a manner beneficial to all of us.

NOVAK ELECTRONICS NES-1A MIDGET SERVO

It is an overworked phrase. . . State-of-the-Art . . . meaning as good as we can do with the present technology, but I don't know how else to describe Novak Electronic's new NES-1A servo. It comes in the same size package as its already



RAM's Battery Backer switches on auxiliary airborne power if primary pack fails. One of many electronic items.

Tower Hobbies Astro GX 202 two-channel system. One of several house-brand radios available.

famous Bantam Midget, fits the same mounts and all, but there the similarity ends. As all of us who know him perssonally can attest, Bob Novak did not just fall of the turnip wagon as a designer of R/C equipment. Off his motorcycle, water skis, skateboard, and the curb, yes, but not off the turnip wagon. Bob's experience goes back for many years and is the basis for the design, mechanics, and electronics of the NES-1A.

The NES-1A features angled gears for superior strength and smoothness, compounded from a new more stable material. A .150-inch thick output gear is utilized; the interlocking tongue-and-groove case assures dirtproofing. A signetics NE-544 IC with linear one shot amplifier is used, driving external PNP transistors. The pot is conductive plastic; the motor is five-pole with silver commutator and gold alloy brushes. A 0.5 degree deadband is claimed, tested as high as 150 degrees. It is operational on 6 cells for 1/12 electric cars (one dropping diode is recommended), and optional ball bearing and "O" ring seals are available.

Its torque is reported to be 21 oz-in, with a transit time of .27 seconds for 90 degrees, which makes it rather speedy, to say the least.

Size and weight are attractive also, 1.5 x 0.7 x 1.2 inches, and .846 of an ounce.

Novak Electronics NES-1 servos are compatible with most modern receivers and systems, and can be obtained alone, or as part of complete airborne or road systems in conjunction with the Novak NER 1-9 (six to nine channels) or NER-2 (two channels) receivers. Included in the package are a mini switch harness, and your choice of battery sizes and configurations.

Novak systems are available with your choice of Kraft, RS, or Futaba connectors; servos are available with a variety of other types of connectors, and adjusted pulse width and centering for optimum operation with the system specified.

My latest *International* flyer is Novak equipped, and has not missed a control yet. I say International, because I recently had it down in Mexicali for a fun-fly. I have written before about what tremendous times those of us in the know have at contests down in Mexico, and this one was no exception. Some of us even drink the water . . . of course it is disguised in one form or another, my favorite being Bacardi. If you can get to Guadalajara for September 16 . . . I'm buying! *(Look out! You better float a loan, Eloy. wcn)*

KRAFT

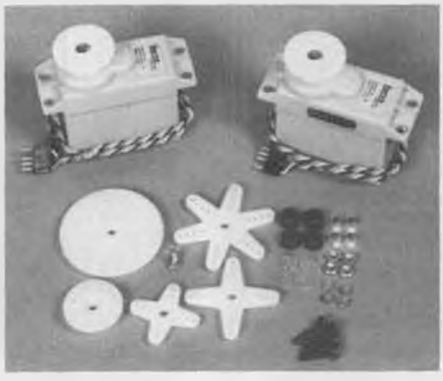
Kraft Systems introduced it's new KPC2N Carpak, being offered as a companion to the KP-3KW three-channel, wheel equipped, pistol grip transmitter, known in some circles as the "Kraft Staple-Gun". Whatever they may call it, it has received rapid acceptance by the R/C car drivers as well as by the roostertail crowd who find it's rather unorthodox appearance provides a more natural operating link than some of the other systems in use.

The addition of the KPC2N provides a complete competition proven package, and if it looks familiar, is should be, as it is being manufactured for Kraft Systems by Novak Electronics. In this case, it is known as the KPS-33N Servo, with the same specs as listed previously for the Novak NES-1A. The receiver is designated as the KPR-2N, two channels, and incorporates a double balanced IC mixer, decoder with flutter and noise filtering, double tuned front end, and is available on all 27 and car/boat 72MHz frequencies.

It is claimed to have a sensitivity of 1.0 to 2.0 microvolts, with a power consumption of 9.8 MA at 4.8 volts; 11 MA at 8.5 volts. It's size is 2.45 x 1.08 x 0.7 inches . . .wee indeed . . . and it weighs in at 1.0 ounce.

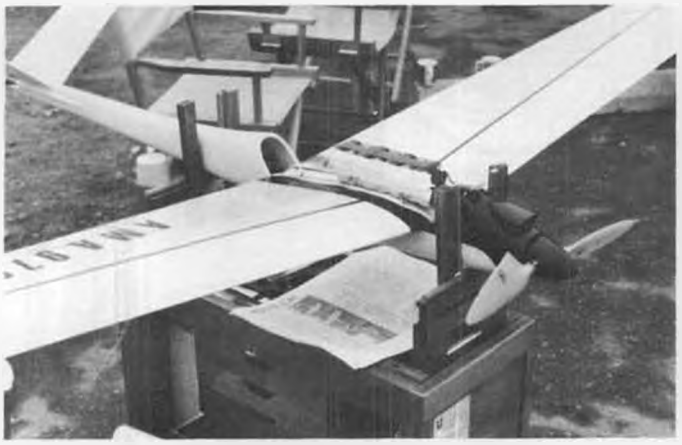
Continued on page 81

Kraft Systems' KPC2N Receiver/Servo combination, for car/boat KP-3KW transmitter. They're made by Novak.



The new, all but bullet-proof Kraft KPS-24 and KPS-24R (reverse).

Small, smaller, and smallest receivers by Royal Electronics. Part of full line of kit and assembled R/C electronics.



Dave Schadel's Hot River (Geist kit) with Geist samarium cobalt motor, gear reduction, prop. Uses 14 cells. Incredible climb.

Steve Manganelli's BN Islander twin 020. About 36 ounces all up. Second in R/C Scale. Nice flier.

ELECTRIC POWER

By MITCH POLING

• Two electric contests in one month! Amazing! Now if that would just happen all the time. Someday it will. Both were in Los Angeles, a perfect place and time for a contest in winter. I live in Seattle, and I can't resist going to sunny California in January, the jump from winter to summer is always incredible, and welcome.

The first contest (January 9 and 10) was the Leisure Electronics Grand Championship, with a thousand dollar first prize for electric sailplane duration. The basic rules were a stock 05 motor, six sub-C cells or eight .600 Ah cells. The flights were man-on-man, 1-1/2 minute power run, and the last man down won the round. The top 24 pilots of the first day would fly the second day to narrow the field to six, then these would fly all at once to see who came out in the top three. The weather was good during the contest, and the mass launches (up to six at a time) worked out well. I'll give the results here, then on to comments about the details.

The six finalists on the second day were Mike Charles, Jeff Rebholz, Mike Regan, Frank Heacox, Steve Neu, and Frank Chastler. The final top three were Mike Charles (1st), Jeff Rebholz (2nd), and Mike Regan (3rd). Mike had to work hard for his win, there were over forty entries! His time was over eight minutes on the 1-1/2 minute motor run, for first place, and third place was over seven minutes. Mike got the check for $1,000, Jeff got a four-channel Futaba radio, and Mike Regan got a Leisure digital charger. Congratulations! Besides these prizes, Gary Ittner got $100 for the best direct drive design, and Toss Thomas got $100 for his Playboy, as the best old timer design.

Now for the details on the designs. Mike Charles had a two-meter original design using a Leisure racing wind motor turning an 8 x 4 Rev Up prop on six Sanyo sub-C cells.

Jeff Rebholz flew a two-meter Olympian (Larry Jolly's design, the one that won $100) with a Leisure racing wind motor on a 3:1 gear drive turning a worked-down Geist prop, drive by six Sanyo sub-C cells. Mike Regan used a Leisure pattern wind motor turning an 8 x 4 Rev Up prop on six sub-C Sanyo cells. These Leisure motors have to be seen to be believed, by the way. These are not the yellow case Leisure 05 that I reviewed a few months ago, made by Igarashi, but an entirely new motor, made by Sagami. They have a "Rolls Royce" look to them, with a black machined case and recessed brushes that use spring loading instead of the leaf design of the previous motor. This allows high current handling with no sag in motor performance, so the motor can handle overloading much better. This can make quite a difference in a situation like the contest, because larger

F4U Corsair control line by Lon Tar Diss. Astro 020. Folding wings, realistic weathering. From a mere Guillow kit. First Place.

Scott Manning (left) with his "Electric Rat" pattern ship. Leisure 05. Fast, crisp maneuvers, lots of power. Placed fifth.

Bob Boucher's Porterfield with Astro 15 on 3:1 reduction drive. About five lbs. total. Astro Flight kit. Placed third in R/C Scale.

Tony and Addie Naccarato's Astro 40 samarium cobalt pattern ship. Smooth, slow, like Ukie stunt. Built in three days. Third place.

props can be used. I have the pattern wind motor, and hope to report on it shortly. I hear its performance is even better than the yellow case 05, in which case its performance is very good indeed. This motor did cause some consternation for the out-of-town competitors, who didn't know that there was a new motor out, and showed up with the yellow case 05!

The plane that caused the most excitement, though, was not one of the winners. It made it to the final rounds, then lost out on landing points. This was Ken Banks' original two-meter ship using the Leisure 05 racing wind motor and a 5:1 Carrera gear unit to turn a 325 mm Carrera folding prop. It used eight 600 mah Sanyo cells, and its climb performance was incredible. The reports are that Ken would launch it at a 45° angle, and it would just keep going on up! In fact, the 1-1/2 minute run was too long for it . . . it was so high in that time that it was hard to see and control. In five seconds it was well above high-start altitude! I have no doubts at all that this will be the most copied design for the next contest (it will be an annual event). The plane is very handsome, by the way, with a neat cowling over the motor and gear unit so that it is quite streamlined. It is 560 square inches, and 41 ounces all up. Those who have seen the Geist samarium cobalt units perform say that its performance was even better than the Geist units!

Other notes . . . Larry Jolly made the 3:1 gear reduction units for his plane and Jeff Rebholz's plane. These have the smallest housing I have ever seen for a gear reduction unit. It is machined aluminum, beautiful workmanship, and it adds almost nothing to the frontal area of the motor. These are the best looking gear units I have seen for the 05. I don't know if Larry plans to make any for the general flyer, though. The other item is that Frank Heacox, one of the top six, is organizing a national association for electric fliers. I'll give out more news on this as it comes in. I had a chance to talk to Frank later, and I think he's the right man for the job. He knows his stuff, and if anyone can organize us mavericks (you gotta be, to be flying electrics!), he can.

The next contest, the following weekend, was the Astro Flight championships at Mile Square, on January 17. This one is a favorite of mine, as it features just about every possibility in electric flight. This year there was everything from control line to R/C pattern. I'll list the winners (top three) in each category, then on to the details. In R/C sailplane (in order), were Larry Jolly (Olympian, Geist samarium cobalt), Dave Shadel (Hot River, Geist samarium cobalt), and Mike Charles (original, Leisure 05). In old timer (in order), were Ross Thomas (Playboy, 3:01, 05), Larry Jolly (Comet Interceptor 3:1, 05 . . . this may be a kit later), and Bob Sliff (Playboy 3:1, 05). In R/C scale, Bob Sliff was first with his Rearwin Speedster (Astro 15), Steve Manganelli second with his Britten Norman Islander (twi Astro 020), and Bob Boucher third with his Porterfield (an Astro kit, Astro 15). In pattern, Steve Neu was first with his 05 plyon plane, Steve Manganelli second with his 05 pylon plane, and Tony Naccarato third with his 40 (Astro 40, samarium cobalt) original design. In control line, Lon Tar Diss was first with his F4U Corsair (Astro 020), Ron Duly second with his Zero (Astro 020) and Addie Naccarato third with her Airabonita (Astro 020). In Jr. control line, Eddie Paz was first with a P47 Thunderbolt (Aero 020), and John Godel second with his P47 Thunderbolt (Astro 020). In free flight scale, Bill Stroman was first with his DH 10 (Astro 020), Ferrell Papic second with his 1907 type VII Bleroit (Astro 020) and Bill

Ken Banks with two-meter original. Leisure 05 racing, eight .60 Ah Sanyos, Carrera 5:1 reduction. Climbs at 45°!

Winner of Leisure Champs (and $1000) Mike Charles. Two-meter original, Leisure 05 racing, 8x4, direct drive, six 1.2 Ah Sanyos.

Best Old Timer at Leisure Champs, reduced Playboy by Ross Thomas. Leisure 05, 3:1 reduction, to be Leisure kit.

Warner third with his Caudron (Astro 020). In Jr. Free flight, Linda Cope was first (and only!) with her "Garfield Special." In open free flight Jim McDermoth was first with his Strato Streak (Astro 020), and Joe Tschirgi second with his original design (Astro 020). In free flight old timer, Jim McDermoth was first with his Buzzard Bombshell (Astro 020). Jim McMahon second with his Powerhouse (Astro 020), and Bill Stroman third with his Carl Goldberg Valkyrie (Astro 020). Whew! What a list! Like I said, something for everybody at this contest.

Now for the details. In size, this was the biggest Astro Champs yet, with nearly seventy entries in all the categories combined. It was also the most sophisticated, with several samarium cobalt motor entries. The contest had to start late, at noon, due to fog, but once the fog lifted, the weather was superb. The contest was run very well indeed, with mass launches the rule. This is new. Previous contests ran one contestant at a time, and it took all day to get through the flying. Most of the flying was done by 2:30, and the dramatic effect of the mass launches is a real bonus. It is really neat to see four to five old timers or sailplanes launched at once, there is a tremendous crowd response and interest. Beside the thrill of near misses(!!), you can compare and see the differences in the flight performances, and usually you start rooting for one of the competitors! Actually, the crowding in the air is not any more than at the flying field I go to, and there were no collisions. I like it, I hope this will become a tradition.

In the sailplanes, the overwhelming impression was that of the Geist powered sailplanes. These perform! It is amazing to see the climbout, especially in mass launches, where the Geist planes would be at double the altitude of any other plans at any time. In fact, this created problems for the Geist fliers, because the 1-1/2 minute motor run was really too long. At 1-1/2 minutes, the planes were nearly out of sight, and very hard to pilot with so little visual reference. This is for six-pound, eight-foot sailplanes! This may have been, unfortunately, the cause of one crash . . . Hans Weiss's beautiful Hot River sailplane with the Geist unit. It was nearly out of sight vertically when it went into a series of hard "roller coaster" dips and dives. This broke a wing, and then the vertical dive from over 1000 feet. Ugh! However, the Geist units are well made, even in a crash from this height, the damage looked repairable. The Hot River, by the way, is a fiberglass fuselage kit from Geist, and is available from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, Calif. 90403.

The oldtimers were well represented, including the Playboy (a Leisure Electronics kit), Miss Philadelphia, Berkeley Brigadier, Trenton Terror, and the Comet Interceptor. These were mostly 2/3 size, powered by 05 motors with 3:1 belt reduction units, which gives good

Larry Jolly uses own 3:1 gear reduction in own-design Olympiad (Hmm, sounds familiar). Gear drive very compact and smooth.

climb performance. I was going to fly my Berkeley Brigadier, but I really pulled a dumb one. I had the Brigadier in the back of the car, and it shifted around quite a lot during the two hour drive to Mile Square. The receiver switch got knocked "on", and then the radio turned on the motor! All this happened without my knowledge, and when I stepped up to the flight line, I found I had a dead receiver battery, dead motor pack, and a burned out motor. Scratch one contest for me! The lesson here is to *unplug* your motor and radio batteries when you are going to drive, otherwise, sooner or later, the motor will get turned on. This is the first time for me in nine years of electric flying, but once is enough! Oh well, so much for learning from hard experience.

In RC scale, Bob Boucher's Porterfield (Astro Flight kit) put in some outstanding flights with the Astro 15 and 3:1 belt drive. This combination is really impressive in the air, lots of power, it "looks

Continued on page 95

Beautiful decoration job on this Best Direct Drive winner by Gary Ittner. Leisure 05. At Leisure Electric Championships.

Inside details of Ken Banks' ship. Eight cells right behind motor, motor above gear drive. All is covered by neat one-piece cowling/canopy.

1. Bruce Norman tells Santa Claus (Frank Huffman) how many trophies he wants for 1982.

2. Santa Claus gets assist from V.P. "Bo" Buice, presenting service award to Dave Salguero.

3. Bruce Norman presents SAM 29 "Horns" service award to "Bo" Buice.

PLUG SPARKS

By JOHN POND

• This month we are indebted to James W. Buice, M.D., located at 800 Eighth Ave., Suite 106, in Fort Worth, Texas, for the following report and photos of the SAM 29 year end awards banquet.

Held at the Coors Hospitality Suite (oh, drool!) in Fort Worth, members of SAM 29 were surprised by that world famous free flighter, Santa Claus! Actually, Santa was played by Frank Huffman, well known for his models and articles.

As can be seen in Photo No. 1, Santa Claus is holding court with Bruce Norman on his knee. We can only guess that Bruce was asking Santa for a SAM Championship High Point Sweepstakes Award for 1982, said meet to be held in Massachusetts.

5. Bill Redeker in 1939, with king-sized tail on early pylon model. Another photo gem from Bruce Lester.

Photo No. 2 shows the general run of fun and the acknowledgment to those who made the club activities so successful during the year. In this case "Bo" Buice is assisting Santa Claus in handing out those highly coveted "Horns" award. Dave got his reward for putting in many hours as the newsletter editor of "Plane Talk", the official organ of SAM 29, the "Planesman".

Might mention at this time, to eliminate confusion, that James Buice, Sr., is called "Bo", while the son is simply called "Jim". Takes a little while to get it straight, but what a great family!

About this time, having been the recipient of many jokes and awards, Bruce Norman asked for equal time and in conjunction with Santa Claus, presented "Bo" a "Horns" award for his outstanding work as Vice-President and then as President of the Planesman. This writer is not exactly sure of the honor involved, as no one in any of the photos seems overjoyed to receive a "Horns" award, as can be seen in Photo No. 3.

About this time, with the temperature climbing from all the whiskers and red suit, Santa decided to take a well deserved rest. As can be seen in Photo No. 4, Frank Huffman was Santa Claus, enjoying a well deserved break. Actually the writer is envious, as it is things like this that help solidify a club's membership.

MARIN COUNTY (CALIF.) CUTUPS

The latest information to emanate from the Marin Airplane Club is that they have graciously decided to bolster the sagging fortunes of SAM 27 by affiliating themselves with a SAM Chapter rather than start up an entirely new SAM club.

With more membership to draw on for future rubber type contests, the 1982 MAC Contest schedule will look something like this:

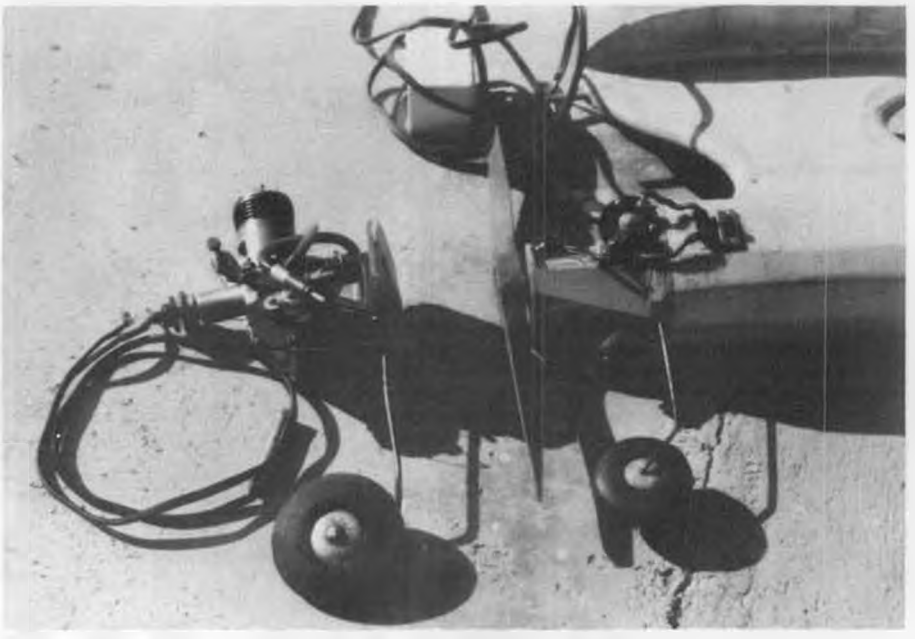
April 4: Peanut scale (pre-1919), AMA Rubber Scale, Cabin 36 and T-Tray for Juniors only

April 25: Peanut Scale (1920-39), AMA Rubber Scale and Embryo.

May 16: Peanut Scale (WW II), AMA Rubber Scale and Cabin 36.

4. Santa unmasked. Frank Huffman takes a break from the ceremonies.

6. Photo of our intrepid early Nats photographer Bruce Lester, with R/C "Sparrow" primary trainer glider.



7. Gordon Codding flies Civy Boy on gas or electric, using quick-change power units. More in text.

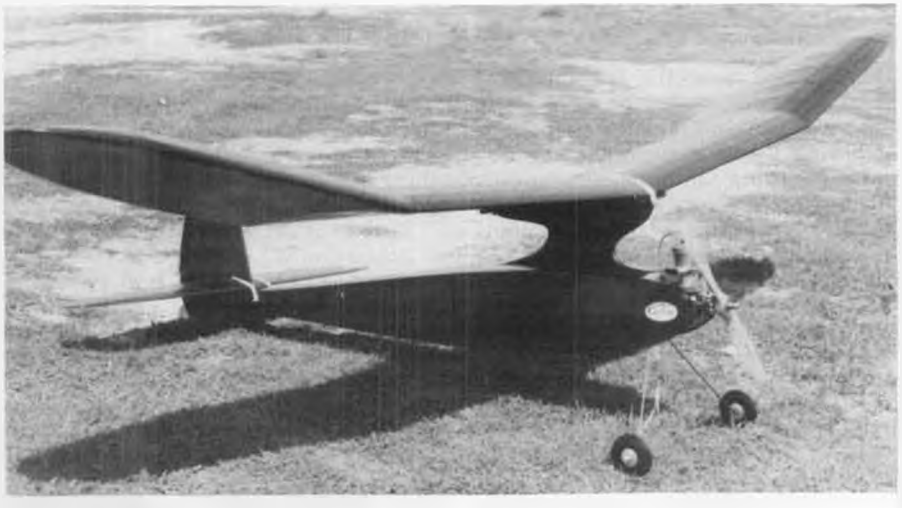
June 6: Jot Ott Day; Two events, those under 20" w/s and those over 20".
June 27: All biplane contest: Peanut Scale, AMA Rubber Scale and 36" w/s duration.
July 25: Pre-1939 Wakefield Replica, 30" max. wingspan.
August 15: SAM Pacific Ace Challenge.
September 5: National Air Races (FAC Rules), Peanut Scale, and 36" Cabin.
September 26: CO2 Duration, AMA Rubber Scale, and Peanut Scale.
October 4: Peanut Scale, Multi-Engine Rubber Scale 36 max. w/s, and Embryo Events.

That ought to stir up any red blooded modeler who likes rubber models. According to Tom Brennan, individual flyers will be issued for each special event shortly. To get more information, call Tom Brennan at (415) 479-7088 or Hal Makinson at (415) 453-4278. Don't miss the fun!

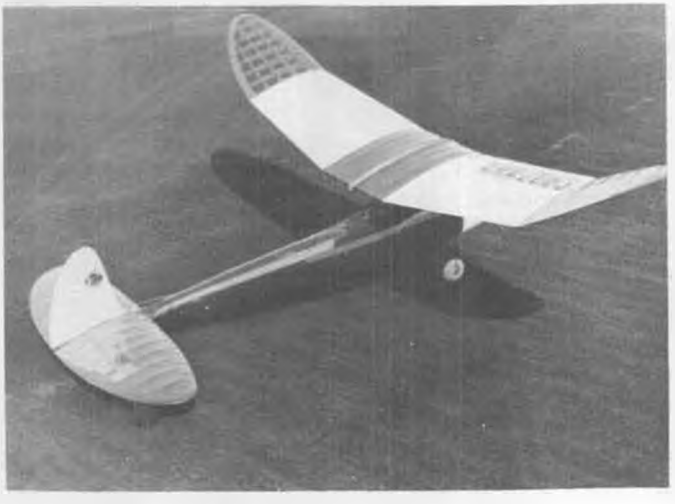
ENGINE OF THE MONTH

You don't really qualify as an old timer if the name Paul W. Lindberg fails to ring a bell. For the benefit of the uninitiated, Paul Lindberg first came to national attention when he became model editor of *Popular Aviation*, then the biggest and best aviation magazine on the newsstand.

Joe Ott first headed up a model section in *Popular Aviation* beginning in 1929. About 1933, due to the press of business, Jack Knoble took his place for about six months. Of course, the "drag" of having to put out a completed model with drawings every month proved to be too much for even the most ardent modeler.



10. Jack Jella built this excellent flying Playboy Senior. Flies better than it looks, on Cyclone power.



8. Hot performing Sailplane by Kraft's Jack Albrecht. Seen at SAM 49 meet, Taft.

9. Tom Hammond at Taft with a great flying Megow Korda Wakefield. Photo by Johnson.

12. Ben Buckle doing his thing at the English O/T contests. Now producing five or six kits.

11. Brown D powered Quaker Flash by Clarence Bull, Oregon, complete with original scalloped paint effect.

However, Lindberg was more than qualified to accomplish this. A series of half-inch scale rubber models were his first selections to be presented . . . an excellent set of plans that have been plagiarized by more than one kit manufacturer.

Along about 1936, Lindberg became absorbed in the gas engine, and put out his first gassie, the Rearwin Speedster. Although badly out of scale, the model (and later kit) proved to be so tremendously popular that Lindberg embarked on a program of one gas model design per month. The real kicker was that most were very good flying scale subjects!

Eventually Lindberg became involved in the manufacture of kits, sometimes farming out his designs to nationally known firms such as Megow, National, etc. Lindberg himself got involved with solid scale models and I.D. kits for the national defense effort.

This, of course, led to the demise of the model section in *Popular Aviation*. After all, who could follow an act like that? One of the best articles Lindberg did was to feature construction of a model engine known as the Lindberg "Hornet A". This two-part article appeared in the January and February 1940 issues of *Popular Aviation*.

Many years later, John Morrill was looking for a model engine design to produce. After his success with modifying the Garami Simplex engine to the point where it would run quite respectably, John selected the Hornet A as his next project.

In going over the drawings, Morrill immediately found the bore and stroke gave a .23 cu.in. displacement, making it a Class B engine. It was no great problem to reduce the bore, as John discovered the motor as manufactured directly from the drawings did not perform anywhere near to the output of the contemporary engines such as Ohlsson, Bantam, etc.

A lot of hard work and experimentation went into the "re-design" of the Hornet motor. As John says, about the only thing that is exactly the same as the original engine is the name. However, all due credit to Morrill, as all of the features and appearance of the original engine have been maintained.

Probably the trickiest idea John came up with was to have the crankcases made from extruded aluminum rather than make up castings. Although more machining time was involved, the extruded crankcase would be stronger than a casting and the cross section more consistent.

John readily admits to changing the sideport area, timing, and compression ratio. After many hours of comparing notes with many good motor men, John finally came out with an engine that retained all the classic looks and handling of the old motors, but yet would run comparably with the contemporary engines of its day.

For those who are interested in how the engine is fabricated, the crankcase, cylinder head, back plate, timer frame, and tank cover are machined from 6061 aluminum. The crankshaft and crankpin are precision ground, case hardened 1117 steel. Connecting rod was machined from 2024 aluminum. Of course, good old mehanite was used for the piston, to ensure long life.

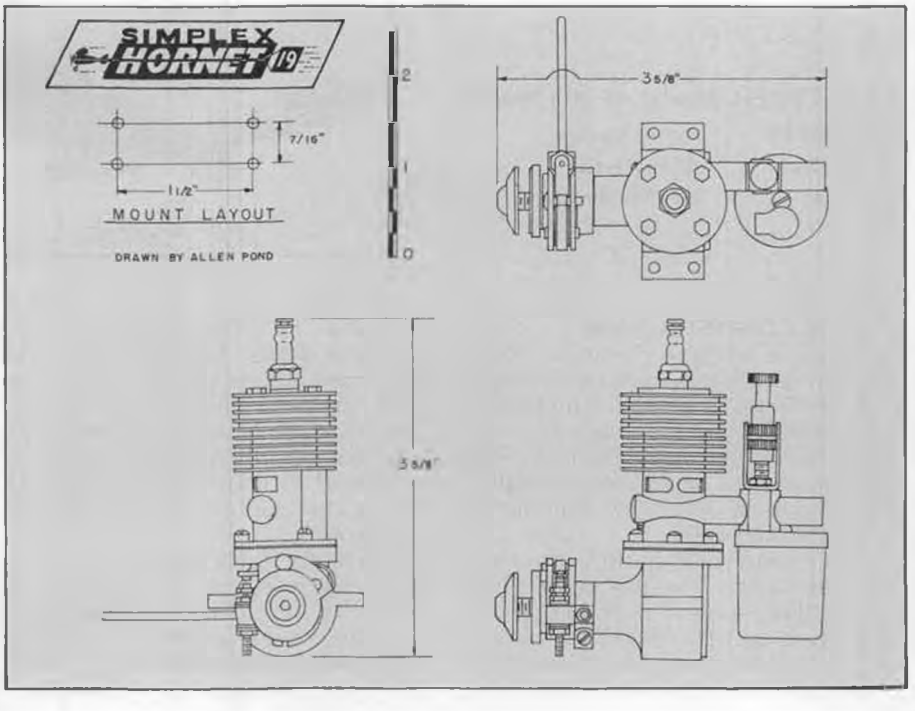
Technically speaking, the Morrill Hornet features a bore of .625 in. and stroke of .640 in., giving a displacement of .196 cu.in. Weight of base engine is 5.4 ounces. Performance-wise, the motor has turned 10,000 rpm using a 9-4 Zinger propeller.

Morrill wishes to point out, due to numerous changes to Lindberg's Hornet, the Simplex Hornet cannot be regarded as a true Lindberg Hornet, as he does not intend to do this. He freely credits Lindberg for the inspiration for the present engine.

THIRTY YEARS AGO, I WAS. . .

Just received a letter from Robert Wynne, 4124 - 96th Ave., S.E., Mercer Island, Washington 98040, via the **Model Builder** office. In his letter, Bob sez he remembers the California State Fair contest in 1937 quite fondly:

"I don't remmber Rod Doyle too well, but know he was a friend of Joe Culver,



14. New Zealander W.B. Mackley, still active after all these years. Holding electric powered original design.

13. Jim Palmer, N.S.W., Australia, displays parts to an original model built back in 1938!

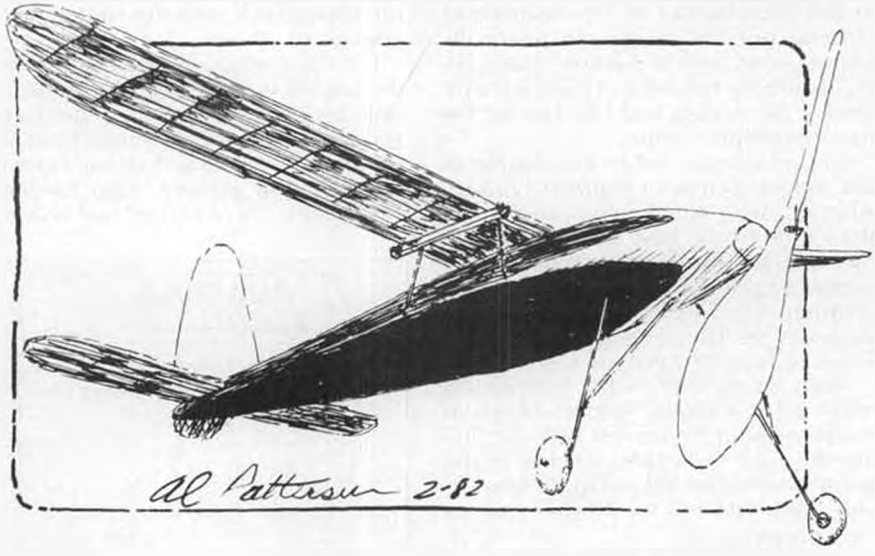
who had won some important national (AMLA) contests a few years before. They both belonged to the same club in Oakland.

"The 1937 State Contest was won by Bud (as he was called then) Ohlsson. Several modelers from the Los Angeles area drove up to Sacramento and back (note: This was the gang comprised of Louie Shock, Henry Stigelmier, and Irv Ohlsson). That was no small feat in those days over the old Ridge Route. There were only two lane highways then. But, hallelujah! Gasoline was only 11 to 15¢ per gallon in those days.

"My own part in the contest was rather minor. A friend of mine, Howard Roberts, along with Pete Bowers, had left early that morning for Sacramento only to find they had left some vital parts home. A hurry up call from the boondocks got out my trusty Fleet Biplane to deliver the badly needed part. Everyone was quite blase about the trip I made. In

Continued on page 87

STRUCK CONTEST WINNER



OLD TIMER Model of the Month

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

STRUCK CONTEST WINNER

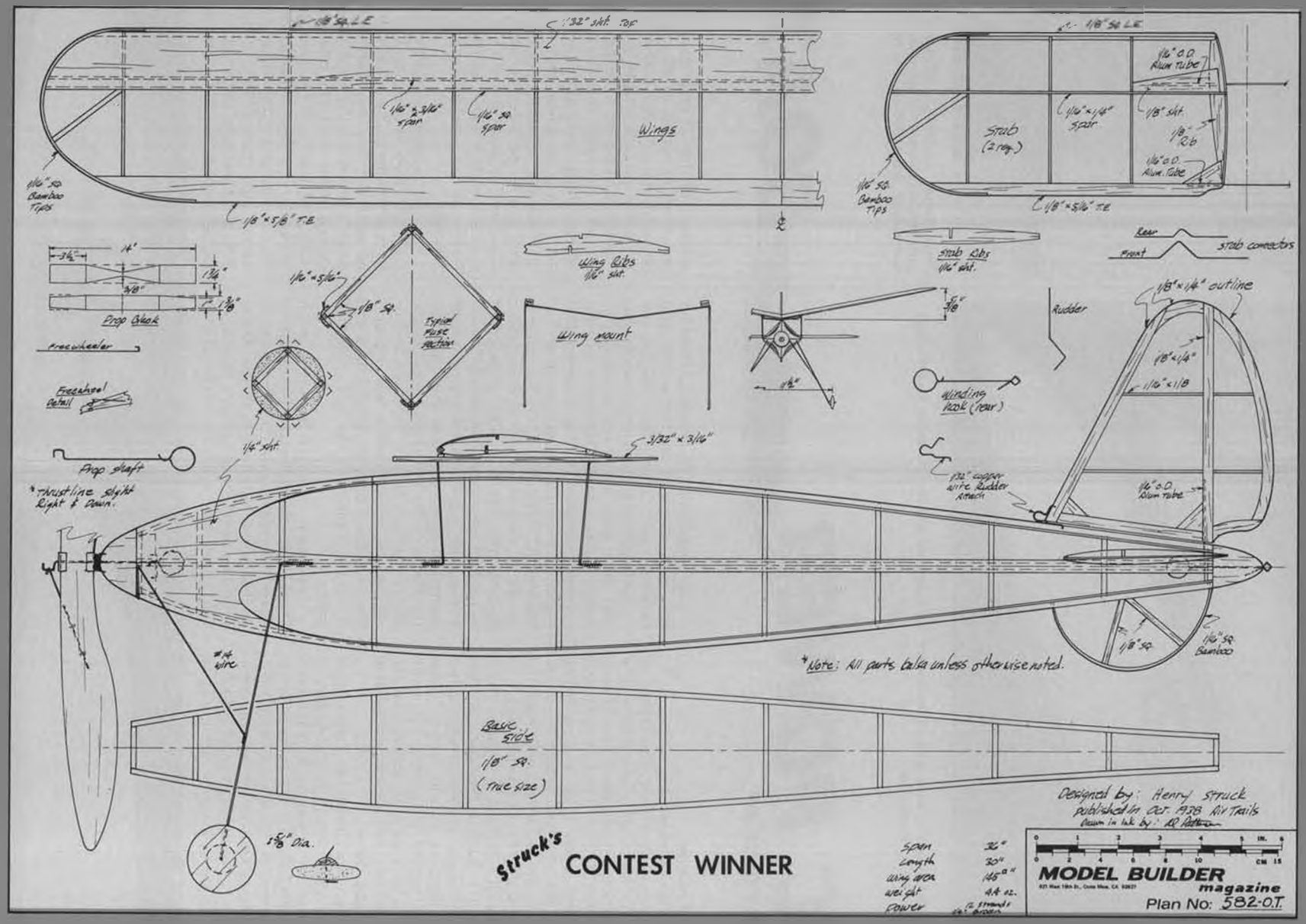
The name pretty much dates it. "Contest Winner," "Texaco Contest Winner," "Eastern States Champ." It seems that in the earlier years, the modelers were more concerned with designing a reliable aircraft that performed well, rather than conjuring up a name that implied what it should do.

This model brings up a puzzling memory to me. The first scratch-built competition model I ever managed to complete and fly successfully was a Henry Struck diamond fuselage design which must have been a predecessor to this one . . . it had much the same structural design, but without the 1/4-inch sheet around the nose. There also must have been full-size plans, because I wasn't too good at enlarging plans in the mid-'30s. Could it have been published in *Model Aircraft Builder*? Anybody have a clue? Let me know, if you have the answer.

This Henry Struck Design (is he not the best model designer of all time?) was published in the October 1938 issue of Air Trails, during a time when many of its plans were published reversed, that is white lines and copy on a black background. The text indicates that models of this design had been winning contests since 1936 (which backs up my belief about there being a similar one published earlier). The diamond fuselage (square cross-section throughout, turned 45 degrees to put a corner longeron on each side and at the top and bottom) is extremely rugged, with the 1/4-inch sheeted nose, and cap-stripped longerons.

The wing is typical Struck construction, with the top surface sheeted more than one-third of the way back from the

Continued on page 86



FULL SIZE PLANS AVAILABLE—SEE PAGE 100

Wardcraft Offshore 33's belonging to the author (background) and David Austin. David's boat powered by O.P.S. .21 Marine.

Terje Haugen, set IMPBA .65 hydro record with his Crapshooter 60 Sprint outrigger hydroplane. Stock OPS 65. See text.

R/C POWER BOATS

By JERRY DUNLAP

The Ward Marine Corporation Offshore 33

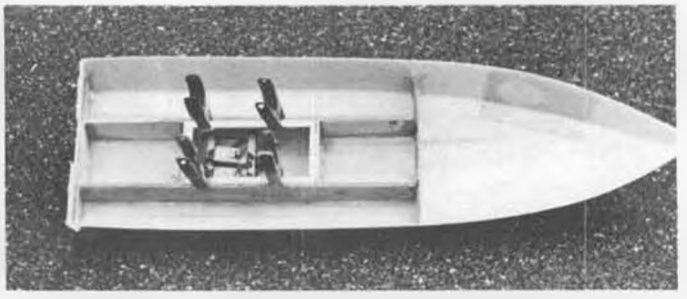
As I begin this article, I'm trying to think of the last time I did a review on a Ward Marine Corporation, also known as Wardcraft, designed boat. I've known Frank Ward since 1968, and have run many of his designs during the years. You know, the last boat I reviewed that was designed by Frank was his DragN' Fli 60 hydroplane, kitted by Dumas Products. That was back in 1969, for a pioneer model boating publication called "Model Boating World News." That particular model magazine has been gone for a long time. However, you can still find the DragN' Fli hydroplane kits in many hobby shops.

Actually, I'm somewhat responsible for Frank Ward being in the hobby of model boating. It was back in the early spring of 1968 that I first met Frank. It was at a contest at Seattle's Green Lake, where he walked up to me and mentioned he thought this would be a fun activity to join. I assured him it was an enjoyable pursuit. To prove it, I fired up my boat, threw it in the water, and handed him the transmitter. Well, Frank drove that boat around for a few minutes and stuck around the rest of the day to help. To say that Frank has gotten involved in model boating since that first experience would certainly be an understatement. Capitalizing on his experiences as a racer of full size outboard hydroplanes, Frank quickly established himself in the model hydroplane arena. In the mid-70's, Frank's design interests turned to deep vee, and this has been the focus of his efforts in recent years. But he has not entirely forsaken hydroplanes. He developed a twin-.65 outrigger hydro a couple of years back and it has been officially clocked at over 80 mph.

I've been "messin around" with Frank's 33 inch hull for the last couple of years in various power configurations, as well as some hull modifications. At the time this article was written, Wardcraft Offshores were available in the 33 inch version for the .21 engines, and in a 44 inch version for .65 to .90 engines. It is planned that a 38 inch hull, along with a 31 incher will be available by late spring. Frank had hoped to have the two newer lengths available last year. Unfortunately, things just didn't work out in such a way to allow that to happen. Information regarding prices and shipping can be obtained by writing Ward Marine Corporation, P.O. Box 2579, Lynnwood, WA 98036. In the evenings, Frank can be reached by calling (206) 775-3969.

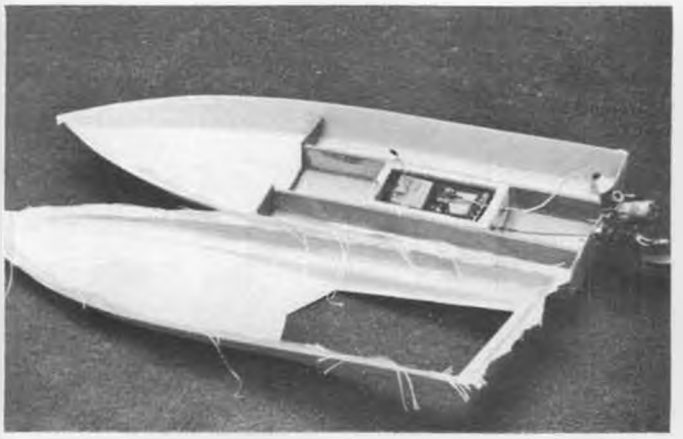
My first experience with the Wardcraft Offshore 33 was a couple of years back when the hull was being produced by another company. Ward Marine has since reacquired the molds and is the source of this hull. The boat was set up with the K&B .21 Outboard, and it worked very well with that power source. This combination proved to be a winner for me, also. During 1980, the boat established both straight-away speed and oval racing records. Just to top things off, the

Wardcraft Offshore 33 unjoined, with rear deck still not cut away.



Offshore 33 hull with radio compartment built between the engine stringers.

Deck and hull taped together with masking tape, in preparation for joining with glass cloth strip and resin.



Ready to join deck and hull. Glass cloth strip has been resined to deck first. Radio compartment and linkages finished.

boat won the A Outboard Monoplane Class at the 1980 North American Model Boat Association Nationals.

In discussions with Frank Ward prior to the writing of this review, we talked about what would be the best version of the boat to tell about in the article. It was decided that the emphasis would be towards the outboard version, since this is the easiest way to set up the boat. Besides the ease of setup afforded by the outboard, it is also a less expensive method of propelling a boat. Even though the .21 outboard is about $30 more than the inboard engine, there is no need of a hardware package. A good hardware package for an inboard will cost around $70.

However, it must be pointed out that the outboard powered boat generally will not be as fast as the inboard powered version of the same hull. Having run the Wardcraft Offshore 33 as both an inboard and an outboard, I can supply some specific numbers for comparing the two forms of propulsion. When I set the outboard record, the best time I ever had for straightaway speed was just over 35 mph and my best time for the .9 mile oval was 2:13 for five laps. With the inboard version, I've hit 39.8 mph for straightaway and have turned a 1:48 for the oval. At this time, the only area offering .21 outboard deep vee as a separate class is Southern California. A person needs to take these points into consideration when selecting the type of engine to be used. For a new model boater not particularly interested in competition, an outboard powered vee hull would be a combination worth serious consideration.

Wardcraft Offshore 33 with .21 K&B outboard, going full tilt.

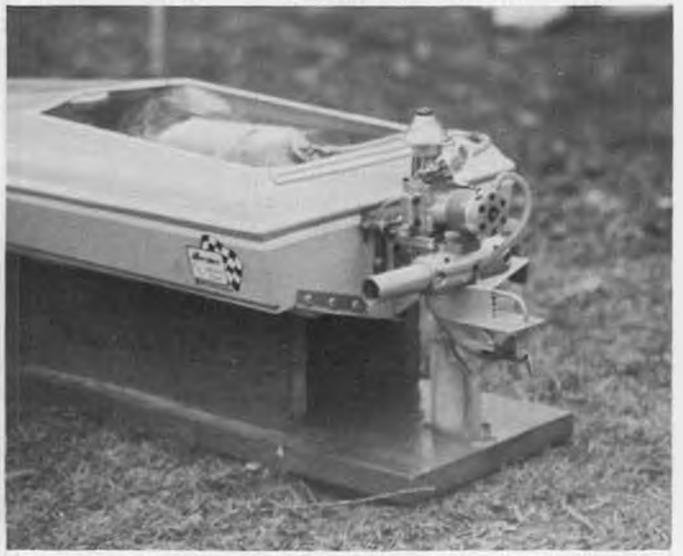
JOINING THE HULL

It may well be that by the time this article is printed, the Offshore 33 will come with the hull joined. Since Frank Ward wasn't completely sure this would be the case, some time will be spent on this procedure. I've used two different techniques in glassing the deck and hull pieces together and I'll describe both.

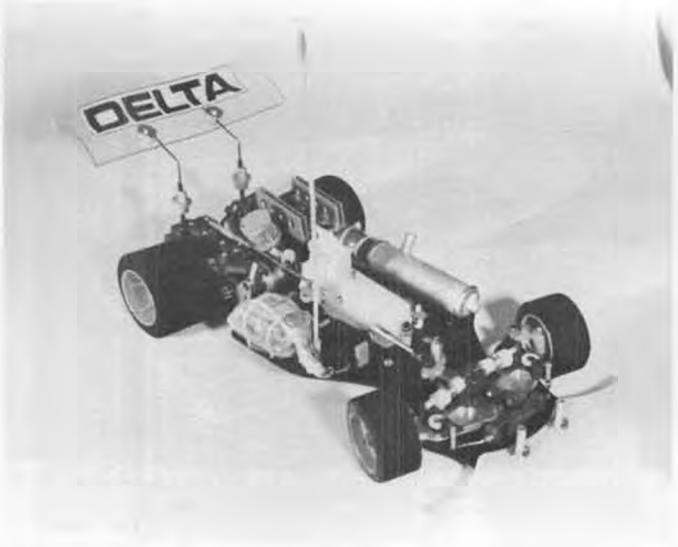
The first method is shown in the photos accompanying this article. Using a two-inch wide strip of glass cloth (four-inch width is available in most hardware stores carrying fiberglass products), glass half of the strip to the inside edge of the deck. The strip of glass cloth runs from the transom to the deck. Allow the resin to set and then join the deck to the hull with the remaining part of the glass cloth on the inside of the hull. It might be necessary to trim some of the material in the bow to allow the deck and hull to fit together tightly in that area. Masking

Continued on page 76

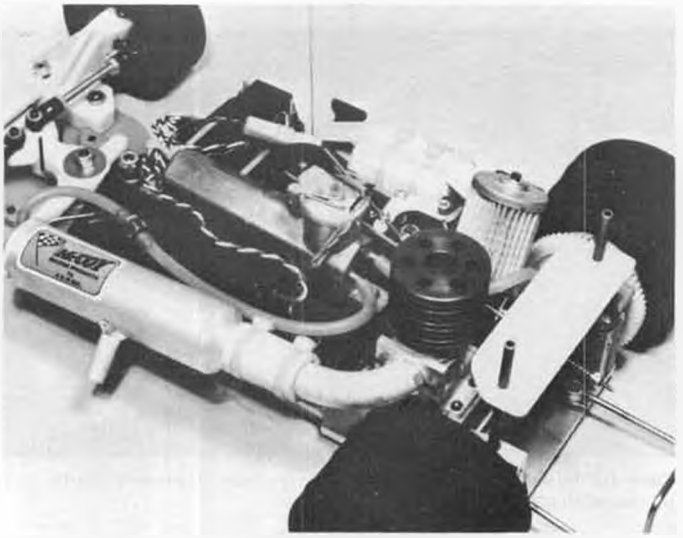
Ready to run, with fuel tank mounted atop radio box. Plastic bubble material stuffed in hull for floatation.



The author's modified .21 K&B Outboard on transom of Offshore 33. Prop is J.G. G-25.



The new Delta Eagle, its entry in the 1/8-scale suspension car market. Has a number of features that should make it effective.



Dirty Racing Team's Associated RC 300, when it was still shiney and new. K&B for power; McCoy pipe for more power.

R/C AUTO NEWS

By DAN RUTHERFORD PHOTOS BY AUTHOR

• Have you tried last month's Hot Tip yet? Yeah, I'll bet you have. And it works, doesn't it?

For any first-time readers, in last month's column I detailed how to break in electric motors, or at least the type that we run in 1/12 scale cars, by running them underwater. If you missed it, you best find yourself an issue of the April **Model Builder**, 'cause that tip is worth some free horsepower.

I know that I have had a great time telling people about it, and of course they rarely believe me; until they try it, anyway. One of the strangest responses came indirectly from World Champ Art Carbonnell, who claims to have raced "slot boats" years ago. I've never heard of such a thing as slot boats, either. But according to the story, they did exist and picked up the electric power from overhead wires, kinda like a trolley or electric bus. Art says that every once in awhile a boat would take a dive into the water, getting everything wet inside. On the next run, the boat would be a lot faster and until he heard about running electric motors underwater to break them in, Art never fully understood what was actually happening.

Don McKay, over at JoMac, was the one to tell me about this tip, as you should remember, and the latest from him is that somebody tried using a tricko chemical solution instead of water and the commutator wore out while the brushes didn't wear at all! Plain old water works and is probably a lot safer than a home-brew mix of some kind. *(In a recent phone conversation, Dan also confirmed that distilled water doesn't work too well, either. It seems that the motor needs the normal impurities of orginary drinking water to get the full benefit of this method. wcn)*

THE DELTA EAGLE

The Eagle is Delta's new 1/8 scale independent suspension car, and it has been 12 years in the designing stage. Well, no, not really, but of late, Bill Campbell has been keeping me pretty well filled-in on how the new car is coming along, and last call mentioned that this a project that he has wanted to do for the last 12 years, that of designing and manufacturing a full-on suspension car. Actual design work has taken place in the last year or so, what with pressure from PB (England) and SG (Italy) and their proven suspension cars.

On first look, the Eagle is easily recognized as a Delta. In fact, I accused them of dummying up a standard Super J with a few front end parts, modified radio tray and a few bits of nylon in the back, just to get a picture of the new car out to the press. Turns out that the picture really is of the Eagle, at the time of the shutter-snapping it was the only one in existence, however.

Even though it doesn't show up too well, the Eagle neatly eliminates the need for the jack-shaft/chain-drive lash-up seen on the PB car. I hear that this arrangement has been reliable enough, but it is still just one more thing to break, has to cost a little bit of power, and adds to the weight of the car. Delta has stolen from the bag of tricks of slot car racers, mounting the motor anglewinder-style, using just a pinion gear driving a main gear to make the transfer of power. The main gears proved to be a problem, as initially they just used modified gears from the Super J. Tooling up for a new

Same RC 300 as above, with Associated's Porsche 30KL body, still minus the driver figure.

gear with a really trick set to the teeth solved that problem.

I can't tell much from the picture about rear suspension bits 'n pieces, but do know that the rear ride height is adjustable, as is the camber of the rear tires. Bill says you get the ride height where you want it and then adjust the camber so the rear tires are flat to the ground and wearing evenly. In the front end, everything is mounted real low, standard Delta practice, with the shocks in an extreme lay-down position. I guess the shocks gave them more trouble than the rest of the car. Bill did a lot of research on shocks in general, actually buying and dismembering Bilsteins and Konis to get ideas on valving and so on. I have yet to see one of the shocks, but the word is that they will be much more than just a simple piston pushin' its way through oil.

Actually, what they have ended up with is a coil-over shock, and coil-overs are all the rage in big car racing. Pre-load on the coil will be adjustable with a threaded collar, although what actually happens is that ride height, rather than pre-load, is adjustable.

Suspension travel limiters are built-in to the car, as well as anti-roll bars that are adjustable. In between the sproingy stuff, there is a new, molded tank, side-mounting of the steering servo, and a rigidly mounted radio tray that contributes to a stiff chassis assembly, required for a suspension car. Out back, the bullet-proof ball-type differential is used. On my own Super J, this type of diff has hours and hours of racing on it without any problem whatsoever. I am thinking about replacing the little thrust washers, as the diff now feels a little bit notchy when turned by hand, even though it still works as good as new.

Release date? Last I heard they were hoping for late March/early April, so they might be out by the time you read this.

AND FROM ASSOCIATED . . .

Naturally enough, Associated has been working on its own version of a suspension car in 1/8 scale. The basic design work was done in the U.K. by Team Associated-England. Several cars were shipped over to Associated for final detailing and tooling work, but were raced at the '81 ROAR Nationals where Rick Davis used one to win the biggie, Can-Am Open. Last I heard, the car was scheduled to be released in late February, so might be rumbling around the tracks as you read this.

Hot tip for indoor oval racing; Leisure Super Sport chassis, six-cell power, and old JoMac hard-plastic Challenger body. Rail-rider front bumper and tough body make it durable.

As the suspension cars intrigue me to no end, I would like to have had more information or pictures to spread around about the Associated car, but there isn't an awful lot known about it right now. I think it will probably have the engine mounted in the back center of the car, with the clutch-mounted gear driving a jack-shaft gear, the power coming out the other side via a sprocket, to a chain and back to the rear axle. A diff is no doubt a part of the package, but whether it is ball or gear-type I'm not sure. Keep hearing all kinds of things about the suspension, springing by "O" rings, snubbed by shocks.

WHAT TO RACE . . .

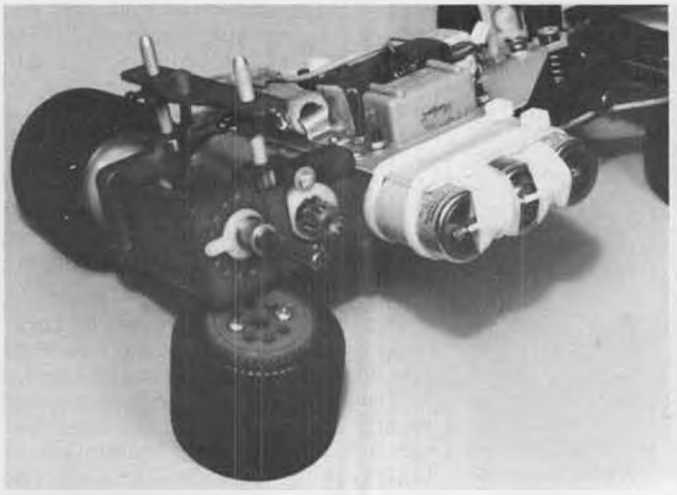
I guess I have never mentioned it before, but you should probably know that I, and the rest of the Dirty Racing Team, much prefer to race the 1/8 cars, given a choice between 1/12 and 1/8. I know that sounds strange to some of you, especially those who have raced only 1/12 scale and heard some of the really gruesome tales about racing in 1/8.

As the usual story goes, 1/12 is so much better for the average guy (and I count myself in with the average guys), because the cars stay relatively clean, there is no motor to worry about flaming out or to adjust, the cars are less expensive to begin with, radios seem to last longer in electrics, 1/8 cars are too powerful to be easily driven, and all of that rot. I say that it simply isn't so . . . well, at least not to the degree that you have probably been told.

First off, I will agree that 1/12 cars are fun, no problem there at all. But the 1/8 cars are also a terrific kick in the butt and do a number of things so much better than a 1/12 car that there is no comparison.

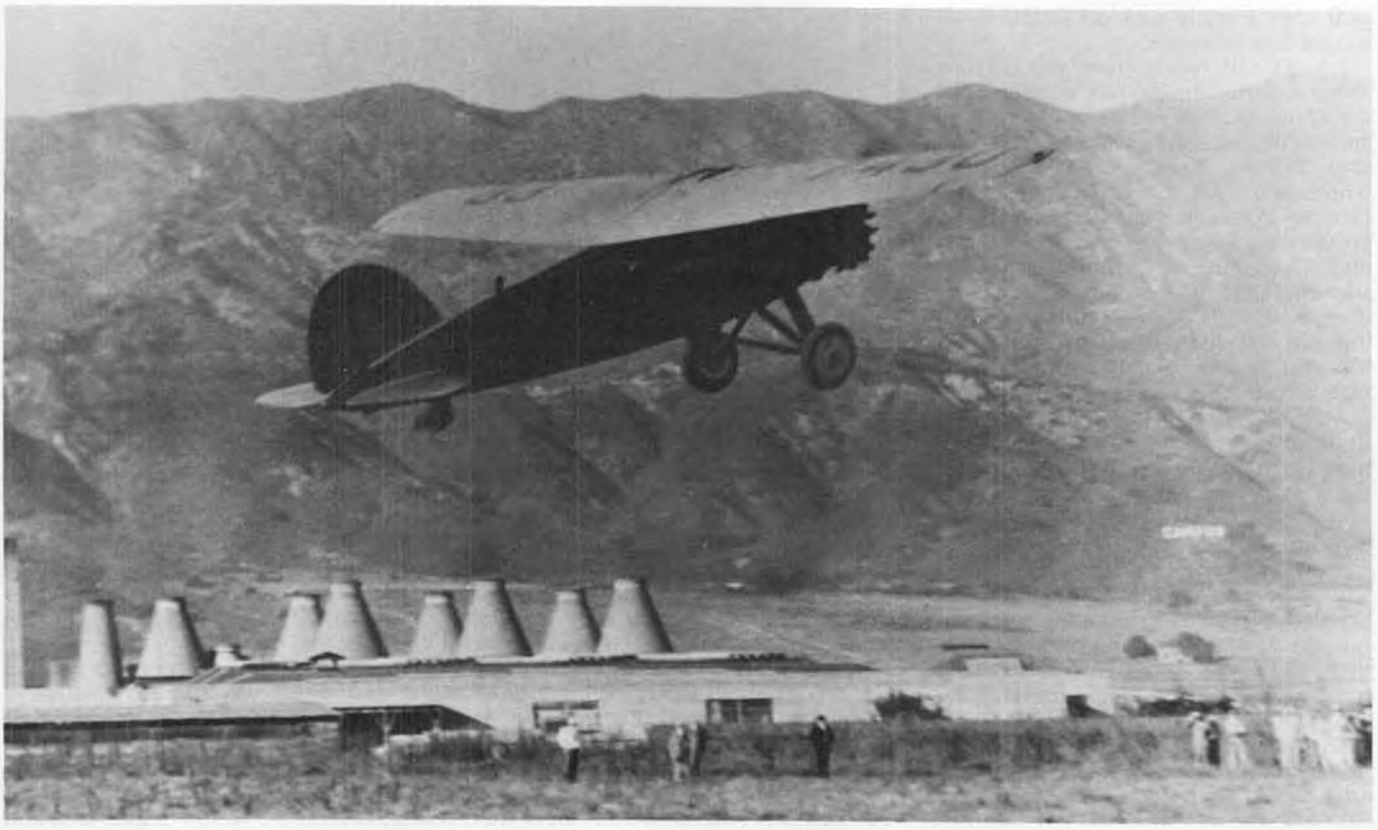
Let me back up for a minute and relate some personal experiences. A season or so back, the DRT, which is my wife, the two kids and myself, raced both 1/12 and 1/8 at almost all of that season's races. Our club is small enough and well-organized enough that for that season, we raced 1/8 in the morning and 1/12 in the afternoon. I found that the racing in 1/8 would go off pretty well, all of us would complete very nearly every heat and main event, and at that time we were racing a mixed-bag, two Delta Super J's, one old-style MRP car, and an

Continued on page 66



Rear view of JoMac Lightning 2000, showing adjustable ride height feature and strong motor pod arrangement.

MRP's Prophet Can-Am body, still one of the better 1/12 scale bodies available.



One of the first Lockheed Vegas taking off from dirt strip in Burbank. Empire China Company and Verdugo Hills in background. Note uncowled engine and absence of wheel covers, also clod of dirt on tail wheel.

LOCKHEED'S "wooden wonders"

By WALT MUSCIANO . . . Tieing in with last month's construction article for the Lockheed Vega, Walt now gives us an interesting profile on the "Wooden Wonder" series of history making Lockheeds.

• When, in early 1927, Allen Loughead, John K. Northrop, and other talented aircraft designers left Douglas to form their own company, little did the aviation world realize the impact that this group was to make in aviation history. The company decided on the name Lockheed, derived from Loughead, and during the next seven years designed and produced a series of outstanding aircraft which served as airliners, executive and business planes, racers, and military transports. The designs were constantly breaking world records, which gave birth to the expression: "It takes a Lockheed to beat a Lockheed". Lockheeds inspired competitive aircraft designing trends but were never seriously challenged by any other aircraft in their class. They reigned supreme and became America's First Family of Aircraft during Aviation's Golden Age.

Famous explorer Sir Hubert Wilkins used early Vega for his Arctic Expedition. Open cockpit aft of wing was a feature used on later Air Express design.

The Lockheed Aircraft Company was founded in Burbank, California, which at that time, was a little obscure town in the Verdugo Hills. The firm shared an old ranch building with the Mission Glass Works, and across the valley could be seen the cone-shaped brick smoke stacks of the Empire China Company. An old ranch house served as Lockheed's office and engineering department, while an unpaved dirt flying strip was the only runway.

The very first plane created by Lockheed made its debut on the Fourth of July, 1927, when it flew from Los Angeles to Oakland, California, setting a speed record for flights between the cities! This was a high-wing cabin monoplane of breath-taking beauty and simplicity and was named Vega, for the brightest star in the heavens. The five-passenger craft

was intended for small airlines, private owners, or corporation service, and during its lifetime, the high performance Vega designs established no less than thirty-four flight records! They flew across oceans and continents and established speed, altitude, distance, endurance, and load carrying records and set new standards for inter-city flying.

The Lockheed Vega construction was as revolutionary as its appearance. Except for high strength items such as engine mounts and landing gear, the construction was entirely of wood. The 3/32 inch plywood covered cantilever wing was built on two spruce box spars and spruce girder ribs. The monocoque fuselage shell was laminated spruce veneer layers bonded together in a thirty-ton concrete female mold under pressure. This molded skin was made in left and right shells and joined together at top and bottom over ellipitical spruce rings and bulkheads. Tail surface construction was the same as the wing. The completed plane was given a beautiful high gloss finish.

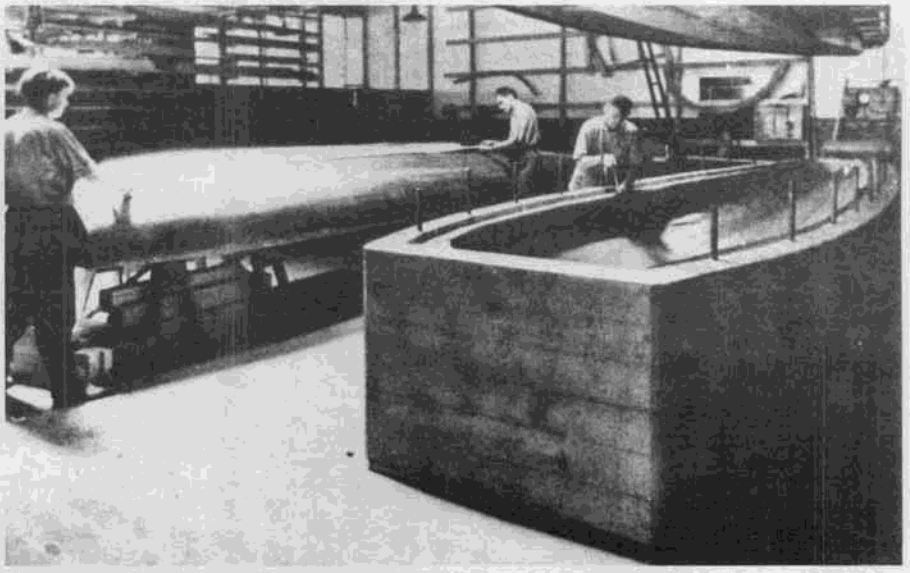
Powered by a nine-cylinder air-cooled 220 hp Wright J-6 radial engine, the original loaded 3,470 lbs. Top speed was 145 mph, with a cruising speed of 115 mph. The Vega was the most numerous of the single-engine Lockheed "Wooden Wonders", 128 having been constructed in the half-dozen years of production. The Vega design was constantly upgraded, and one of the last commercial production versions was powered by a nine-cylinder air-cooled 450 hp Pratt & Whitney "Wasp" SC-1 radial engine; more than twice the power of the original Vega. This loaded 4,750 lb. Vega had a maximum speed of 195 mph at 6,000 ft., with a cruising speed of 170 mph. Landing speed was 60 mph. Rate of climb was 1,200 ft./min., with a service ceiling of 18,000 ft. Cruising range was 550 miles using the three 52-gallon wing tanks. This version carried six passengers and pilot.

The Lockheed Vega was destined to be flown to fame by some of the most famous pilots in aviation history. The sound basic design and its adaptability to modification influenced a parade of aviation celebrities to select the Vega for their record attempts, however, only a few will be mentioned here.

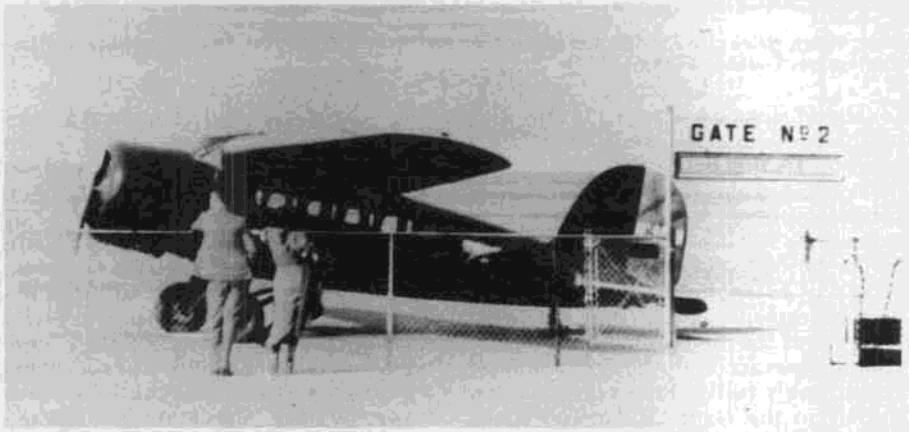
Famous explorer Sir Hubert Wilkins was quick to recognize the Vega's potential and bought one of the first Lockheed Vegas to be constructed. During April 1928, Wilkins made aviation history and the initial "First" for a Lockheed when he became the first to fly over the Arctic from Point Barrow to Spitzbergen using his new Vega.

During the summer of 1931, Wiley Post and Harold Gatty established a 'round-the-world speed record of 8 days, 15 hours and 51 minutes in the Lockheed Vega "Winnie Mae of Oklahoma".

On May 20, 1932, flying a Vega with two other crew members, Amelia Earhart became the first woman to fly



Lockheed 30 ton concrete mold in which wood fuselage halves were made. Completed fuselage half at left. Set of laminations in female mold at right, with male mold/press overhead.



Vega belonging to Wedell-Williams Air Service rests by departure gate. Absence of airport crowd is a far cry from the confusion and chaos of today's air travel!

across the Atlantic Ocean, and in the following month, she piloted her Lockheed Vega from Newfoundland to Ireland in 15 hours, 18 minutes; the first woman to solo the Atlantic.

Jimmie Mattern and navigator Benny Griffin set out to beat the Post/Gatty mark in July 1932. Mattern set many records on the flight: Trans-Atlantic Record 10 hours, 50 minutes for 2,000 miles; First non-stop New York to Berlin; Record New York to Berlin 29 hrs. 31 min. for 4,106 miles; Record Newfoundland to Berlin 17 hrs. 30 min. for 2,960 miles; and the first American to Berlin flight. A crash in Russia ended the attempt. The story of Mattern and his Vega is told later in this article.

During July 15-22, 1033, Wiley Post completed the first successful 'round-the-world solo flight again flying his Lockheed Vega "Winnie Mae of Oklahoma".

Wiley Post again set records in his

Wiley Post with his Lockheed Vega "The Winnie Mae of Oklahoma," flew twice around the world and established U.S. coast-to-coast record, plus altitude record in sub-stratosphere.

Capt. Frank Hawks flew his Lockheed Air Express "Texaco 5" for the Texas Company. Notice exposed oil cooler above cowling. The Air Express was Lockheed's third design.

Lockheed Vega on March 15, 1935. The pilot wore a special pressurized space suit and helmet as he flew 2,035 miles from Los Angeles to Cleveland, via the substratosphere, in 8 hrs. 4 min. Speed exceeded 340 mph during this flight. Earlier he had set an unofficial altitude record of 55,000 ft. This Vega was fitted with a drop-off landing gear and large wing fillets for the high altitude flights. Landing was accomplished on a skid on the plane's belly. Post's Vega is on display in the National Air and Space Museum, Smithsonian Institution, Washington, D.C.

Col. Roscoe Turner, his Lockheed Air Express, and the Bendix, Harmon, and Thompson trophies. The pair set many records.

Lockheed's second design was a little-known low-wing single seater which started as a personal experiment and was designed by Lockheed's chief engineer, Jack Northrop. It had been ordered by Sir Hubert Wilkins in late 1927 and named the Explorer. The Wilkins group suddenly ran into financial troubles, which stopped all work on the design. Revived in 1929, three Explorers were built for Harold Bromley's unsuccessful trans-Pacific flight, and the fourth was flown by Roy Ammel to a non-stop record from New York to Panama in 24.5 hours on Nov. 9, 1930. A seaplane version of the Explorer had been considered but was abandoned, and no further work was done on the design.

The third Lockheed design was the Air Express, which not only resembled the Vega, but used the same construction techniques. The wing was mounted on cabane struts, parasol fashion, above the fuselage, while the pilot's cockpit was an open affair located between the wing and tail surfaces. Designed in 1929 as a mail/cargo or passenger carrier, the new Lockheed was soon breaking more records with famous aviation personalities at the controls. Capt. Frank Hawks, Sir Hubert Wilkins, and Col. Roscoe Turner were among those who flew the Air Express to fame.

Flying his Gilmore Lion Air Express, Turner streaked across the continent from New York to Glendale, California in 18 hours, 42 minutes, and 54 seconds, on May 27, 1930, and established a new east-to-west record.

Two months later, on July 16, Turner set a non-stop record from Vancouver, B.C. to Agua Caliente, Mexico, in 9 hours, 14 minutes, and 30 seconds, in his Air Express.

Eight Air Express airframes were built; one of which was converted into a Vega. All were fitted with the P & W "Wasp" except for Turner's, which used the P & W "Hornet" for his speed runs. The Air Express was the last of the high-wing

Black and gold Lockheed Air Express used by Col. Roscoe Turner. Remember his famous lion cub mascot?

Lockheed "Wooden Wonders".

By the summer of 1929, John Northrop had left Lockheed to form his own airplane company and another gifted designer, Jerry Vultee, became the Lockheed chief engineer. At that time, Charles A. Lindbergh was searching for a high-performance, long-range, dependable airplane that could easily be converted into a seaplane. Lindbergh had specified a two-seater with a low-wing for safety and wide-track landing gear plus quick take-off due to ground effect. During an accidental meeting with Vultee, the Lone Eagle outlined his requirements. Jerry Vultee remembered Jack Northrop's Explorer experiment and realized that with a few modifications it would meet Col. Lindbergh's specifications. Using the Explorer as a base, a new Lockheed was developed following Lindy's requirements and the Sirius was born; Lockheed's fourth design! Construction followed the Lockheed molded fuselage and plywood wing system. Lindbergh had also specified a retractable landing gear, however, his schedule did not permit time for its design and testing so he settled for landing gear strut and wheel fairings.

Originally fitted with a 450 hp P & W Wasp engine, Lindbergh's 2,974 lb. Sirius graduated to a Wright Cyclone engine of 575 hp.

Lindy named his Sirius "Tingmissartoq" (Eskimo for "he who flies like a bird") and on April 20, 1930, Easter Sunday, the Lindberghs established a transcontinental speed record of less than 15 hours in a flight from Los Angeles to New York.

Charles and Anne Lindbergh's primary use for the Sirius was to chart trans-Atlantic, trans-Pacific and transcontinental air routes for TWA and Pan Am during the next three years; one of his major contributions to aerial science. Lindbergh's Lockheed Sirius can be seen in the New York Museum of Natural History.

Fifteen Lockheed Sirius aircraft were constructed; five of which were fitted with Lindbergh's retractable landing gear and renamed Altair.

The Lockheed Altair was basically a Sirius, and of the six Altairs built, only one was constructed initially as an Altair. The most famous Altair was the "Lady Southern Cross" flown by Sir Charles Kingsford-Smith in record flights over the Pacific Ocean.

Col. Charles A. Lindbergh receives handshake from Lockheed executive before testing his Sirius. Broke coast-to-coast record on first long distance flight. Fourth Lockheed design.

Sir Charles Kingsford-Smith stands by his Lockheed Altair, the fifth design, and first Lockheed to feature retract gear. He established several Pacific Ocean records in this plane.

Powered by a P & W Wasp SIDI engine of 550 hp, the Altair attained a top speed of 230 mph. One Altair was fitted with a pilot's cockpit well forward plus a cabin with accommodations for six passengers, and this became the prototype for the last of the "Wooden Wonders", the Orion.

The Lockheed Orion was, in effect, a low-wing Vega with flaps and retractable landing gear. It was the first airliner to have a service speed over 200 mph. The Orion was the most successful "Wooden Wonder" after the Vega, and was operated by airlines in Europe, Mexico, and U.S.A. The loaded weight was up to 5,800 lbs. and the P & W Wasp of 550 hp enabled the Orion to attain a top speed of 225 mph.

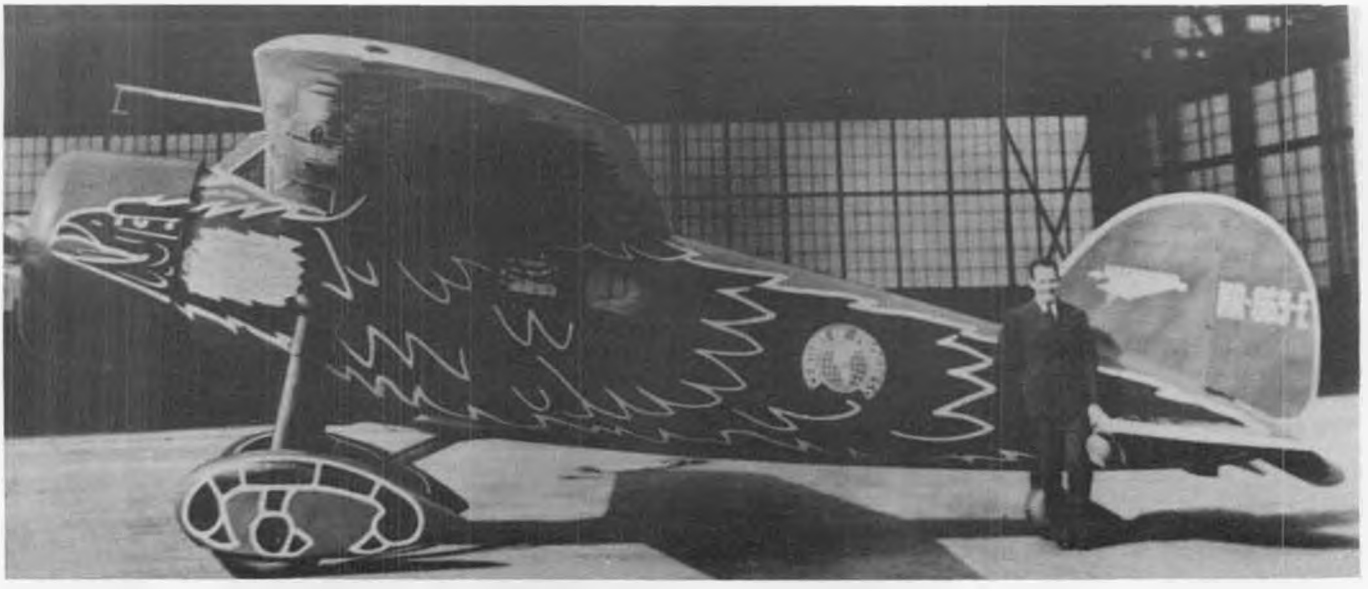
On the George Washington Bicentennial and the 157th Anniversary of the U.S. Postal Service, Major James H. Doolittle flew his Orion over the routes traveled by George Washington during his entire lifetime. The Orion made the trip from dawn to dusk on July 25, 1932, while delivering mail to thirty cities along the route.

The designers and draftsmen at Lockheed made the optimum utilization of the one successful basic design to develop a series of world-famous airplanes. Knowing they had a good thing in the Vega, they altered, adapted, modified and improved each product to accommodate the requirements of the purchaser. The Lockheed "Wooden Wonders" will never be forgotten, nor will a series of aircraft like the single-engine Lockheeds ever to be seen again.

Continuing the enviable tradition set by its founders, Lockheed aircraft have paved the way to higher and better goals for the aviation industry to follow: pre-WW-2 Electra; WW-2 Hudson and Lightning P-38; post war P-80 Shooting Star; F-94 Starfire; Constellation and Electra Airliners; F-104 Starfighter; U-2 high altitude spy plane; Hercules military transport; and 1011 jetliner, to name a few.

The Vega is generally acknowledged the most beautiful of the "Wooden Wonders", and the most beautiful Vega surely was the plane flown by James Mattern on his solo 'round-the-world flight. As was previously related, James Mattern and Benny Griffin had attempted to better the 1931 Post/Gatty

Orion was last of the "Wooden Wonder" series, and most successful since the Vega. Maj. Jimmie Doolittle stands with his "Shellightning." Orion was only "WW" fitted with flaps.



Completely rebuilt after minor wipeout shown below left, Mattern's Vega is magnificent in its distinctive red, white, and blue colors, as modeled in last month's issue. Just before solo 'round-the-world flight, the cabin windows were replaced with colored panels.

Round-the-world-flight during July 1932. Flying to Berlin from New York, the pair shattered many records and established "Firsts". While flying over Russia at night, on the way to Siberia, the sliding hatch over Mattern's head was ripped off by the slipstream. The panel tumbled along the fuselage top and struck the tail; causing so much damage that the Vega became impossible to control properly. Mattern had no alternative but to land his blue and white Lockheed, and spotted what appeared to be a good field. As the wheels touched the ground they rolled for a few yards and then suddenly broke through the crusty surface into a soft mire! The landing gear dropped deeper and deeper into the muck until the resistance forced the Vega to flip over onto its back, smashing a wingtip, wrecking the landing gear and breaking the fuselage! What had appeared to be a pasture was in reality a peat bog consisting of a soft muck covered by a grassy crust. Fortunately, no one was injured.

Rescuers soon appeared and the smashed Vega was shipped to the Lockheed factory to be rebuilt. The wing and tail surfaces were repaired, however, the broken fuselage was replaced with one taken from another Vega. The engine was replaced with a Pratt & Whitney factory rebuilt Wasp swinging a newly developed Hamilton Standard controllable pitch propeller.

Jimmie Mattern was determined to try again to beat the Post/Gatty time, but with one important change; he wanted to fly around the world alone! Knowing that Wiley Post was contemplating a solo 'round-the-world flight, Mattern insisted that his own solo aspirations be kept secret so that the competition wouldn't accelerate their preparations. In fact, Mattern left the cabin windows in place until the very last moment, to make it appear that a navigator was to accompany him.

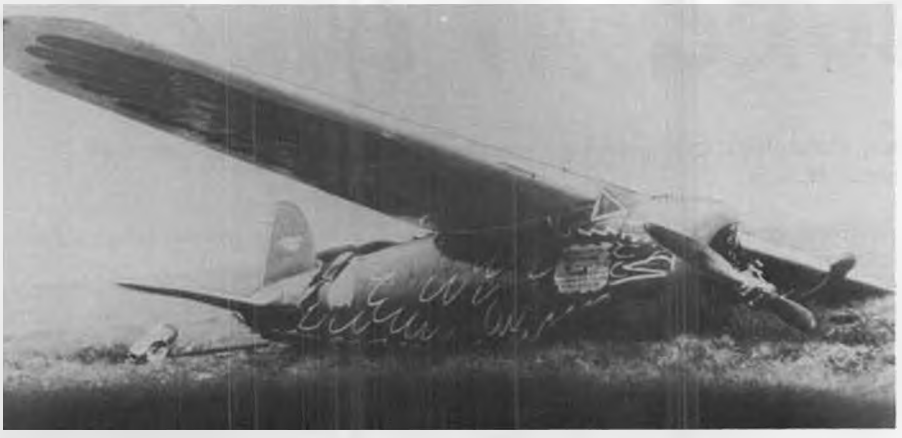
Preparations continued through the Spring of 1933; Stanavo (Standard Aviation Oil) contributing generously to the project. One of the problems was fuel tanks to fit the Vega fuselage, because the three 52-gallon wing tankage had to be boosted to 700 gallons! When Mattern heard that Wiley Post had fuel tanks for sale, he quickly purchased a 144 gal. and a 152 gal. tank. The remaining three fuselage tanks were bought from Amelia Earhart.

Mattern's simple blue and white Lockheed Vega then underwent a startling transformation. On the white wing and horizontal tail surfaces was emblazoned the wings and tail of an eagle, in bright red. The blue fuselage sides received the feathered body of an eagle, while a fierce eagle's head adorned the cowl, and talons were applied to the wheel pants. Among the events of 1933 was the Chicago Century of Progress Exposition. Mattern had the fair's insignia painted on the fuselage side, because he sincerely believed that this was a Century of Progress and was determined to prove it with his flight. Truly this was the most beautiful Vega of all; if not the most beautiful airplane of all.

When Jimmie Mattern climbed into the cockpit he was alone; very much alone, for there was no navigator to direct the course or to keep the intrepid pilot awake. The automatic pilot was just being developed, but was not ready for use. The take-off from Floyd Bennett Field, NY was uneventful at the break of dawn on June 3, 1933, and the beautiful red, white, and blue Vega headed for Newfoundland, 1200 miles to the northeast. When Mattern started out across the Atlantic Ocean ice began forming

Mattern's blue and white Vega after emergency landing in Russian peat bogg during R.T.W. attempt with Benny Griffin in 1932.

Jimmie Mattern poses with his beautiful Vega. Note world records listed on white panel. R/C model of this plane featured last month.



Mattern's Vega after emergency landing in Siberia, 1933. Frozen oil line forced landing on frozen tundra, terminating solo 'round-the-world flight when landing gear collapsed.

on his wings. As the build-up assumed dangerous proportions he decided to dive to a warmer altitude, but during the pull-out after a 6,000 ft. dive, the ice-laden ship resisted and he heard the starboard wing crack! Fierce North Atlantic storms added to the worry of the damaged wing and after flying thirty-seven hundred miles non-stop, Mattern could hardly read his instruments so intense was his fatigue. As a result, he landed on a beach as soon as he sighted the coast of Norway. Fuel was flown from Oslo while Mattern assessed the damage, which was the right wing plywood leading edge covering. Temporary repairs were made and the Vega made it to Oslo to refuel. Within an hour he was in the air again; bound for Moscow. After a refueling, a quick check of the plane and a few hours of sleep for Mattern, the pair were off to Omski; 1,800 miles over the Ural Mountains.

Refueling and rest at Omsk; then off again for Chita, another 1,500 mile run. During this flight, one of the several fuel lines broke and Jimmie was almost overcome by the fumes before finding a suitable landing area. Misfortune plagued Mattern in this flight because, in landing, the Vega tail struck a tree stump and the right half of the stabilizer was sheared off! Russian mechanics rushed to the scene and helped to repair the damage. The field was so small that the Stanavo Vega tanks had to be drained of fuel to make it light enough to take-off. This necessitated an unscheduled stop at Krasnoyarsk, which wasted valuable time. The next stop was to be Irkutsk, but when Mattern arrived, he found the field was flooded and the pilot was forced to fly to the west to Belvia, losing more precious time.

Belvia was the last stop in European Russia, so the Vega received 400 gallons of fuel and a set of new spark plugs for the engine. After a short nap, Jimmie Mattern was off again for Khabarovsk; a 2,000 mile flight. Fighting fatigue all the way, Mattern was forced to give-in only 300 miles short of his objective, by landing on the beach of a river island. After a well-earned sleep, the pilot found that the only fuel available was low octane gasoline and lamp oil. With the engine gasping on this diet, Mattern took off and landed at Khaborovsk, where he filled the tanks with 550 gallons of aviation gasoline. After a few more hours of sleep, Mattern headed for Nome, Alaska, an 800 mile run. During his flight across the frigid Okhotsk Sea, icing conditions became so severe that Mattern was forced to turn his ice laden Vega back to Khabarovsk! More fuel, more sleep, and a quick check; then off again for a successful crossing. Despite fog and more ice, Mattern fought his way to about 600 miles from Nome.

As he passed the Anadyrsk inlet, and was about to cross the Bering Sea, the all-important oil pressure failed because the lines had frozen! The dying engine could no longer deliver the required power and was ready to seize, so Mattern decided on another emergency landing. Below was the hard but rough tundra, and touchdown ripped the beautifully streamlined landing gear from the Vega, which came to rest on its belly in Asiatic Russia. The flight was over.

The aviation community and the world pondered the fate of the flight, while Mattern fought starvation and frigid weather for two weeks until natives finally found the pilot. It was another week before Mattern arrived at Anadyrsk, and from this outpost the world learned that the famous flyer was indeed, alive. Finally, upon arriving in Toronto, Canada, Jimmie Mattern found a Stanavo Vega waiting for him; the white plane emblazoned with a red eagle as was the Century of Progress Vega!

A disappointed Mattern flew the borrowed plane to Floyd Bennett Field. On the way, he made use of special equipment to make the first international radio broadcast from an airplane. Upon his arrival in New York, Jimmie Mattern was received as a hero instead of the failure he thought he was. Well, after all, he did fly most of the way around the world, and was only about 4,000 miles short of his starting point. Despite the many adversities, he had persevered and pressed onward toward his objective; the promotion of aeronautical science.

Jimmie Mattern went on to become an engineering research pilot for Lockheed, and was responsible for much of the success of the P-38 Lightning fighter plane. He was also very active in the complex organization and planning for ferrying planes to Britain during the second world war, and remained very active in aviation during the post war years.

ACKNOWLEDGMENTS

The author wishes to express his gratitude to the following for their kind and generous assistance with photographs and historic information which made this story possible:

Walter J. Boyne and the National Air and Space Museum, Smithsonian Institution; Bruce Reynolds and the San Diego Aero-Space Museum; and Robert C. Ferguson and the Lockheed-California Company.

To all a sincere "Thank You". •

James Mattern, far right, during ceremonies at Lockheed plant concerning P-38 and ferrying of fighter aircraft to Britain in WW-II. His long-range flying experience was major contribution.

THORNBURG AT LARGE

By DAVE THORNBURG . . . Featuring a couple of one-evening projects for those discarded Cox .049 engines. Flying saucer or F/F bipe . . your choice.

• Sometimes Friday evening arrives before you're ready for it. All week you've had this nagging urge to build something new to fly on the weekend, and suddenly the weekend is here and your building board is still buck naked. And the urge is still with you, getting stronger.

Oh, what to do, what to do?

Well, you could take a cold shower, like your Sunday school teacher used to suggest . . . but that never worked before, did it? How about a movie, instead? A movie will cost you four dollars plus popcorn, and when it's over, you'll find you've wasted three hours of building time, and your urge is still unsatisfied.

So why not take your movie money down to the hobby shop and invest it in the raw materials for a flying machine . . . something simple and quick, something you can have ready to fly by midnight, something that won't break your heart or your notebook if it disappears into a cloud and never comes out again.

That pretty well eliminates R/C and control line. Even the cheapest R/C job costs an arm and a leg. And how many ukies have you seen disappearing into a cloud? So what you need is a simple sport free flight design, something built around an inexpensive .049 engine.

Suppose, just suppose, that you have ready access to an old Cox reed valve engine . . . one of those noisy, greasy, easy-starting little critters that has its own gas tank built right onto the back of the crankcase. Almost every modeler I know has a couple of these little gems rattling around in a drawer someplace. If not, check your local flea market. And don't pay more than two or three bucks: you may have to spend another three on a rebuild kit if the reed has gone sour.

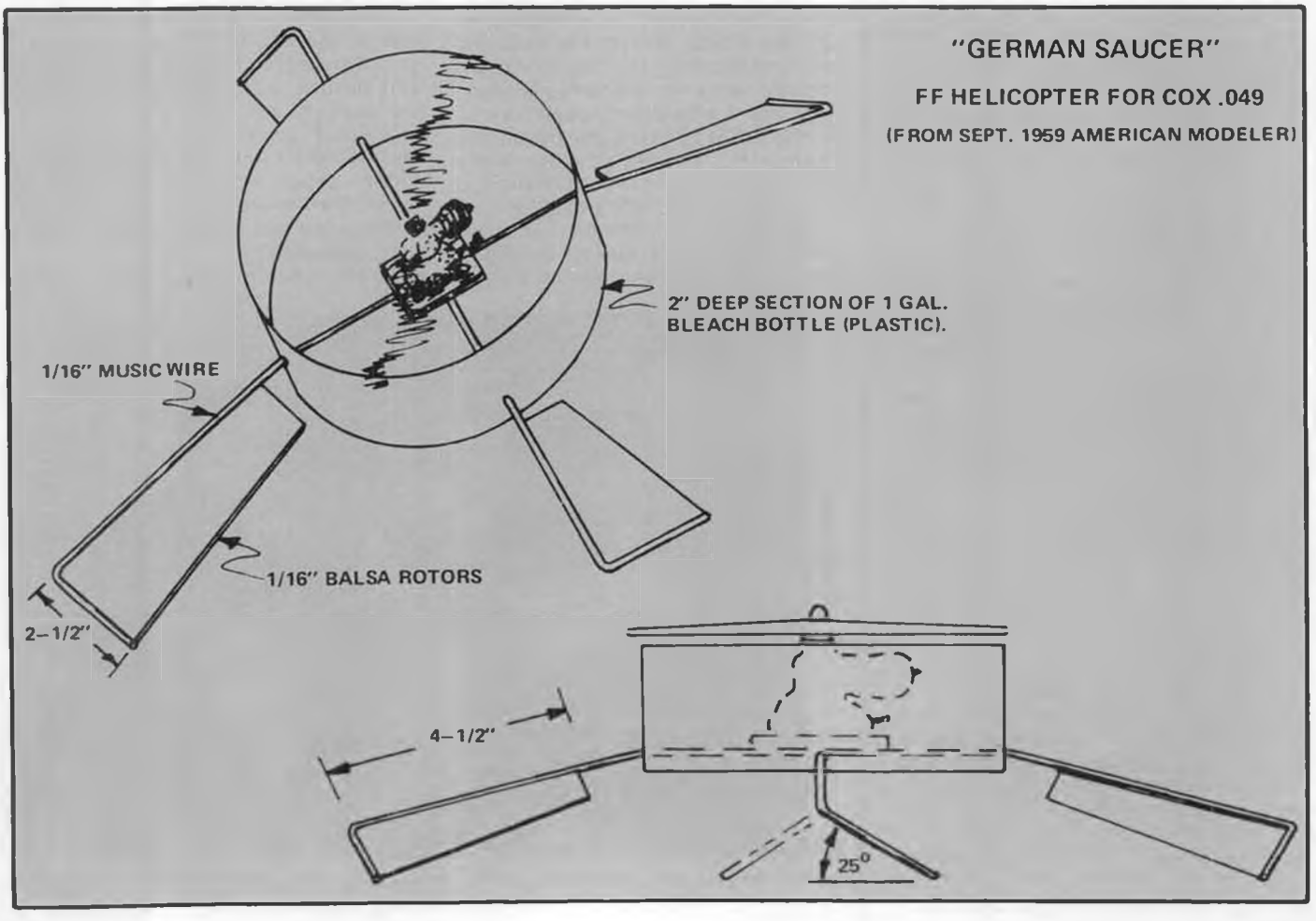
If you can locate one of these engines, and make it run, then you have no excuse for not building a "German Saucer." The German Saucer isn't my idea: it first appeared in American Modeler Magazine back in 1959, contributed by one Ernst Skirde. It's an idea that's too simple and neat to die. The dimensions (see sketch) aren't critical, as I've built two or three of them from memory during periods when I'd misplaced the magazine.

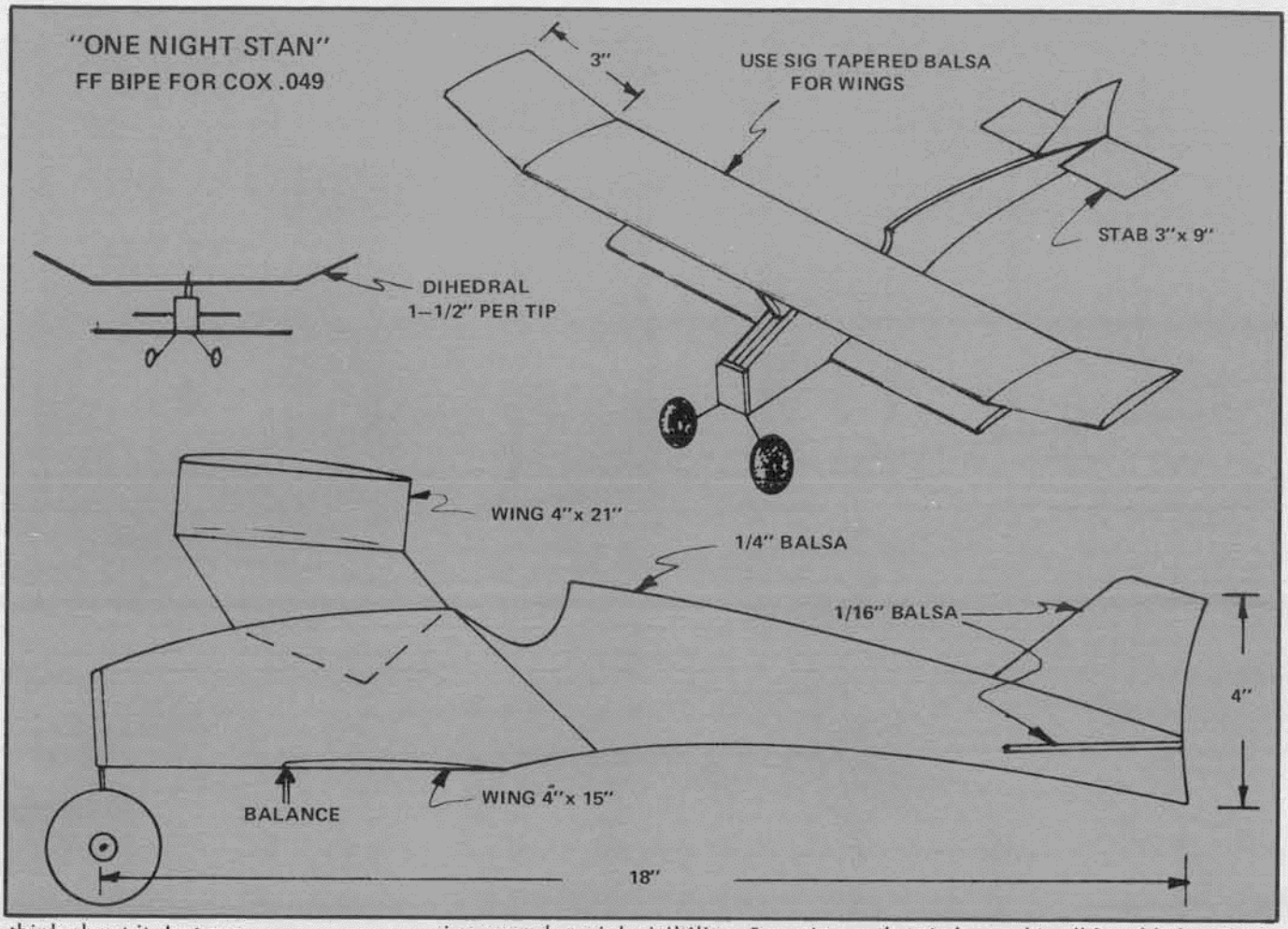
The machine is basically a torque-reaction helicopter. Crank its engine and the prop turns counter-clockwise, right? Engine torque will then try to spin the rest of the beast clockwise . . . after it leaves your hand, of course. As it spins, the thrust of the four rotor blades is added to the thrust of the prop, and the result is that the whole device goes right straight up. . . Usually.

TYPICAL FLIGHT DEPARTMENT

Holding the mounting plate with the fingertips of your left hand, you crank the engine, remove the battery clip, and tweak the needle valve for max RPM. Now you raise the beast high above your head and, still holding the mounting plate in your fingertips, launch it with a quick twist of your wrist. This is important: you *must* set the creature spinning as it leaves your hand. Otherwise it will fall with a thud. A screaming thud.

Now the next step in the launch process is critical, so listen up good, y'hear? *The instant the saucer leaves your hand, run like hell!* Which way? Don't even





think about it. Just run.

Here's the reason. Until this little woppa-woppa develops a couple of hundred RPM, it's extremely unstable. No matter how limp-wristed you are, fella, you aren't going to set it spinning out of your fingers at anything close to 200 RPM. So it's going to do a quick sideslip in one direction or the other, and wallow around a bit, and threaten everyone handy, before it finally gets up to flying speed. Stay out of its way.

Because if it should happen to miss both the ground and the idiots nearby, it will eventually point its propeller skyward and disappear into cloudbase at 500 to a 1,000 feet per minute. Don't panic when it goes out of sight. You'll be able to track it by the engine whine long after it disappears. Just have everyone on the field watch for it to reappear.

Ideally it should counter-rotate down, engine first. If it isn't built true, and in reasonably good dynamic balance, it may alternately spin and tumble its way back to earth. No harm in that . . . it's built to bounce.

"THAT'S FREE FLIGHT" DEPARTMENT

As you might have guessed, the German Saucer is strictly a calm-weather flyer: every MPH of prevailing wind decreases your chances of getting the model back. On a really calm day it will land within a couple of hundred feet of the launch point. On a windy day it will land somewhere. . .

You might try gluing strips of aluminum foil to the shroud and fins for increased aerial visibility. Spraying everything orange helps locate it on the ground.

"GLUE A TO B" DEPARTMENT

Make the shroud from a section of one-gallon plastic Clorox bottle, available from any well-stocked dumpster behind a laundromat. Have a care when you drill the holes for the wire: they should all be exactly the same distance apart, as well as the same distance from the bottom of the shroud.

Cut two pieces of 1/16 music wire to 20-inch length. If you're good at bending kinks, bend a kink in the exact middle of one of the wires, so when they cross each other they stay in the same plane. If you're not good at kinks, skip it. You probably have other talents.

Now for the engine mounting plate. If you feel industrious, make it from thin brass, or tin can stock. Then you can solder it in place, and it will look neato-keen. And probably cut your fingers when you launch.

Personally, I prefer the OSHA-approved version, made from two layers of 1/32 or 1/16 plywood sandwiched around the rotor blade wires. You can fill in the gaps with hard balsa of the appropriate thickness. And don't worry about strength; the engine mounting bolts will hold the sandwich together.

SWASTIKA DEPARTMENT

Now's the time to bend the blade angles into the tips of the wire. Try to stick close to the 25° pitch shown in the drawings. Or, at the very least, try to get the pitch equal in all four blades. This is important.

The blades themselves can be made from poster board of hard 1/16 balsa. Use silk or gauze or old nylon hose to secure them to the wire. Along with plenty of epoxy.

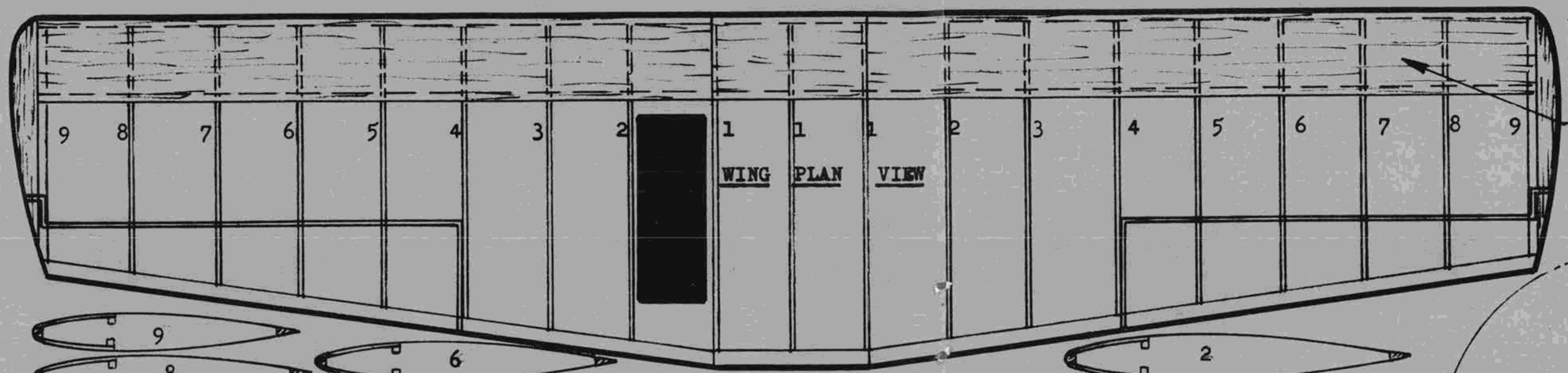
Nothing left now but the engine. Use the prop to help align engine and shroud. Instead of metal washers between engine and plate for thrust adjustments, I like to use rubber servo grommets. They make it easier to change thrust settings . . . a handy tip for any sport free flight.

★ ★ ★

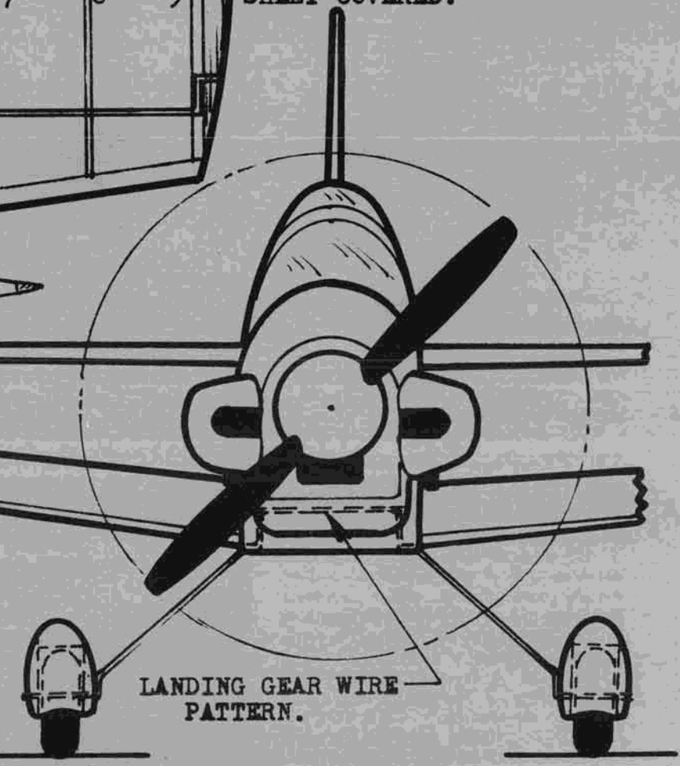
If rotary-wing craft don't stir your blood, then perhaps multi-wings are what you need. Consider "One Night Stan," the little bipe shown in the drawings. The original took just over two hours to build. Next morning I spent an additional 30 minutes "fuel proofing" it with a light coat of Aero Gloss orange spray dope, and mounting the engine and wheels.

Stan is probably the only free flight I ever owned that has given me back more flying time than I spent building it. It had well over 100 flights on it when it went into retirement (the engine fell off, actually). The top wing had been knocked loose more times than I can remember. The bottom wing was full of splits and gouges and cactus spines. The fuselage had three or four extra epoxy joints . . . not shown on the plan. And

Continued on page 85



WING TIPS ARE CARVED FROM SOFT BALSA BLOCK. TOP AND BOTTOM FORWARD OR SPARS, SHEET COVERED.



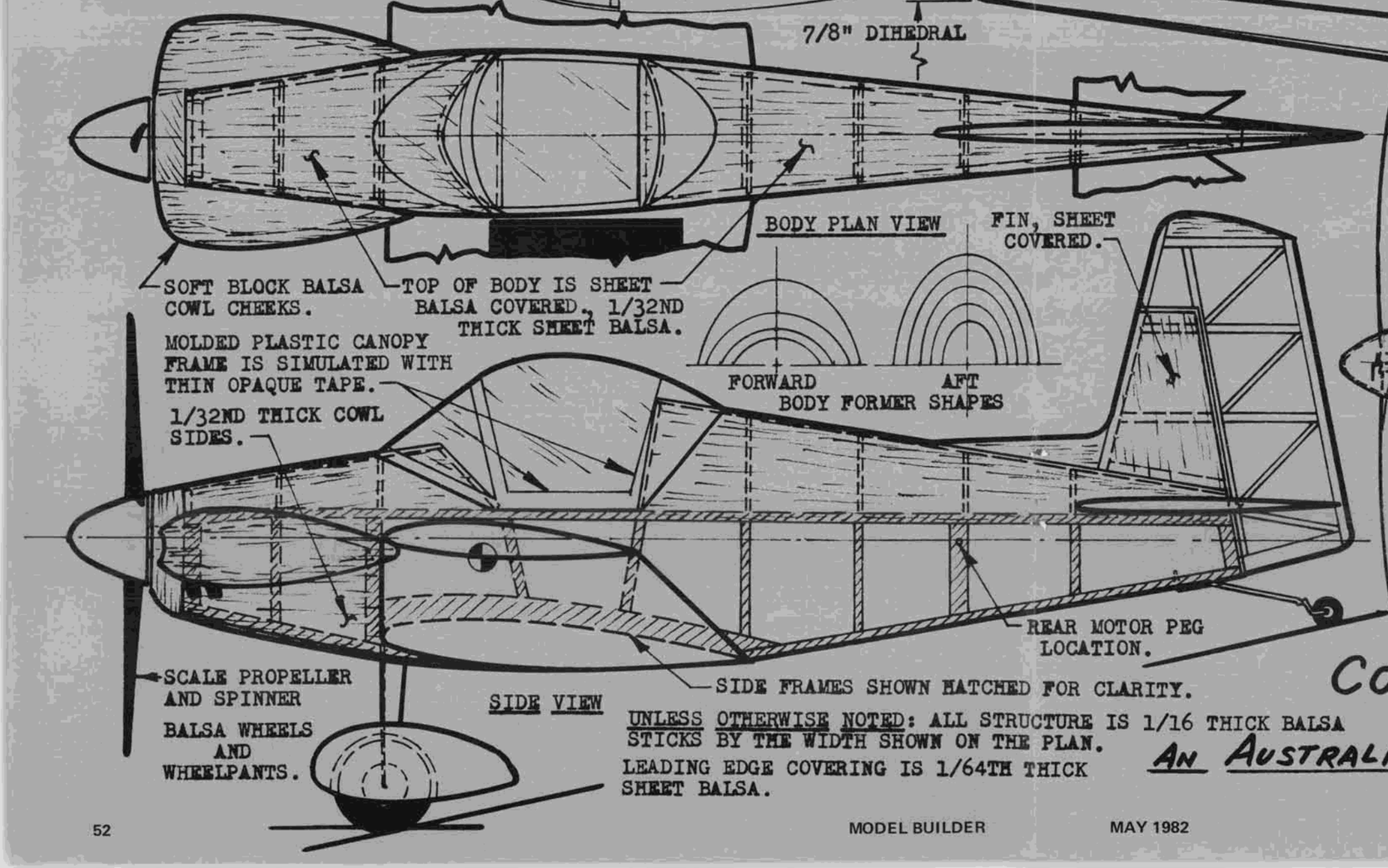
LANDING GEAR WIRE PATTERN.

FRONT VIEW

DETAIL OF FLYING PROPELLER AND NOSE BLOCK.

FRONT OF HORIZONTAL TAIL, SHEET COVERED.

HORIZONTAL TAIL PLAN VIEW.



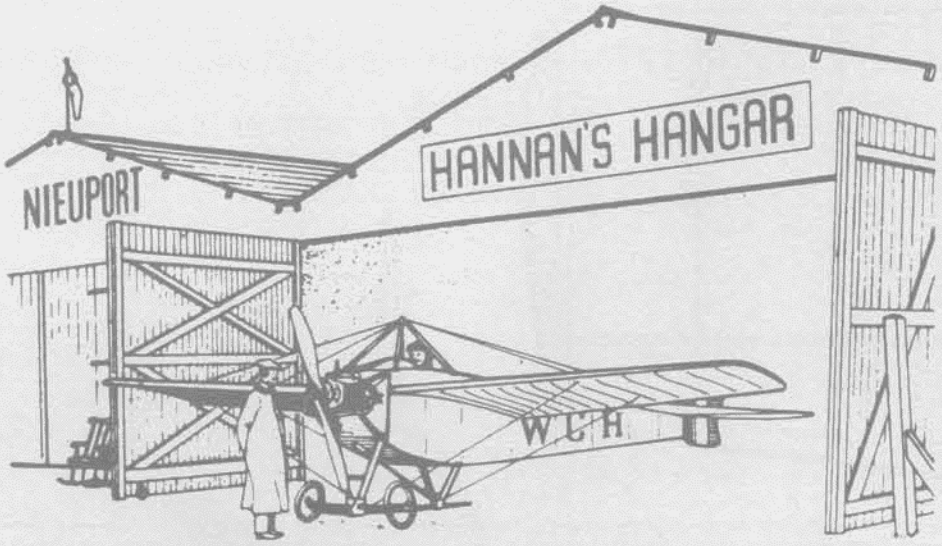
UNLESS OTHERWISE NOTED: ALL STRUCTURE IS 1/16 THICK BALSA STICKS BY THE WIDTH SHOWN ON THE PLAN.
LEADING EDGE COVERING IS 1/64TH THICK SHEET BALSA.

Corby Starlet CJ-1

AN AUSTRALIAN PEANUT

by Walt Mooney
12-17-81

Text begins on page 53



"Some things are too old to be any good. Other things aren't old enough to be any good."

Our quote this month is from the late Vic Warnock, of the San Diego Aero-Space Museum.

ABOUT OUR QUOTES

A surprisingly large percentage of our mail contains mentions (usually favorable) regarding the various quotations and comments we try to include. Many of our readers send along items to share from various published sources, while others seem to have natural knacks at generating their own profound or stimulating commentary, which deserves exposure to a larger audience than their letters might reach. Here is a truly diverse sampling:

"Then, as the art of flying transposed to a science, I found my interest in airplanes decreasing." . . . "I now see scientific accomplishment as a path, not an end; a path leading to and disappearing in mystery." Charles Lindbergh *Life* Magazine July 4, 1969

"I never liked people to call them the Wright brothers. It sounds too much like the Smith Brothers; makes me think of cough drops." J. H. Meyer, retired doctor and member of the Dayton, Ohio Aviation Hall of Fame, 1981

"In a world over-full of committees, more Santos-Dumonts are needed, people who will get on and do something, even if it is wrong, rather than founder in endless deliberations and debates." from *Santos-Dumont*, by Peter Wykem, 1962

"There are so many interesting things to do, I have little use for people who are bored." Frank Scott, 1981

"The idea of collecting old model stuff (plans, etc.) appeals to me more and more. The aficionados will take it, I think, as 'nostalgic stuff' grows on our cult and our 'society' or whatever it may be and nobody quite understands what's happening to us, do they?" Rear Admiral L. S. McCready 1982.

THE CONTINUING SAGA

According to Lloyd Jones, of the International Plastic Modelers Society, the legendary Hughes "Spruce Goose" flying boat is expected to be open to public viewing during the summer of this year. The IPMS is organizing a scale model display to be maintained inside the massive craft, which is to be housed in a 130 foot high dome.

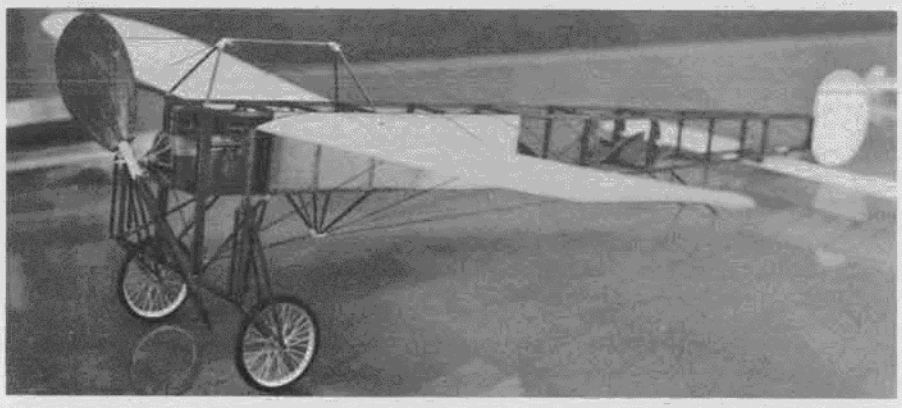
MYSTERY AIRFOIL?

According to the model department editor of *FLY* magazine, for January, 1912: "The side of the plane that should be covered is the underside. But most people prefer to cover the top as it looks neater."

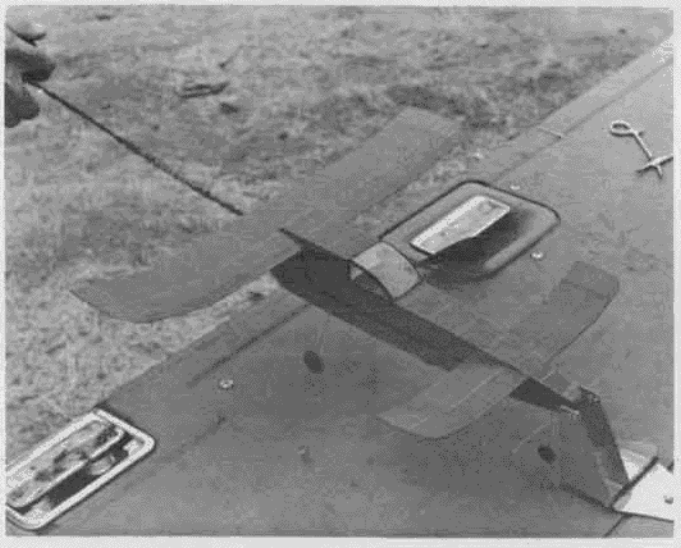
MODEL SCALE

A new plan-set offers a low-cost way to construct a precision beam-balance suitable for model building use. Having a range of .001 ounce through 16 ounces, the unit operates on a simple fulcrum principle, and is somewhat reminiscent

Continued on page 70

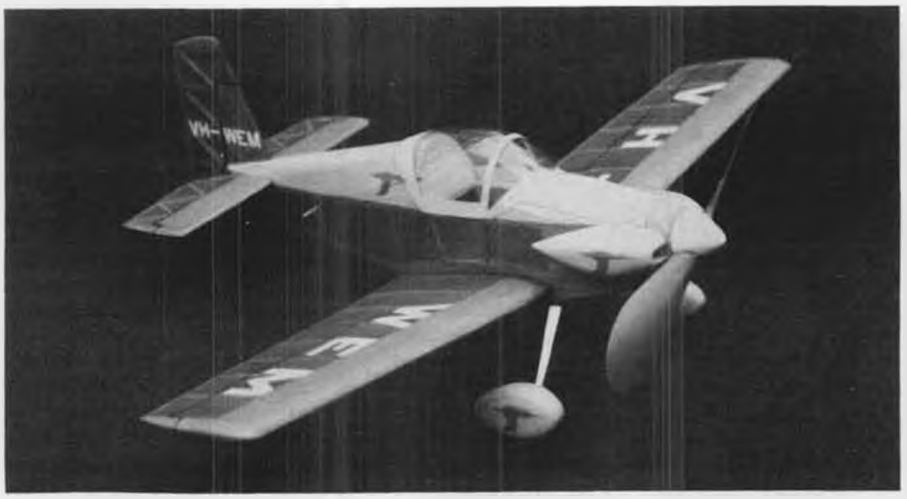


Alain Parmentier's 1911 Cessna, winner of French National Concours "Maquette" Peanut class.



Clarence Mather's West Coast Bostonian carnard flies stably without vertical tail surfaces. Note winding "stooge" on tail-gate.

John Blagg's free flight scale Breda-Pensuti plays second-fiddle to his charming daughter, Nicola.



CORBY STARLET

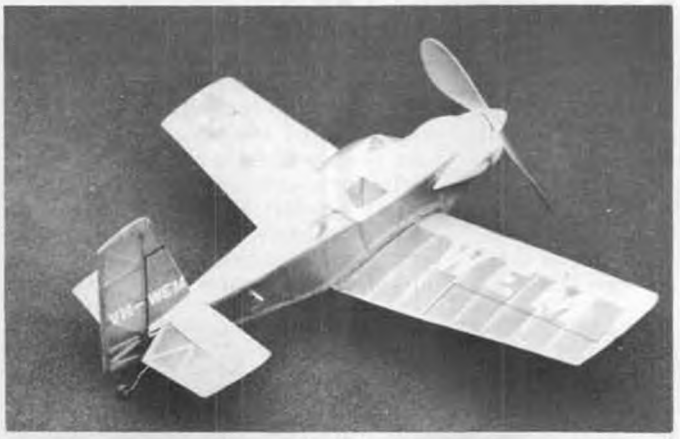
By WALT MOONEY . . . Even though it's not the configuration you might look for to get long flights, and with additional sheeting and heavy canopy, this stubby little homebuilt still makes long flights.

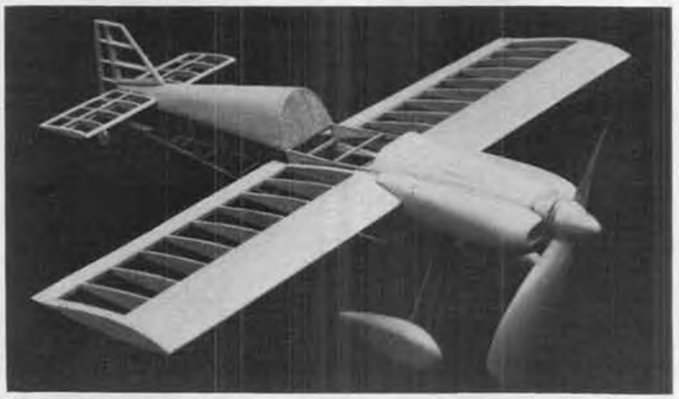
• This is a perky little single-place homebuilt design from down under. The three-view has been published in several aviation publications as a part of the HAPi Engines Inc. advertisement. A Corby Starlet was brought from Australia to the last Oskosh E.A.A. fly-in aboard a Qantas 747 that brought several other Australian aircraft and several hundred E.A.A. members to the get-together. It appears to be an excellent design for Peanut modeling and the only intentional change from exact scale that was made on the model in the photos was an increase in wing dihedral.

The model in the photo weighs 21 grams, complete with a rubber motor. This is rather heavy for a competitive Peanut, but the model is still capable of making flights of 25 to 30 seconds. Most of the excess weight is due to the use of a cut-down Sig six-inch canopy which was designed for U-Control models, and as a consequence, is much heavier than necessary. A heavy plastic propeller is required to balance the model as built. Also, to maintain the basic character of the Starlet, more than the usual amount of sheet covering was used. No matter how thin sheet balsa is, it is still heavy compared to tissue.

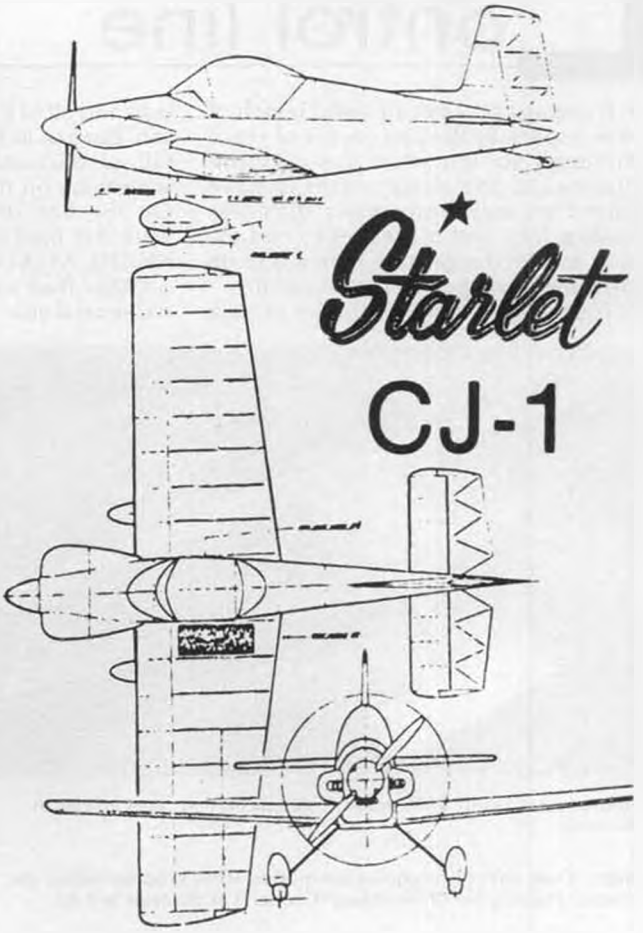
Nevertheless, the Starlet is a cute model. It looks a little like a low aspect ratio, stubby, Mooney M-18 Mite. Wing rib spacing and structural members in the tail all match the three-view. Obviously, a much lighter model could be made with little or no scale judging penalty by (1) eliminating the sheet covering on the vertical and horizontal tail, (2) eliminating half of the wing and tail ribs, (3) using bond paper for the aft top fuselage covering, and (4) molding a

Plans on pages 52 & 53
Text Continued on page 96





The stubby little Corby Starlet will be followed by a Finnish Super Sytky, shown in skeleton form above.



Can you believe it? A non-combat model in Dirty's column! Vic Garner's Goodyear with his own prop and fueling system. Seen at Merced.

Control line

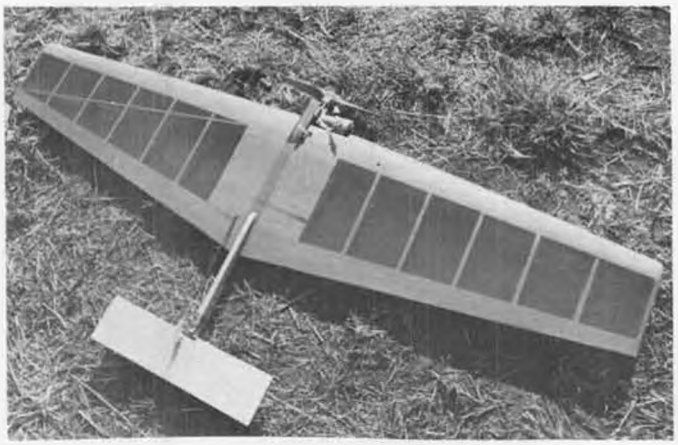
By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

• It seems as if I get an awful bunch of mail, especially the past couple of years. Although not important to you or this discussion, my name seems to have found its way onto many different mailing lists, and it is easier to toss the junk mail in the garbage than it is to do anything more permanent about it.

Today was no different; piles of junk mail and all of it headed for the garbage can. But just as I was tossing this catalog full of discount trophies in the can, something on the label caught my eye. On the line directly above my name were the bold type letters spelling out MODEL AVIATION. Hmmmm. . . .

Other than a couple of articles that I did several years ago for then-editor Bill Winter, I have had nothing to do with MA. Except belong to the AMA, of course. And I know damn well that I have never written to a trophy company asking for quotes and/or catalogs. I do have a Contest Director license with AMA. It is likely that my name, along with several hundred others, was pulled out of the computer memory banks,



Above: Here's your $100 wood Rotation Station, seen lurking at the Nats.

Right: Does anyone recognize the master, Riley Wooten behind the shades? Holding for unidentified (Cooper?) at the Nats in FAI.

"Adios old paint." Tim Gillott releases Shark during 4:50 run.

these "lucky" folk getting their very own wholesale-type trophy catalog to fondle, caress and love forever. It's not the fact that I don't want to buy trophies via their toll-free line, purchasing trophies in this manner seeming to be asking for trouble anyway, what bothers me is that the AMA mailing lists are (evidently) available to these people.

I made a promise to myself (and Bill Winter, although he doesn't yet know it) than I would never again get involved in AMA politics, and I'm not doing it now. But I would sure like to know how much it costs to get an AMA mailing list, and who can get them. (*Furthermore, most publishers request a signed permit from their subscribers to pass around their addresses. wcn*)

AND ANOTHER THING

Golly, Wow, I see where our AMA pulled off another big spectacular with the recent completion of yet another cross-country race, oops, "rally", I guess they called it this time around, or at least used rally-type scoring on each leg.

Is trashy stuff like this all we can come up with for promotion of modeling? I mean, having teams of fliers work their models across the country has to be one of the biggest jokes of all time. What purpose could it possible serve? How does it promote model aviation? Does it advance the state of the art in modeling and modeling equipment in any way? Can you, as an indivudual, point out any tangible benefit from this cross-country race?

Oh, sure, it is probably a great time for those actually involved in the race (and I think I will continue to call it a "race", as I am familiar enough with rallying to know that more than just a little racing goes on quite frequently, especially when you get behind on your minute). And everybody gets those fancy jackets to wear, which must be quite a thrill, as around here we have a fellow who wears his all of the time, has been known to go out of his way just to walk in front of somebody rather than behind where he couldn't be seen nearly as easily. You laugh. I've seen him do it!

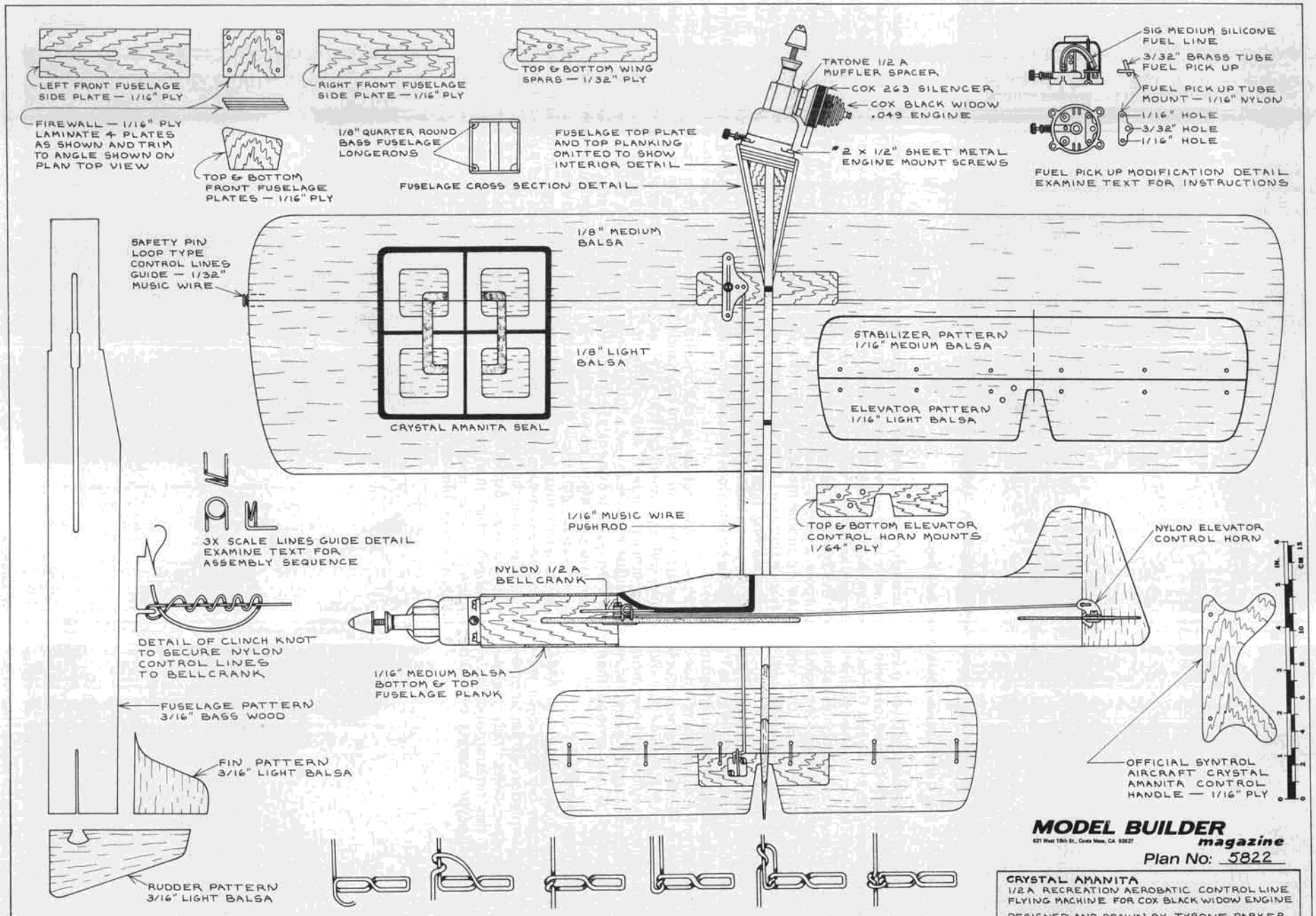
The real kicker, and what bothers me most, I suppose, is that to fly a model cross-country, you really should be borne along by a vehicle of some sort, what with walking so many miles being such a drag and all. Almost as much of a drag would be wheeling off cross-country, so those nice, smooth highways are just too much to resist and here we have pickemups, campers, and such with pilots sprouting out of them, flying a model in what would *have to be* close proximity to a roadway with other traffic on it. An out-of-control model going one way at, say 60 mph, an oncoming car clipping along at 70 or so . . . let's see, that's a closing speed of 130 per and could easily be higher.

Of course, that smooth roadway is just too much to resist when it comes time for a pit. "Bring 'er in, Harry, can't see a car for miles and I don't think there is one around that curve." Hey, it must happen, one of the pictures in the report showed a model taking off from what was clearly a road, white line down the

Continued on page 92

Mr. Moto gets arm lock on Masked Marvel during Nats. Could be Cleveland in back. Not sure.

"Hey, watch it with the hands!" Gary Frost and Stubblefield mix it up during FAI Combat at the Nats.


LEFT FRONT FUSELAGE SIDE PLATE — 1/16" PLY
RIGHT FRONT FUSELAGE SIDE PLATE — 1/16" PLY
TOP & BOTTOM WING SPARS — 1/32" PLY
FIREWALL — 1/16" PLY LAMINATE 4 PLATES AS SHOWN AND TRIM TO ANGLE SHOWN ON PLAN TOP VIEW
TOP & BOTTOM FRONT FUSELAGE PLATES — 1/16" PLY
1/8" QUARTER ROUND BASS FUSELAGE LONGERONS
FUSELAGE CROSS SECTION DETAIL
FUSELAGE TOP PLATE AND TOP PLANKING OMITTED TO SHOW INTERIOR DETAIL
TATONE 1/2 A MUFFLER SPACER
COX 263 SILENCER
COX BLACK WIDOW .049 ENGINE
* 2 x 1/2" SHEET METAL ENGINE MOUNT SCREWS
SIG MEDIUM SILICONE FUEL LINE
3/32" BRASS TUBE FUEL PICK UP
FUEL PICK UP TUBE MOUNT — 1/16" NYLON
1/16" HOLE
3/32" HOLE
1/16" HOLE
FUEL PICK UP MODIFICATION DETAIL EXAMINE TEXT FOR INSTRUCTIONS
SAFETY PIN LOOP TYPE CONTROL LINES GUIDE — 1/32" MUSIC WIRE
1/8" MEDIUM BALSA
1/8" LIGHT BALSA
CRYSTAL AMANITA SEAL
STABILIZER PATTERN 1/16" MEDIUM BALSA
ELEVATOR PATTERN 1/16" LIGHT BALSA
3X SCALE LINES GUIDE DETAIL EXAMINE TEXT FOR ASSEMBLY SEQUENCE
1/16" MUSIC WIRE PUSHROD
TOP & BOTTOM ELEVATOR CONTROL HORN MOUNTS 1/64" PLY
NYLON ELEVATOR CONTROL HORN
NYLON 1/2 A BELLCRANK
DETAIL OF CLINCH KNOT TO SECURE NYLON CONTROL LINES TO BELLCRANK
1/16" MEDIUM BALSA BOTTOM & TOP FUSELAGE PLANK
FUSELAGE PATTERN 3/16" BASS WOOD
FIN PATTERN 3/16" LIGHT BALSA
RUDDER PATTERN 3/16" LIGHT BALSA
OFFICIAL SYNTROL AIRCRAFT CRYSTAL AMANITA CONTROL HANDLE — 1/16" PLY
DRAGON SCALE ELEVATOR HINGE DETAIL — EXAMINE TEXT FOR INSTRUCTIONS
MODEL BUILDER magazine
621 West 19th St., Costa Mesa, CA 92627
Plan No: 5822
CRYSTAL AMANITA
1/2A RECREATION AEROBATIC CONTROL LINE FLYING MACHINE FOR COX BLACK WIDOW ENGINE
DESIGNED AND DRAWN BY TYRONE PARKER

CRYSTAL AMANITA

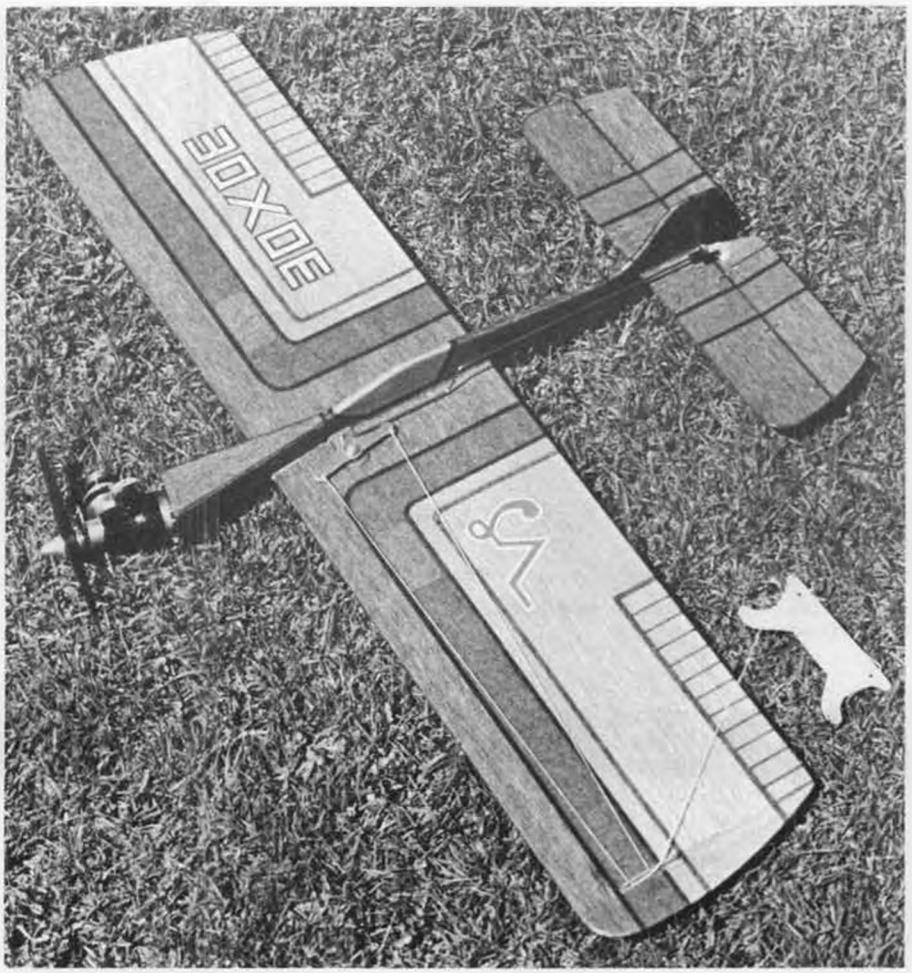


PHOTO BY DAVE PURCHASE

By TYRONE PARKER . . . An easy-to-build 1/2A control line sport model with detailed instructions for assembly. An excellent model to get that youngster interested in the hobby.

• Crystal Amanita is styled generally like the modern parallel-line type aerobatic monoplanes, and is designed to be vibration absorbent in the front and to distribute vibration throughout the rest of the airframe so as to minimize excess stress in any one area.

Crystal Amanita has proven to be durable and a really good flying machine for about two years that I have been flying and improving the design. It is well worth the time and care to cut and fit the parts snugly, as accurately fitted parts will require minimum glue to hold securely and no amount of glue will make an improperly fitted seam as secure as an accurate one. Excess glue only adds undesirable weight, which both decreases flight performance and dampens flexibility, which results in premature airframe fatigue.

Glue one piece 1/8 x 2 x 24 inch medium balsa to one piece 1/8 x 4 x 24 inch light balsa, to form one piece 1/8 x 6 x 24. Sand top and bottom of wing blank when dry . . . trim tops to outline shown on plan . . . shape edge to half-round and sand smooth.

Cut fuselage to shape from 3/16 bass wood and sand bottom wing spars to shape from 1/32 ply . . . shape top edge of top spars and bottom edge of bottom spar to 1/4-round and sand both spars smooth. Slide fuselage to center of wing . . . slide spars into position . . . lightly trace spars' outlines onto wing with a .5mm mechanical pencil . . . slide spars back out . . . slide fuselage away from wing center to clear spars area . . . glue spars in place with aliphatic resin glue . . . slide fuselage back to wing center . . . press spars on one side of fuselage tightly to wing with thumb and forefinger . . . tack those spar halves to wing with cyanoacrylate adhesive then press and tack spar halves on other side. Slide fuselage about a 1/2 inch back from wing center . . . apply glue around wing center . . . slide fuselage back to wing center . . . use triangle to check that fuselage is straight up from wing top and straight back from wing trailing edge . . . tack with cyanoacrylate adhesive and seal fuselage to wing seams with aliphatic resin glue.

Cut four firewall plates from 1/16 ply and laminate with cyanoacrylate adhesive as shown on plan. Cut left and right front fuselage side plates from 1/16 ply and sand smooth. Trim fuselage front to angle shown on plan top view and glue firewall in place.

Slide fuselage side plates into position . . . trim inside back edges to fit flat to fuselage . . . trim firewall edge to fit flat to inside front sideplate surfaces and glue side plates in place. Trim 1/8 inch quarter-round basswood fuselage longerons to fit inside top and bottom edges of left and right fuselage side plates and glue in place.

Cut top and bottom front fuselage plates from 1/16 ply . . . glue bottom plate in place and with the grain running across the fuselage center line. . . plank fuselage bottom from back of bottom plate to back of side plates with 1/16 medium balsa . . . trim and shape edges to 1/4-round and sand smooth. Glue top plate and planking in place. . . trim and shape edges and sand smooth. Cut fin and rudder from 3/16 light balsa . . . glue fin to fuselage . . . taper rudder to about 1/16 at trailing edge and tack lightly in place. Sand both sides of fin and rudder . . . shape fuselage edges back from top and bottom planking and fin and rudder edges to half-round . . . sand smooth and separate rudder from fin and fuselage.

Cut stabilizer from 1/16 medium balsa . . . elevator from 1/16 light balsa . . . sand tops and bottoms . . . shape edges to half-round and sand smooth. Cut top and bottom elevator control horn mounts from 1/64 ply . . . sand smooth and glue in place. Drill 1/16 hinge holes in stabilizer and elevator as shown on plan and glue stabilizer in place. Tack rudder lightly back in place. Cover wing

Continued on page 77

Chris Beattie firmly attached to winder by strap around his waist.

Ed Wogulis launches Wakefield at Harts Lake Semi-Finals.

Tim Warren launches Mulvihill model at '81 Nats. Coached by Chuck Markos.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

20518 S.W. Leeds Ct.
Aloha, OR 97005

• By the time you are reading this, I hope that signs of spring have appeared, and that you've managed to dig yourself out of what seems to be the worst winter weather (except for the West Coast) in recent years in the U.S. Here's also hoping that most of you have taken good advantage of the long building season, and have something new ready to go when the weather clears. (I wish I had something to show for the long winter layoff besides several half-completed airframes hanging around, just waiting for the spring pre-flying flurry of activity.)

One person who hasn't been wasting his time lately is Wayne Drake. He just purchased a new Rockwell bandsaw and called the other night to relay the labor-saving inspirations the new machine has given his building technique. Well, I've had a bandsaw for awhile now, and consider it to be one of the basic tools of my workshop, but Wayne's worked out a few hints and kinks he'd like to pass on.

The main use I put my bandsaw to is the stack-cutting of wing ribs and other identical curved pieces. Wayne has found that adding a block of hardwood or particle board to the bottom of the stack makes it much easier to follow the lines on the pattern. I *had* noticed that ribs cut from hard balsa seemed easier to do than those cut from softer stock.)

Wayne has also found the fence to be invaluable for lots of tasks. For instance, he doesn't stack sheets to cut out ribs; he uses a solid block, then slices off the ribs like salami at the butcher shop. He also uses the rip fence in conjunction with the tilting table on his saw to cut trailing edges to the proper cross-section. But not just any plain trailing edges, mind you! He stacks and glues sheets of 1/8 balsa together to make the proper width of the trailing edge. In the middle, he puts in a layer of 1/32 ply, and the bottom layer is of 1/64 ply. When passed through the saw, the result is a laminated trailing edge that is light, strong and straight . . . and it's likely to stay that way.

Wayne has also used his new saw to make jigs and fixtures to speed up construction. For instance, he cuts out spacer blocks for placing wing ribs and shear webs in the correct locations, almost eliminating the need for plans. He's also made a miter gage setup for mass-producing gussets.

One final tip from Drake is the use of 3M Spra-Mount spray adhesive for making up sanding blocks. It's quick and easy, and permits the old sandpaper to be peeled off easily. It's also very good for attaching paper patterns to rib stacks, etc., since it peels off without a trace.

Former Wakefield World Champ Albert Oschatz, prepping for flight at 1973 World Champs, Weiner Neustadt.

DARNED GOOD AIRFOIL . . . Eppler 205

This month's DGA is the latest hot setup for RC sailplanes, but it looks to me like it might be useful for free flight, also. One of the Eppler 205's prized characteristics for RC is that is will operate over a wide range of speeds, to enable fast penetration upwind for thermal searching, but with good glide performance at slower speeds for light lift. These are the same characteristics needed for a good airfoil for FAI power, for example. The 10.5% thickness is greater than that normally used nowadays, but that shouldn't cut the climb down much (Dave Benepe's computer simulation in the 1978 NFFS Sympo showed that there was a total difference of only eight feet in altitude between six percent and ten percent thick airfoil section, and that the ten percent section had 60 seconds more calm air duration than the six section.) The extra thickness should make for stiffer wings as well as a better glide. Interestingly enough, the 205 flunks the "Eppler test" for upper surface drop-off, but only by 0.1%. It seems to have the basic shape of many successful power airfoils, with a slightly upswept leading edge and flat bottom.

MYSTERY MODEL

I haven't included too many gliders in the MM Sweepstakes, since there aren't as many distinctive-looking birds as among the gas models. (The early Nordics all seemed to have elliptical tips; now the style has changed to straight lines). But this month's MM is one that should be familiar to avid followers of

the F1A (nee A/2) class. It was used for a place on the National team by the designer twice, and made the flyoff in another flyer's hands in later years. The tapered tips, with tip plates, fuelage shape, and top and bottom rudders are the main identification features. If you think you have this model identified, send in your guess to the MB office (619 W. 19th, Costa Mesa, CA) to see if you were early enough to win the free subscription.

MODEL OF THE MONTH:

Brian Martin's *Streaker* Open Power

I have a soft spot in my head for British Open Power models, I guess, but I've always admired the concept of a gas event free of any restrictions but engine run and max. (I also agree with John O'Donnell's suggestion a few years back that the FAI Power be conducted under unrestricted rules . . . let the World Champ be the guy who brought the hottest model he could trim!) Anyway, this month's three-view (from *Free Flight News*) is a good example of the breed. Here's what Brian has to say about his design:

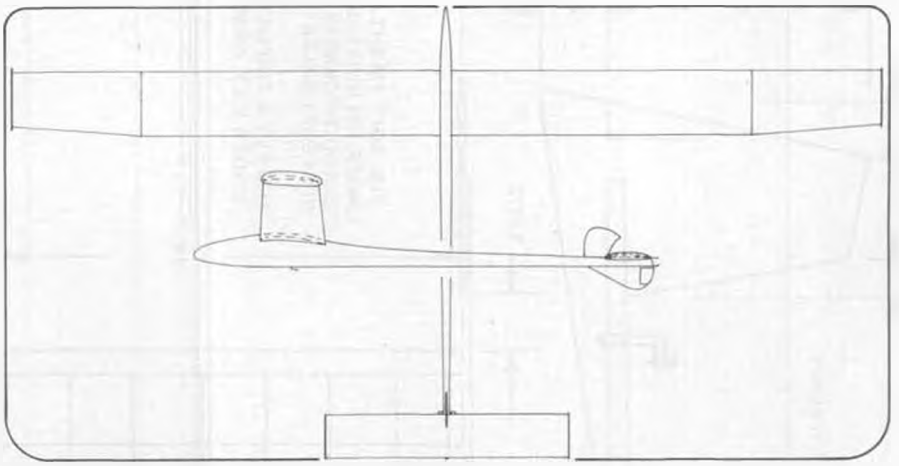
"Before building Streaker, I had been flying 5 cc. (.29) powered non-VIT models which were reliable and consistent, but hadn't enough performance to do well in flyoffs. Streaker was an attempt to build a higher performance flyoff model whilst retaining the reliability and consistency of the previous models.

"The model flew much better than previous models. Streaker is not a high-performance still air model, being capable of about 4-1/2-5 minutes from a 10 second motor run. What performance it has is achieved by the brute power of a '40' hauling a big, stable model up to a good height. More important than out-and-out performance is that this model will max in any weather and will survive a bad launch or a short motor run. The wing is of all-sheet construction. The reason for this is that built-up wings have a tendency to alter their warps and spoil the power pattern. Once built in, wraps and an all-sheet wing are retained and a consistent power pattern results.

The wing is also very strong and will withstand the knocks received during competition flying in bad weather. The section is a Pimenoff, which is stable and forgiving, and combined with a 1.5 tail volume coefficient, 70% CG and VIT, gives a model which will ride well through turbulent air.

"The engine is a K&B 40R Series 69, which has the main properties (I wish I could find a good used one of these—TH) required in an open power motor, i.e., good starting, good running, light weight, high power. The tank position as shown, combined with an RV carburetor, means that the plumbing for the motor's pressure fuel system can be kept to a minimum, and better motor runs are achieved.

"A further aid to reliability is the almost unbreakable glass rod fuselage. Fitted into the front of the rod are large dural-faced engine bearers which help the engine develop full power with minimum vibration."



MAY MYSTERY MODEL

BUILD YOUR OWN SCALE?

What the modeling world has needed even more than a good five-cent cigar or a reasonably priced FAI engine, has been a reasonably priced weighing device. Now, Micro-Air Precision products may have come up with a solution in the form of a do-it-yourself wooden beam balance kit. Actually, it's more of a plans set, with stick-on templates, instruction notes, etc., to enable you to produce, from ordinary modeling materials, a balance capable of weighing from thousandths of an ounce up to one pound.

The calibration instructions show how to read out weights in ounces (from .001 oz. to 10 oz., using an accurate one ounce calibration weight) or pounds, but the unit could be easily made to read out in grams, which are more convenient for modeling use, by using a 10 g. calibration mass. This would permit readouts from one to 100 g, while a one gram mass could be used to obtain a 0.1 to 10 g range.

The Plain Set is available for $3.50 from Micro-Air, PO Box 1129, Richland, WA 99352.

TESTS ON DIFFERENT FIN POSITIONS FOR F1C MODELS

(reprinted from *Free Flight News*)

BACKGROUND

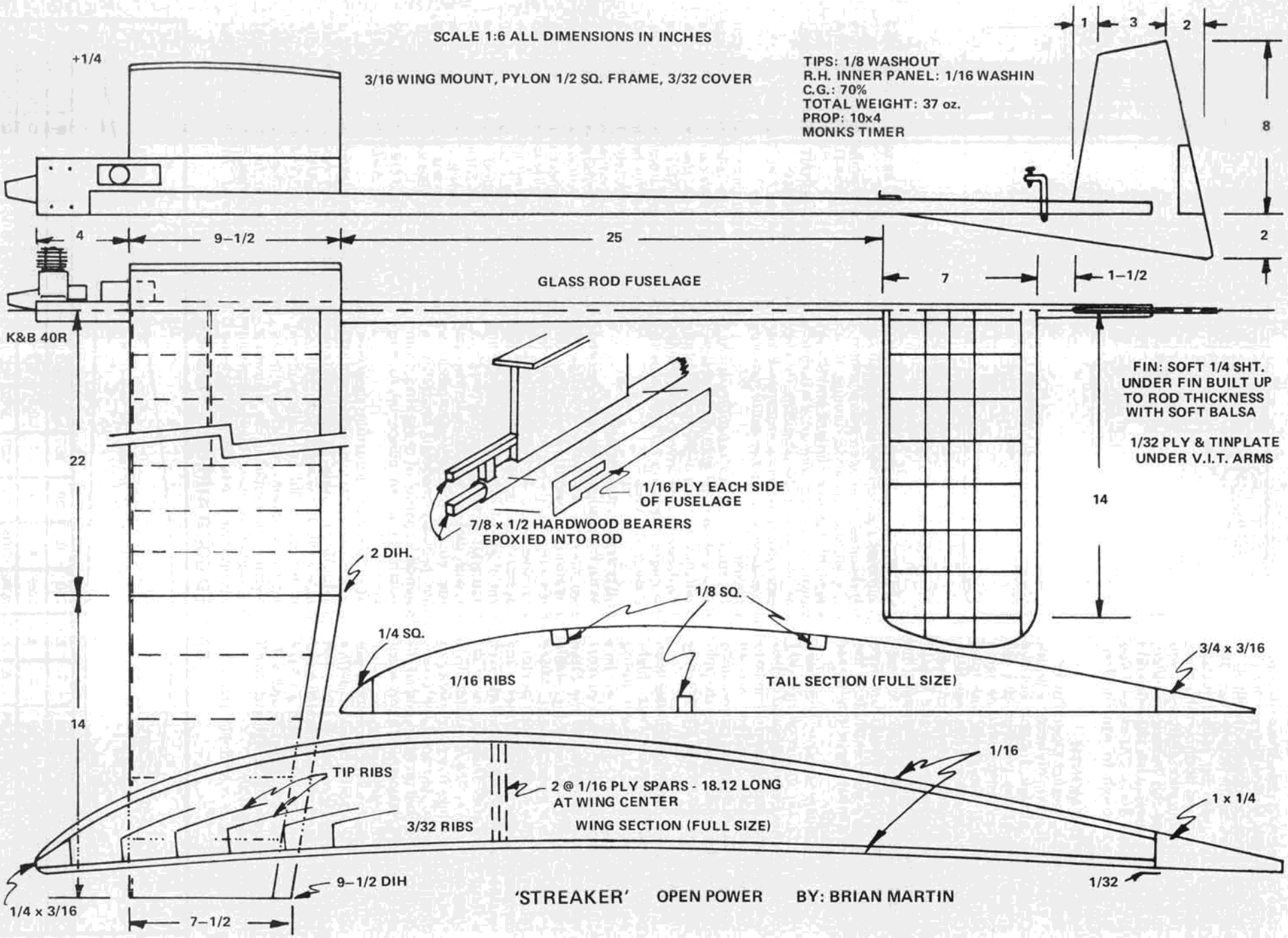
Tests on the three basic fin positions (in front, on the tailplane, and behind the tailplane) were carried out in the late 50's/early 60's, in the days before variable incidence (VIT). As a result of the tests, I changed from the 'forward fin' position to the 'fin behind' layout and gained approximately 50 seconds extra duration. I have continued to use the 'fin behind' layout to the present day, but in the mid-70's, following the current trend to high-aspect ratio sheet wings, bigger wing/smaller tail, etc., I started to have difficulties with it. This led to tests on triple fin and T-tail layouts, both of which were found to have definite disadvantages in English weather. Currently, I am flying a mixture of fin-behind and foward-fin airplanes and haven't yet decided which to stick with.

2. TESTS ON FORWARD-FIN, ON THE TAILPLANE AND REAR-FIN LAYOUTS.

The tests are carried out following a period in which I had considerable trouble with forward-fin airplanes; the two I sent to the USA for the 1953 finals were written-off due to spiral instability. A 25% increase in the fin area appeared to cure the problem, but isolated write-offs still occured. The lesson learned

DARNED GOOD AIRFOIL — EPPLER 205

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	1.8	2.6	4	4.9	5.65	6.8	7.6	8.1	8.3	8.1	7.2	6	4.6	3	1.45	0.75	0
LOWER	0	-0.9	-1.25	-1.6	-1.95	-2.05	-2.05	-2.2	-2.26	-2.15	-2	-1.6	-1.4	-1.15	-0.95	-0.65	-0.3	0



'STREAKER' OPEN POWER BY: BRIAN MARTIN

Clarence Haught receives few words of wisdom from Charlie Martin, 1981 US Power Team member.

eventually was that if any signs of spiral instability are in evidence, the order of fin area increase required is 50%. The signs are, firstly, an inability to fly a consistent flight pattern in windy weather, and, secondly, in extreme cases, sudden changes in direction when flying side-on to the wind (fin stalling). (Extra) area on the sub-fin was added for esthetic reasons and caused considerable trouble, the model barrel-rolling left violently during the first three seconds of the motor run. Once this was removed, it trimmed out satisfactorily, but I had lost confidence in forward-fin airplanes by this time and decided to test other layouts.

Two forward-fin contest airplanes were sacrificed to carry out the tests; the procedure being to modify one and sort out the bugs, then modify the second one to check for consistency of result. Fin on the tailplane was tried first, as it required fewer modifications. The first airplane was modified by moving the existing fin back onto the tailplane. The underfin was also removed, as I hoped to do without it, being liable to damage in DT landings onto the runway, and also because it concentrates stress forward of the tailplane mounting, necessitating a beefier fuselage construction.

The first flight was . . . well, memorable! Not expecting to need much change other than possibly to rudder adjustment, I set the motor for 3/4 full power and launched a four-second run. It turned right sharply and made to bunt (outside loop) into the ground. The turn eased off after two seconds to pull the nose up a bit and the motor cut just as contact with the ground seemed imminent. Diagnosis was a tight right turn at the start and gross under-elevation under power. The underfin was replaced to straighten out the right turn at the start, and a lot of incidence added progressively. A staggering 1/4 in. (+2°) was required to get a normal climb and this caused problems on the glide, ending up with approximately two ounces of lead strapped around the nose with rubber bands. When trimmed out, performance appeared similar to the forward fin model despite all the lead. It climbed higher but didn't glide as well. I retired home to think about it and, in particular, to work out where all that extra tailplane lift came from.

A plausible theory was produced, as follows . . . The tailplane operates in a spiral slipstream, the angle of spiral being greatest at launch when prop slip is at maximum. The left half of the tailplane is thus effectively operating at higher incidence than the starboard. On the underside we would expect pressure to be higher on the left side than on the right, causing the flow to bend towards the right side. On the top, pressure would be higher on the right side causing the flow to bend towards the left. A top fin placed in this flow would produce right turn, but would also serve as flow straightener, increasing tailplane lift and reducing the induced drag that would occur at the tailplane TE when the opposing crossflows meet.

Returning to the model, performance was now being wasted by having the CG too far forward and it was decided to replace the existing low aspect ratio tailplane by one of much higher AR. One degree of incidence was removed from the wing and the lead was taken out. This proved about right, and a good trim was achieved easily next time out, although a further increase in subfin area was needed to cure a mild right wing swing at the start. Performance was now 1/2 minute up due to climbing steeper and faster and gliding better due to the higher AR tailplane. It was put into contest use and differences as compared to forward fin were noted as follows:

PRO

1) Duration up 1/2 minute
2) Much easier handling in windy weather
3) Less tendency to go over the top in windy weather
4) Climb steeper/faster and generally more stable
5) Better glide due to more efficient tailplane

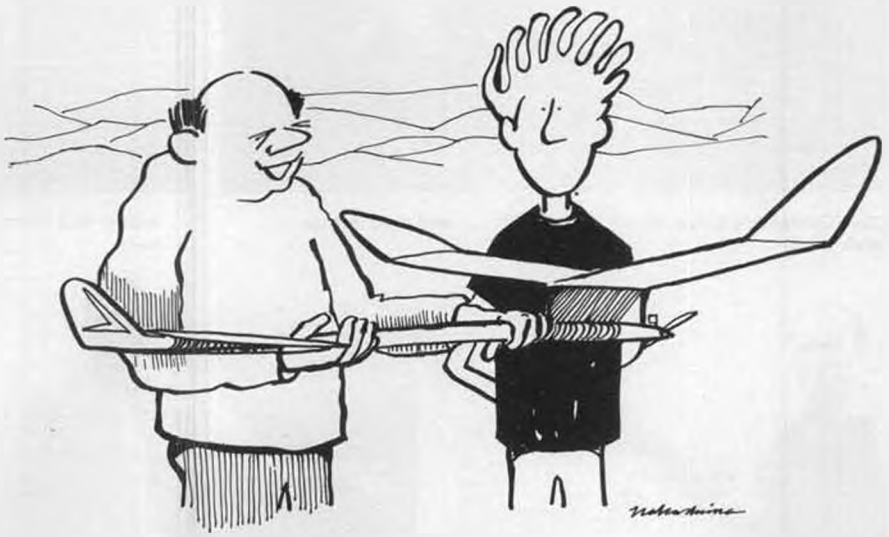
CON

1) Rolled less well (but well enough), requiring wider climb circle.
2) Required slightly more right rudder for power turn
3) Need to watch tailplane keys

The number two model was similarly modified to check for consistency and presented no difficulties. It was then modified to a rear fin layout. The same top fin was used and an underfin was fitted, as I was now resigned to the need for it. The high AR tail was retained, but what to do about the incidence? It seemed likely that a fin behind the tailplane would perform a flow-straightening function on the tailplane to some extent, but less well than the fin on the tail. Incidence settings were therefore left as they were, with the expectation that the model would tend to loop,

Continued on page 93

Don Chancey won A/2 Nordic at Nats after five-year hiatus. Stopped by F/F area after flying R/C Sailplane event.



"Amazing isn't it that someone ugly like me can make something beautiful like this."

Trophies for the Astro Flight electric contest included a solar cell from the historic Solar Challenger channel crosser.

Ferril Papic's Bleriot No. 7 in flight. A very consistent performer.

ASTRO'S ELECTRIC F/F CONTEST-8th Year

By BILL STROMAN . . . The free flight portion of Astr Flight's 8th Annual electric contest brought out a bevy of beauties. Electric power is coming of age!

• This may be hard to believe, but the weather did affect the turnout in a contest in Southern California! No high winds, or below freezing temperatures, but fog. We had a starting time of 8 AM for free flight . . . normal gas powered contests can't start until 9 AM because we fly next to a golf course . . . but because the electrics are quiet, we can fly earlier. This may be a thing to think about if you need a flying field nearer home. At 8 AM, one could see about fifty feet. This forced us to sit around and admire each other's model, and talk in general. The fog lifted about 9:30, and we got down to business.

Bill Warner had a whole stable of scale models, these included a Lee Richards No. 3 annular wing, a Paulhan Tatin Torpille, and a Caudron "Simon". The Simon has a 60 inch span, and was powered with an Astro 035 motor and an Astro reduction unit. This power more than flew the model off the ground, and seems to be the motor for the larger free flight model.

Clint Gardener entered a Luton Minor that was modified from a Flyline kit. This model had an Astro 020 motor, and really was too fast. We suggested that he increase the prop diameter next time to cure this. As this was his first time at a contest, I thought he did very well. At least he made some new friends and

Clint Gardener's Luton Minor. Lots of lift . . . and drag in that thick wing.

Author Bill Stroman's DH-6 just nosed out Papic's Bleriot for first place.

Tom Arnold and his clean Blackburn Firebrand.

Clint Gardener with his Luton Minor. It's a Flyline kit.

Another view of the Bleriot 7, with builder/ flier Ferril Papic.

Jim McMahon's cute little Powerhouse is a fine performer.

Bill Warner and his pretty Aero-Torpille No. 1.

A beautiful aircraft in any scale or power mode, Art Herbon's Fairchild 24.

Linda Cope's New Taube, with Garfield in the pit, took first place in Junior event.

Bill Stroman's Staaken R6, all seven foot span and four engines of it. Info on the pretty girl by written request.

learned how to prepare his model for the next contest. One of the other modelers offered to send send him a three-view of his model for static judging, others helped him trim the model and helped in general, but then, that's the way free flight scale modelers are, we help each other.

Art Herbon flew his Fairchild 24; sure looks good in flight, very stable, got maximum for flight, but had trouble with the R.O.G. and lost some points there. Maybe next contest Art will have this problem cured. Tom Arnold had a WW-2 Blackburn Fireband that was very detailed, but seemed to need more power to fly well.

Of course, I must tell you my sob story. Got two of the new Astro 035 engines and thought it would be a good idea to put them in my seven-foot Stakken bomber. Like all modelers, this took longer than I thought it would, and I spent a week repairing and painting the thing. It seems to have the thrust (am changing to 5-1/4 x 4 prop to increase this), but was trimmed wrong. By the time I had balanced it, and was hand launching it, I discovered that it had too much down elevator. It landed downwind and hit McDermoth's moped. Didn't hurt the moped any, but did some damage to the front end of the Staaken. Thank goodness it has knockoff wings, they weren't hurt at all! Looks like another week's work to get it in the air again. Oh well, need something to do anyway.

The man to beat in scale was Ferril Papic. His Bleroit No. 7 can make perfect flights every time. This contest was no different; that plane really is trimmed to perfection. Just to make things hard, it is also a very detailed model that always gets high scale points.

I had entered a 30-inch span DH-6 biplane, and had to tie Papic's model in flying, that is, a perfect score. After two flights that were good, but not good enough, I lucked out with a perfect score. We were also very close in static score, I'm glad I didn't have to pick between them.

The man who did the judging was Joe Tschirgi, and one would have to go a long way to find a more qualified person. Joe flys in scale RC and is very knowledgeable in full-sized as well as scale models. We want to thank Joe for doing a very hard and thankless job. Well, it wasn't so thankless, as Joe seemed to enjoy Bill Warner's scale presentations very much.

Joe also flew in the unlimited event with an Astro 020 powered original design. All of Joe's models are great, and this one was no exception. Very clean lines, slight pylon mount for wing, had a good climb and a flat glide. Jim McDermoth flew his Hummer II design in this event, and got two three-minute maxes on 25-second motor runs. It sure is nice to see how far electric power has advanced in the last few years.

I started the 02 replica event by flying

Jim McDermoth and his Hummer 2.

Jim again, with his Strato Streak.

Joe Tschirgi's original Mark II has interesting power pod.

my Valkerie into a figure 9. As this did some damage, I was out of the running, and the rest of the fliers got serious. Jim McDermoth's Strato Streak can really climb on power, then shift into a flat glide for long flights. Jim McMahon had a Powerhouse that was very light and had a great idea for an engine timer. This was made from an escapement from a plastic robot. The escapement drove a nylon bolt. A ring was put on the threads, and a string hooked to the motor switch under tension. As the bolt turned, the ring followed the threads until it came off, turning off the switch. It was really clever, worked well, and best of all, very light.

We had one junior entered. This was Linda Cope, Lonnie Cope's daughter. She had a model that looked like a Taube, of all sheet construction. It's pilot was a profile of the cat, Garfield. Do you think Linda was trying to influence me, as I'm a real fan of Taubes, and a cat fancier to boot?? By the way, the model flew very well and she really earned the trophy.

The trophies were really collector's items. Each walnut plaque had a solar cell from the Solar Challenger mounted on it, as well as a plate identifying the cell, and another plate giving the event and place. Great idea Bob Boucher!!! Each person who entered also received a poster of the Solar Challenger, signed by Bob Boucher. Bob, as you may know, built and designed the power system for the plane that made the flight from Paris to London using solar energy for its power source.

Well gang, that's about it, we all had a great time. Too bad there weren't more of us. Hope we don't get bad weather next year.

SCALE

1.	W.R. Stroman	DH 6
2.	Ferril Papic	Bleriot N. 7
3.	Bill Warner	Paulhan Titan
4.	Art Herbon	Fairchild 24
5.	Clint Gardener	Luton Minor

02 REPLICA

1.	Jim McDermoth	Strato Streak
2.	Jim McMahon	Powerhouse

ENDURANCE

1.	Jim McDermoth	Hummer II
2.	Joe Tschirgi	Original II

JUNIOR

1.	Linda Cope	New Taube

Fuel Lines. . . . *Continued from page 20*

TABLE 1

TEST/LOAD	RPM	TORQUE	BHP
1.	10150	120	1.208
2.	10350	118	1.211
3.	10800	117	1.253
4.	11200	116	1.288
5.	11500	114	1.300
6.	11700	111	1.287
7.	12000	103	1.225
8.	12200	98	1.185
9.	12300	96	1.170
10.	12700	92	1.158

R/C Auto. . . . . *Continued from page 43*

Associated RC300. The MRP car had a little problem with bending axles once in awhile, those 1/4-inch numbers just can't take a lot of pounding. But other than that, the cars were reliable; we'd race 'em, prop 'em up against the bumper on the van until the next heat and then race 'em again. All we really had to do was to keep fuel in the tanks and maybe change rubber compounds a couple of times. With our heat racing system it was possible for all four of us to be in a heat at the same time, although I don't remember that happening. Still, there were times when three of us were in the same heat and there was no problem. In fact, we have a three-minute warning prior to the start of a heat and we wouldn't even fire the first car until they announced two minutes. (Hmmm, guess I shouldn't be writing in past tense, as we still race 1/8, still get in the same heats and still can get several cars fired and to the line in not much time at all.)

The point here is that we would get along just fine all through 1/8 racing and then when it came time to run 1/12, all the little irritating hassles would start. Nothing big, you understand, but have you ever tried to charge, to the max, four 1/12 cars with three chargers, and this was back in the days when there were only ammeter-equipped chargers available? Not such an easy thing to do, especially when you have to do it for two practice sessions, three heat races and one main. And the cars always needed fiddling between races. Change a gear ratio here, different rubber there, less wing on this one, rock in the gear on this one, bad tweak in that one, that one is only half-charged and it's two minutes to the start. . . Aaarrrghhh, let me outa here. . .

Today in 1/12, things have changed a lot, the chargers for one thing are a lot better now, but to be real competitive there is even more fiddling to take the place of charging hassles. Have to swap different rubber around to get things just perf, apply messy traction additives to the tires, still have to play with gearing a lot, taking care of the motor is a story all its own, ditto with the batteries, especially since Sanyo cells came on the scene with their seeming dislike for less than perfect charging procedures.

It comes down to the fact that, at least for us, racing in 1/8 scale is much less work and a lot more play. Less work because the cars just run and run, all you have to do is keep that motor supplied with fuel. More play because the main events, and quite often heat races, take more time to complete. Even a 50 lap main event, which is considered short, 100 lappers being more common, will take about 15 minutes for the winner to complete at our track, with 18 second laps being a pretty decent pace. And for 100 laps, you just double that driving time. In addition, a 1/8 car is going just as fast at the end of a race as it was for the first lap, where 1/12 cars go real good at first, drop off a bit through the middle of the race and then get decidedly slow at the end of the race. Then there is the most aggravating part about 1/12 . . . watching your car suddenly slow up, telling you the batteries just took a dump, and while you might have won the race from a driving/car setup point of view, you lost the charging contest and everybody who you just smoked off wheels by and there isn't a thing you can do about it.

OK, the majority of R/C car racers today prefer to race 1/12 scale, enjoying every aspect of it, including all of the fiddling, so I am in the minority. But

there are an awful lot of you guys who enjoy car racing, who are only racing 1/12 scale, avoiding 1/8 because somebody told you it was a big hassle. Maybe it was a hassle for them, it isn't for me, and it might not be for you. Give it a try sometime, I'll bet you like it.

The last sentence was supposed to wrap it up, I suppose, but the thought just occurred to me that the cost factor of 1/12 vs. 1/8 is not that big a deal. If you just flat can't afford to buy a 1/8 car, well, then it is too expensive. But if you can, you can get at least as much on-track racing time per dollar spent with a 1/8 car as with a 1/12. No, I didn't sit down and figure it all out right down to the penny and the last lap. But I know pretty accurately what it takes to seriously campaign either a 1/12 or a 1/8 car, and while the 1/8 car will cost more in a dollar-spent/racing time comparison for the first few races, as time goes on the 1/8 car costs less and less to keep competitive, while the 1/12 car keeps nickel-and-dimeing you constantly.

Personal Experience Time Again: The DRT now races three Delta Super J's, plus the Associated RC300, with the old Murp in semi-retirement, but still brought out for friends to race occasionally. Initially, those cars would cost quite a lot of money to get track-ready, especially the Delta cars, as they are easily the most expensive flat-pan cars around. The RC300 has been pretty reliable, even though it has a slightly blemished record in that regard, spitting out a couple of clutch bearings once, twisting up one of their older-model gear diffs twice and eating several main gears. Better clutch bearings from Associated solved the clutch problem, switching to a Thorp ball differential solved the other, and the main gears . . . well, we just take spares to the races.

With the Super J's, one has a season on it, another two seasons, and my car has three behind it, going on the fourth. They have an almost perfect reliability record, the only time any of those cars has failed to finish a race entered was the first year I raced a Delta and I was cleaning the car, including a rather important hanger-mounted clutch bearing, with alcohol. The alky washed all the lube out of the bearing, which, naturally enough, failed one day. That was my mistake, so an argument could be made that the cars have been 100% reliable, the mechanic was the defective part of the equation.

Anyway, after the completion of the '81 season, all the cars were stripped down, cleaned real well and hung on the wall, minus engines (which were wrapped in plastic bags and stored) and the radio trays which were left on the charging bench and the battery packs given a slow-charge every month or so.

Just a couple weeks ago I had time to get ready for '82 and spent two evenings checking motors over, greasing diff units and just making sure that everything on the cars was ready. At the end of that time, the four cars were all bolted back together and prepared for a full season of racing. No chassis parts needed replacing, the motors were all in super shape, thanks mainly to running effective air cleaners and good fuel. Other than gluing and truing tires, painting new bodies and lining up some more fuel, those cars are ready to race and with very little expense involved.

The 1/8 cars are more expensive to race than 1/12? I wonder about that, I really do. And if I have gotten you thinking about it, why not give 1/8 racing a fair try, you might just like it. . . •

Choppers. . . . *Continued from page 29*

Novice:
1. Tim Peters
2. Walter Throne

AMA NATS '80, Wilmington, Ohio.
23 contestants.

Expert:
1. Mike Mas
2. Hubert Bitner
3. Larry Jolly

Intermediate:
1. Doug Law
2. Bill Cheng
3. Bruce Buchanan

Novice:
1. Gary Saia
2. Rick Chin
3. Scott Slayman

AMA NATS '81, Seguin, Texas.
Est. 10-15 contestants.

Expert:
1. Mike Mas
2. Hubert Bitner
3. Tony Frackowiak

Intermediate:
1. Robert Gorham
2. Jay Willeams

Novice:
1. Jay Towbridge

Well, that's quite a list. From it, I'd like to review each contest a bit, especially the earlier ones. Those were the ones I attended personally and could feel the "pulse". Unfortunately I haven't been able to make the last three AMA Nats, so my comments will be limited.

The Nats of 1971-73 (I'm not sure if there was a National Helicopter contest in '73. . .) showed us the advancing technology of R/C helicopters. During Nats week there was always a helicopter demonstration at some time. Those of us who were into helicopters, or thinking about it, always enjoyed these demos. I distinctly remember Horace Hagan demonstrating his big Schluter Cobra. It was always a very impressive machine.

The years 1973-1974 brought the formation of the National Radio Controlled Helicopter Association (NRCHA), sponsored by RCM, and the first NRCHA Nats. If you'll remember, the NRCHA had a progressive grade level program for proficiency, along with a periodic newsletter listing the number of pilots in the various grade levels, and their names and addresses.

I believe the '74 NRCHA Nats brought about 30 entries, and Dave Gray won Expert. The NRCHA did not follow the AMA rules, but designed the maneuvers as it pleased. This was always a sore spot between the NRCHA and AMA, and it came from two different philosophies of what a contest should be.

Basically, Bill Curtis and a few others drew up the rules and organized the 1974-'78 NRCHA Nats. In 1975, the NRCHA Greenville Nats had a beautiful turnout. Lots of new people were getting involved in R/C helicoplters through the grade level program. Novice maneuvers were flown in an empty aircraft hangar. Not the safest thing as we look back on it, but it kept the novices out of the wind. All novice maneuvers were precision hovering. The experts flew outside, the course consisting of precision hovering and some forward flight maneuvers.

The year 1976 brought another excellent turnout for the NRCHA Nats. Three events now, novices still in the empty hangar. The experts flew a combination of precision ground maneuvers and forward flight sequences. The last flights between Don Chapman and Ernie Huber rate as some of the most exciting competition ever seen in a helicopter contest. Don was the ground expert, Ernie the master of the high skies, and in the end Ernie nudged out Don by a few points. Overall competition was intense, but the competitors were friendly. During rounds you could sit and discuss problems, solutions, etc. in an atmosphere similar to the "uncontests" and "fly ins" of recent giant scale meets.

The 1977 NRCHA Nats included a new "judgeless" format. All entrants initially flew one round to determine in which class they would fly. The highest 15 scores were to be in Masters, the rest in Sportsman. However, you could move from Sportsman up to Masters if you wanted to, but not back down. There was a sizable prize ($50 if I remember) to the winner of this initial round, to deter any would-be sandbaggers (John Simone won it). All maneuvers were judged 'yes' or 'no', or by time and tasks. For sure, no one argued about the results of this contest. On the other hand, the '77 contest featured all precision hovering maneuvers, and it seemed apparent that there needed to be some type of judgable airwork.

These changes were included in the '78 NRCHA Nats maneuvers. But in the fall of '77, some very important events occurred that were to change the R/C helicopter world.

THE RULES

Schluter introduced the Heli-Boy: Now high "K" factor maneuvers became easy to do and judges scored all of the aerobatic maneuvers high, with little regard to the quality. This left anybody with a "non-aerobatic" helicopter out of the running in the expert category. Essentially you had to loop and roll to be competitive.

Now it wasn't the Heli-Boy's problems; it was the first new generation helicopter that could do most anything. The real problem was that the AMA rules could not change quick enough to keep up with the advancing helicopter design. This may have been excusable the first year, but here in 1982 the problem still exists! The rules are still the same and maybe they'll be changed one of these years. . .

THE ORGANIZATION

Another killing blow came with the news that RCM was dropping sponsorship of the NRCHA. Too few members? Hardly. The association was getting so large that RCM had to spend too much money on time and secretaries to keep up with the paperwork. (At least that's what we heard, and I believe it.)

What could have been done to rectify the problem is not too much of a concern now. The fact is that it happened so fast that no one else picked up where RCM left off, and the NRCHA died.

This didn't affect the experts so much as it did the beginners in the hobby/sport. (I still prefer hobby.) No more grade level pins, no more outside motivation to continue to improve flying skills, etc. The NRCHA made contest participation a part of its grade level program by requiring a certain number of contest points for each grade level. This in turn motivated people to attend

contests.

Anyway, some people did try to establish new organizations, but they never really caught on. To understand that, you've got to look at the individual helicopter pilot.

THE PILOT

I believe it was Harry Reasoner who once made a comparison of airplane pilots vs. helicopter pilots. It went something like this:

The airplane pilot is a bright eyed extrovert, while the helicopter pilot is a quiet, cautious introvert. The helicopter pilot knows at any moment that something is about to go wrong.

In the beginning, the NRCHA did not take off like wildfire. RCM ran years and months of helicopter articles and, why even Don Dewey was interested in the helicopter! It was because of Don's persistence that the NRCHA began to grow. In the years following, it grew so much it turned into a monster, with the before-mentioned consequences.

None of the other organizers really had the means or the money (i.e. a national magazine) to support the initial drive. In other words, the helicopter pilot is a cautious individual, and his machine requires concentration to fly. He does not want to be embarrassed in public because he can't fly right off the bat like an expert. What too few heli pilots realize is that everyone else is in the same boat. . . It simply takes a lot of persuasion to get him involved with others who have the same frustrations and joys.

THE MACHINE

Those who did learn to fly the helicopter soon discovered that it took a little "something extra". A little more practice to maintain proficiency, a little more care in daily maintenance. The helicopter is not the easiest machine to compete with, either. It is very sensitive to the atmospheric conditions and temperature. Add to this the cautious pilot, and it becomes even more difficult to get the two together in a contest.

One of the reasons the early NRCHA contests were so popular was that there were prizes to be won. Not five or ten dollars either. I mean helicopter kits, radios, engines, starters, etc. If someone dangles a new helicopter kit in front of some "would be" contestants, they'll feel a little more like entering a contest, right? Most of the credit for this goes to Bill Curtis. He was the one who begged and pleaded for donated prizes. He even laid out quite a bit of his own money to round out the "incentives". Add to this a good contest schedule, and the turnouts were very impressive.

Some of the airplane contestants reading may be asking, "Isn't it enough of a reward just to win or place in the contest without a sizable prize?" The answer to that is 'no', not in the state that helicopter contests were/are in. Before you can do that you have to establish a prestigious event. The NRCHA contests were starting to get there.

The 1978 NRCHA contest was hosted by Dwayne Stevens, and held at Columbus, Ohio. Actually, the '78 contest was put on after the demise of the NRCHA, but that's a minor point. What is really important is that the '78 contest was the best helicopter contest ever put on.

Some lessons had been learned from the '77 contest, and now aerobatic Heli-Boys were present in numbers. To accommodate each of these factors, a new Masters event consisted of precision scale maneuvers, with ground work and air work included the time. The Expert event was run by AMA expert guidelines.

This allowed the scale type helicopters to be competitive with the precision event in Masters, yet the loop-it-roll-it pilots had their Expert class too. One pilot could enter both classes, and fly separate ships in each event. The best overall pilot was the average of Masters and Expert scores. (The Expert class was also called "Hot Dog", and the contestants didn't let anyone down!)

With 61 entries and 175 helicopters present, the '78 contest was quite a weekend. Pilots from all over the country attended. This was the start of the "prestigious event" talked of earlier.

It was about that time the "fly-in" type of meet was starting to gain popularity. This factor, along with the work of putting on a yearly contest: Organizing judges, awards, and necessary field equipment, lead to a 1979 fly-in at Columbus. So just when the R/C helicopter competition was finally getting established, it lost its foothold.

This leaves the AMA contests from 1979-81. Entry was poor, average, and poor, respectively. Personally I'm surprised that entry was *that* low. Several factors probably lead to the low turnout. I'll touch on those in the upcoming paragraphs. In the end a vicious circle results. No one cares to come because nobody comes anyway. . .

I've given a brief history. How about some answers? These suggestions basically relate to Nats competition. We only need (or want) one or two national events a year. But they can also apply toward establishing more regional events too.

1. Set up rules that can be changed quickly to keep pace with the advancement of the helicopters and pilots. I'm still waiting to see the end of the three-minute routine in Expert, and only allowing a set number of maneuvers to be performed from the Expert freestyle sequence. Some of the "K" factors need to be modified too.

2. National contests should be set up with a "Masters" event to allow smoothness and precision as well as aerobatics. ("Scale", as it exists now in AMA competition is not the answer, either.)

3. In order to get contestant draw again, significant prizes will have to be given to re-establish a "prestigious event" that does not need large prizes.

4. We need national advertising well ahead of the contests to give people a chance to plan their schedules accordingly. Some good ads and general encouragement should help turnouts considerably.

5. We need dedicated contest directors to set the events up and organize the judging . . . Dwayne Stevens has been doing this job at the last several AMA Nats. Anybody else out there?

6. The pilots who fly helicopters now must actively encourage their peers to go with them and enter contests. Not so much in a killing effort to win, but also as a base for the exchange of ideas and information. A contest must be a fun and enjoyable weekend!

7. In addition to #6, how about some seminars in the evenings of the contest? How to install radios, set up machines, track and balance, trouble-shoot problems, etc. Let's let the experts give some real live tips to those who want help.

If pilots don't care about contests, nothing will be done. And helicopter contests never will become prominent events, which will hurt the helicopter pilots themselves in the long run. A contest can always be used as an incentive to work for, a reason to push on . . . no matter if you enter for the competition or for the fellowship.

In short, sometimes I think we're in such a deep hole now that it will be very difficult to pull ourselves out. Then again, concentrated effort in the right places could change things around fairly quickly, and re-establish the national contests and participation we once enjoyed.

By now, some of you are filled with viewpoints one way or the other. I'd appreciate hearing your comments. If you would like a reply, send a S.A.S.E. to me at: 388 Roswell, Long Beach, CA 90814.

For the next month or two . . . if you haven't purchased a High Point Balancer, get one. We'll be using it quite a bit in the upcoming articles. See you then. •

Hannan . . . . . *Continued from page 54*

of the famous old Frank Zaic paper-clip beam scale.

The plan-set consists of detailed and well-illustrated construction and operating instructions, plus stick-on templates. Materials and tools required, but not furnished, are apt to be found in the average model builder's shop, or available at low cost.

The plan-set is $3.50 postpaid from: Micro-Air, P.O. Box 1129, Richland, WA 99352.

AND MORE PLANS

A series of model plans such as a mini-twin pusher, Embryo Endurance type, biplane R.O.G., a Bostonian and various Peanuts are offered by David Aronstein, 50 Pasture Lane, Poughkeepsie, N.Y. 12603.

We were particularly intrigued by a tiny (8" span) Farman Mosquito. A stamped return envelope will bring a complete list. Please tell 'em *Model Builder* sent you!

LONG-LIVED PRODUCT

One thing that seems to have been around almost as long as the model building hobby is Ambroid glue. But until reading the February 25, 1911 issue of *AERO*, we hadn't realized just how old the product really was: "The Amberoid (note spelling w.c.h.) Company exhibits a glue of the same name. This cement which is unaffected by boiling water, or any liquid or acid in common use, has a variety of uses about the aeroplane. It can repair a tear in the wing fabric and make it stronger than before. That it has been used for years in repairing leaks in canoes and rubber goods, establishes its moisture-proof qualities beyond question. When it dries, it makes a hard waterproof substance, which proves very effective in repairing leaks in gasoline or oil lines and in tanks."

FIRST SOARING AWARD

The first recipient of the Soaring Society of America Junior award was Aaron Markos, of Deerfield, Illinois, according to Executive Director John Dezzutti. Ten-year old Aaron is son of well-known modeler Chuck Markos, and he received the $100 cash prize for winning the FIA A/1 class towline glider event during the 1981 Nationals Championship.

NASA AWARD TO BUILDER

According to Paul McIlrath, of Cedar

Rapids, Iowa, Professor Donald Gurnett, who recently received NASA's Exceptional Scientific Achievement medal for his contributions to the Voyager Spacecraft project, was a Junior Nationals model Champion during the early 1950s. Look where a hobby can lead!

ONE DESIGN CONTEST

Don Ross, of Jew Jersey, proposes an outdoor event geared to the fun-flyer, and the "almost over the hill" modelers: "No pressure, no club officers, no stringent rules. . . just get together for a meet built around some central theme and, maybe, start something that we can repeat from time to time."

Don wants to eliminate special high-performance models by having everyone build the same design, such as the Pacific Ace. Possible theme events are as follows:

1. Thompson Trophy: All launch at once, Flying Aces style, after a one-minute warning to get models wound. Last man down wins.

2. Random Time: Some method (sealed envelope, dice rolled, etc.) of choosing a random time between 30 and 90 seconds is set up. No one knows the time before he flies. Nearest to secret time wins.

3. One Minute: Nearest to 60 seconds, but *under* 60 seconds, wins. Can be R.O.G. or hand-launched.

4. Toilet Paper Tow: This must be R.O.G. and can be tricky and a lot of fun. Multiply your time in seconds by the number of toilet paper sheets you can take-off, tow and land with. We'll supply the paper so no super-light ringers can be used. You can do a lot with this one using qualifying heats. Thirty seconds times 30 sheets, or 60 seconds times 20 sheets.

5. Lindberg: Take off before a line on the runway, land after another line or between a second and third line.

6. Pennyload: Seconds times number of pennies your model can carry.

7. Regular Duration: One hand-launched flight and one R.O.G. Add the times to find winner.

"What we need is an enthusiastic bunch of people who want to get together for a day and go back in time to the days of yesteryear when things were a little less complicated . . . " Modelers in the New Jersey/New York area who may care to participate, should send a stamped return envelope for more details to: Donald H. Ross, 38 Churchill Road, Cresskill, N.J. 07626.

MEDIA MENTIONS MODELS

Ed Whitten forwarded a clipping from the *New York Times* highlighting a recent indoor meet. Featured were three photos, and an article by reporter Laurie Johnston, from which we excerpted these comments: "Watched by the likes of Euripides, Demosthenes and Sophocles in marble — as well as a portrait pantheon of Columbia University's presidents — men at play flew their tiny airplanes yesterday under the 105-foot dome of Low Memorial Library." . . . "The fragile craft floated and circled the granite rotunda like silent thoughts. Then it was a graceful glide to the floor or a crash landing — or perhaps, if the altitude was impressive, a sudden tail-spin into the tricky recesses of the upper columns and cornices." . . . "Set up at small tables, often with lunches and thermos bottles, the hobbyists adjusted their planes after crashes, muttering on occasion." Hmmmmm.

PEANUT PROLIFERATION

While Peanut Scale continues to be enthusiastically supported in several parts of the world, the search continues for universally acceptable rules. Butch Hadland's proposed F.A.I. World Peanut regulations have been tested and favorably received in England, but USA

response has been reserved with the west coast preferring the simpler Mooney "ranking" system of judging, while the New England modelers stand by the original Flying Aces concept.

Active New York Peanutist Bob Clemens feels that rise-off-ground starts should be optional, with allowance made for retractable landing gear equipped aircraft to have their wheels in a simulated "up" position. Among Bob's other thoughts: "Do we really want to make Peanut under whatever rules, an F.A.I. event?"

And, from Australia, *Airborne* Editor Merv Buckmaster opines that if it becomes an official World Championship class ". . . it won't be Peanut anymore!"

Doc Martin, genial promoter of the West Baden Peanut Gran Prix has announced that this year's contest rules will offer a 10-point bonus for R.O.G. in addition to the unlimited flights, multiple entries and proxy-flying that has contributed so much to the enjoyment of past events. Plan to enter!

MEANWHILE IN FRANCE

The National Concours at Orleans produced an interesting response in Peanuts. Contestants could elect to enter either the traditional rules "Cacahuete" division, or the experimental, much more static-scale oriented "Maquette" category. Perhaps it is too soon to draw any sweeping conclusions, but there were only five entries in "Maquette", contrasted to about twenty-five in "regular" Peanut. This would seem a direct parallel to the entry distribution in US AMA R/C Scale, where "Standoff" draws massive numbers of models, while "Museum Scale" attracts so few. Why?

ORLEANS RESULTS

Maquette:
1. Alain Parmentier, 1911 Cessna
2. Claude Weber, Nieuport 62
3. Emmanuel Fillon, Hawker Fury

Cacahuete: (note multiple entries)
1. Andre Meritte, Poulin JP 30
2. Andre Meritte, PB 6 Racek
3. Jacques Delcroix, Pottier 100
4. Jacques Delcroix, Trempik SK 1
5. Bernard Boutillier, Fike E

An international flavor was added by the entry of Alfred Klinck, of Germany, who entered a Demoiselle, placing 12th, and a Farman Moustique from the U.S.A., which was proxy-flown to 10th place by Michel Frugoli.

OUT OF THE BLUE

One of our favorite columns is written by "Updraught" in the Australian *Airborne* modeling magazine, and we present this somewhat condensed sample of its humor: *"MORE THAN JUST A PRETTY FACE."*

"It seems ever more fashionable to feature a comely girl embracing someone's model aeroplane on the covers of our magazines. It makes them look much more attractive on the newsstands, I suppose, and in fact, if some of the aeroplane owners were to be featured clutching their creations, the shop proprietors would likely be moved to display the publications in question face down.

"Only a tantalizing glimpse is ever given of these females, although they are invariably very much more interesting than the models to which they are supposed to add interest.

"Sadly, the details supplied inside the magazines are always sketchy: 'Lovely Gladys Bogthorpe, a secretary from Tempe, is seen on our cover with Cedric Cloddley's latest pattern design, a 'Munneysucker' powered by a Walletbuster 61 . . . ", followed by a few more boring details of the dreary aeroplane, when most of the readers, I am sure, would far prefer details concerning the young woman." •

Jungman . . . . . *Continued from page 19*

ator openings. Fill all pinholes and voids. Finish sand outside of cowl completely before you dig out the foam.

Fenders: Make a block 5-1/2 x 5-1/2 x 2 inches. Epoxy a 1/2 x 6 inch dowel into center of block at right angles to 5-1/2 inch side. Chuck dowel into drill press, set on low speed and sand to five inch dia. with one-inch radius on edge. Coat mold with styromate and sand smooth. I used three layers of four oz. glass cloth wrapped continuously around the periphery of the mold. Lap glass down at least one inch from outside edge. Sand and fill all pits in fenders. Cut fenders to cover 120° of wheel arc, and to be 3/4 inch deep at center. Fender braces were made from .060 x 1/4 inch brass strip and bent to fit inside of fenders. Braces are at 90° to each other. Use 2-56 screws on each side of fender to hold it to braces. Solder (Sta-brite) braces to 3/16 wheel collars. This will hold both the wheel and fender in position.

RADIO INSTALLATION

If you are using a direct drive .90 or a Fox twin, locate radio gear in bottom wing saddle opening. If you are using a .90 on a drive unit or a Quadra, provide a bolted type hatch in the bottom of the fuselage between bulkheads No. 8 and No. 9 for radio gear.

I used Futaba S-15 servos throughout. Two servos were used on elevator; one servo each for ailerons and rudder has proven adequate. Use a 1200 mil airborn battery pack as the current drain is fairly high, especially if you are doing any aerobatics.

FLYING THE MODEL

The balance point of the model is four inches aft of the leading edge of the bottom wing, measured at the fuselage side. For trial flights, move the balance forward 1/2 to 3/4 inch. The propeller I found to be the best for either drive unit or Quadra was an 18 x 10. I used a dual-rate radio to fly the model. I set the control surfaces as follows; High rate for aerobatics, Low rate for normal flying.
Elevator up-dn Hi rate 1-1/2", Low rate 1"
Ailerons up-dn Hi rate 1/2", Low rate 3/8"
Rudder left-right, 2 inches both ways.

The plane flies very smoothly and is a

slow and easy flying machine. You do need some coordinated rudder input with ailerons when making turns. Take-offs are a piece of cake, just a little right rudder and it tracks straight down the runway. Rolls are smooth and axial. Point rolls and knife edge flight are very good, crisp and sharp, no falling off of the points. Wheels-on landings seem to be the best and easiest to do. Reduce power to about 1/3 during landing approach, reduce power slowly when plane is in line with runway, keep some power on, don't chop the throttle until the wheels are on the runway. This plane slows down very rapidly when you cut the throttle. For dead stick landings, put the nose down, and keep the speed up. This plane has a lot of drag and sink rate is fairly high. •

Counter. . . . . . *Continued from page 8*

★ ★ ★

Sterling Models has just released its new "Penny Pincher" series. Only $1.98 will buy you either a Hellcat, Mustang, Piper Cub, Cessna 180, Sabre Jet, or a T 38-A Thunderbird balsa wood kit. Just add your two cents worth (two pennies in the nose for weight and balance), no glue required, and go fly! Or, use them for display as they are in full color if you prefer. The new Piper Vagabond, latest in the "Kid Series," sports a 33-inch wingspan. Designed to be flown with the rubber motor and prop supplied, or with an .049 engine for control line, or by utilizing the miniature R/C systems available today, up to three channels may be used.

Sterling Models emphasizes that, although the "Real Sporty" stand-off scale model meets all the specifications for 1/4-midget racing, with a mild engine it can be used as a real sport flyer. This 40-5/16 inch wingspan model comes complete with vacuum formed canopy, cowl, and wheel pants. For a catalog containing the entire line of controline, R/C and scale kits, boat model kits and accessories, send $1 to: Sterling Models Building, 3620 "G" St., Philadelphia, PA 19134.

★ ★ ★

Dumas Products has released the Hot Shot 45 Tunnel hull kit as completely described in Jerry Dunlap's column prior to production of kit.

★ ★ ★

Now available from Skylark Flight are full color postcards of general aviation, military, and special interest aircraft. This new classic series has 15 full color cards, ranging from the classic Piper J-3, P-51 Mustang, Spitfire, and Staggerwing Beech through a range of Cessna aircraft. You can get the complete set of 15 colorful postcards for $3.75. For more information, send a SASE to: Skylark Flight, 1711 Skylark Lane, Newport Beach, CA 92660.

★ ★ ★

As mentioned in last month's *Over*

The Counter, Sig Mfg. has released more details on its RISER, 2-meter class sailplane, designed by Bill Fleming. Spanning 78 inches and priced at $24.95, this kit, very complete with all hardware, nylon tubing pushrods, printed fuselage sides and tail parts in the usual Sig manner, can also be flown with an optionally available power pod kit. The Riser, utilizing either high-start or power pod assist, was designed with the beginner in mind.

Sig has just released its improved Mark II KOMANDER. New features include redesigned fuselage structure, new 36-page photo-instruction book, new wing center section for better fit and appearance, and new separate fuel tank compartment. Sig has updated an old favorite without changing the well proven aerodynamics of this outstanding aileron trainer. As with all Sig kits, it contains Sig quality balsa and ply throughout, pre-cut foam wing cores, all hardware, nylon fittings, wire parts and aluminum motor mounts.

For .40 to .50 engines, a good kit design has been made better. Sig Mfg. Co., Montezuma, IA 50171.

★ ★ ★

MRC's newest off-road R/C Vehicle is the 1/10 scale Ford Ranger Pick-up. Run it on smooth pavement or through mud, water, or sand. A tough aluminum and fiberglass chassis coupled with a stiffly sprung four-wheel independent suspension system with four shock absorbers, keeps the truck level over all kinds of terrain. A sealed radio compartment protects your 2-channel radio system, while a sealed aluminum gear case covers the gears. A servo saver protects your steering servo, and a switch controls two forward and two reverse speeds. A highly detailed body, wide traction, block pattern tire treads with fancy rims, and realistic decals for trim make it look like a pick-up should! See your local hobby shop, or contact: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

★ ★ ★

Dick Hanson Models, manufacturers of custom built Tiporares and other pattern aircraft, has been producing a very successful "Flying Hippo 825." Now, the new 750 sq. in. "Tipo Hippo" is getting around and doing extremely well at local, regional, and national contests. Included with your custom built "Tipo Hippo" is a "free" Hippo Tee shirt! Also available separately for $8 each, plus UPS charges, in the following sizes: Small, Medium, Large, and of course, Hippo. For your pattern aircraft needs, write or call: Dick Hanson Models, 5269 Lucky Clover Lane, Murray, UT 84107; (801) 261-1402.

★ ★ ★

In designing or building a new model, R/C or control line, modelers should not overlook the line of precision machined, cast aluminum I. M. Products motor mounts available from Circus Hobbies. The mounts, available in several sizes, come with cap screws, washers, blind nuts, and allen wrench for mounting. The mounts feature a "captive plate" engine retention concept that allows the mounting of several different brands of engines without drilling and tapping the mountings holes, although drilling and tapping can be done, if desired. See your dealer or contact Circus Hobbies for more information on these and the complete accessory line from: Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109; or call (702) 731-6472.

★ ★ ★

Getting "shot down" or "glitched" at your R/C flying site? Use of the Airtronics Frequency Scanner to check for "clean air" may help save a model aircraft. Designed for covering the seven frequency spots on 72-75mhz, the unit can be set to scan all seven spots, or be set to monitor any of the seven spots individually. If a signal is present, a very audible tone will be heard, and the L.E.D. on the frequency will remain lighted as long as the signal is present. The unit may be powered by either four AA alkaline cells or AA sized NiCd cells (not furnished), or an external 12-volt source may be used. Priced at $149.95, Californians add 6% sales tax. Interested individuals or clubs should contact Airtronics direct. Airtronics, 12160 Woodruff Ave., Downey, CA 90241; or call (213) 862-6583.

★ ★ ★

Micro-Air Precision Products has announced its first item, the Micro-Air Wooden Bean Plan Set. The plan set includes theory of operation, a complete bill of materials, construction notes and photos of the completed scale. All templates are included, too. Capable of weighing from a few thousandths of an ounce up to 16 ounces, it can be constructed in one evening and should satisfy the needs of most free flight and indoor modelers. Price is $3.50, postpaid, from: Micro-Air Precision Products, P.O. Box 1129, Richland, WA 99352.

★ ★ ★

Davey Systems Corporation has released its new Sailplane Launch Line Retreval System just in time for the spring flying season. The result of three years of testing and refinement, it can be used with existing launch systems and batteries. No more chasing parachutes, and an increased launch frequency of up to one a minute is claimed. Features include welded frame, ball-bearing swivel, hand-controlled switch, battery cable and clips, 12-volt motor capable of operating on six volts, and 1,000 feet of braided line. The introductory price is $225. Contact: Davey Systems Corporation, One Wood Lane, Malvern, PA 19355; or call (215) 644-0692.

R/C Boats . . . . *Continued from page 41*

tape can be used to hold the deck and hull pieces together. Run a strip of masking tape along the seam to keep any resin from working through the seam. Having stuffed the glass cloth attached to the deck down along the inside of the hull, the resin can be applied to the material on the sides of the hull. Be sure to work the resin into the cloth so it will bond the cloth to the hull. The seam along the transom of the boat can be done rather easily since there is plenty of room for working with the glass cloth.

The other method uses the same material, only the way of doing the inside seam is different. Using this method, the two pieces are taped together first. The boat is laid on a side and the piece of fiberglass cloth is resined in place about half way along the seam. After this portion has set, the remaining material is worked into place and resin applied to the glass cloth and worked into the material. This process is repeated for the other side and the transom. To work the resin down along the front of the boat, try using a stiff epoxy brush like those available from Sig. The length of the brush can be extended by shoving a piece of a stick into the handle. Did you know you can wash out that little brush with soap and water after you're done working with the resin? Well, you can if you do it before the resin sets hard. For the person without much experience with fiberglass, the first method might be easier, since it eliminates having to work with the glass strip unattached to the hull. The important thing is the working of the resin into the glass cloth to assure proper adhesion to the deck and hull parts.

INSTALLING THE RADIO SYSTEM

There are a couple of options available regarding installing the radio system. The photos in this article show how to build the radio box right into the boat. The engine stringers make the sides, and plywood end pieces can be glassed or epoxied in place to make the compartment. Strips of half-inch hardwood can be glued either inside or outside the compartment sides. A piece of plexiglass can be cut to fit down on top of this compartment and sheet metal screws can be used to screw the top down on the hardwood strips. There are a number of fine bulkhead seals that can be used for running the rudder linkage from the servo to the engine. I've used G&M Model seals, K&B seals, Prather seals, and even airplane pushrod material. My personal favorite for connecting the throttle servo to the engine is the K&B Throttle Assembly Kit. Besides building the radio compartment into the hull, it's possible to use a radio box. There are a number of radio boxes available. I've had good luck with G&M Models' radio boxes and these were covered in last month's article. In the outboard powered Offshore 33, the radio compartment was located towards the rear of the hull. The photos show its location.

INSTALLING THE ENGINE

I would recommend the use of either a Prather .21 outboard motor mount or a Teague Marine mount. They are the same mount and sell for the same price. This type of motor mount will allow adjustment of the engine both higher and lower as well as angle in or away from the transom. The optimum engine height appeared to be a setting that had the centerline of the prop 1/2-inch below the vee bottom. The engine was angled slightly away from the transom. The adjustable motor mounts really are slick when it comes to experimenting with varying engine height and angle settings. When it comes to telling about installing the outboard on this type of boat, there really isn't a whole lot to tell.

If the old style K&B .21 Outboard is used, it would be a good idea to make an additional rudder/skeg to attach to the cavitation plate. With the engine mounted in the suggested location, the boat would slide badly in the turns with the stock lower unit. This happened because there wasn't a sufficient amount of the engine below the bottom of the hull to prevent the boat from sliding in the turns. To correct this situation, I used a piece of 1/16 inch brass three inches long by one inch wide. One end was bent at a right angle so a 1/2 inch of the strip could be bolted to the top side of the cavitation plate. With the addition of this device, the boat would really hold down on the water. It did cut down the top end speed a little. I think it would be possible to reduce the width of this added-on rudder/skeg and still retain the gains made in improved cornering. Reducing the width may lessen the amount of speed loss due to the additional drag caused by the longer rudder/skeg. Be certain to sharpen the edges of any add-on type of rudder/skeg.

RUNNING THE WARDCRAFT OFFSHORE 33

If setting a few records, which have since been broken, and winning a national championship is any indication of the way the Offshore 33 is capable of running, I'd have to say it is a very decent boat. To be honest, I really didn't work all that much on fine tuning the boat with the .21 K&B Outboard. The addition of the bolt-on rudder/skeg cured the cornering problem. Because there isn't a class for outboard vees in my area, I only ran the boat in a couple of races to set records and then at the 1980 N.A.M.B.A. Nationals. I would have to say for the amount of time invested in this particular setup, I certainly gained a great amount of satisfaction and recognition.

During this last racing season, my son used a shortened version of the Wardcraft Offshore 33 in District 8 for .21 monoplane and offshore competition. With this boat he placed fourth in the mono class and fifth in the offshore category. I borrowed the boat for one

race and turned the fastest time I've ever clocked with a .21 powered inboard vee hull.

A LITTLE SUMMATION IF YOU PLEASE

Inboard or outboard powered, the Wardcraft Offshore 33 is a fine running boat. It has what I consider one of the better looking deck designs for a vee type model. My experiences with this design would indicate it is capable of holding its own against any of the boats currently running in the .21 vee/mono class.

NOW IF GOING 85 MPH TURNS YOU ON

The Indy Model Boat Club sent me a brief report about the accomplishments of one of its members. Seems that back on October 11 of last year, Terje Haugen laid down a couple of pretty quick passes with his four-year old Crapshooter 60 Sprint using a stock OPS .65 engine. His top one-way was a blistering 89.24. His second pass was somewhat slower, resulting in a two-way average of 85.486 mph.

Terje was using an Octura 1167 modified to nearly seven inches of pitch by Greg Huey. A 55% nitro fuel mix provided the go juice. The last paragraph of the announcement states that the "secret" to this record run, an International Model Powerboat Association record, was his GloBee #2-L glow plug. Quoting the article, "Terje found in practice that the GloBee plug really gives more power, and his new speed record proves it." I thought this statement about the type of plug used was rather interesting. It's the first time I've ever heard of so much credit being given to the glow plug. Going that fast with a model boat is a combination of things working correctly including having a bit of luck going for you. Terje is to be congratulated for putting it all together in one place at one time.

SO WHY DON'T YA WRITE MORE STUFF ABOUT RIGGERS AND BIG ENGINES

A guy from somewhere in Texas called me up one evening to chat. Since it was his nickel, I didn't mind listening to his comments, opinions, and criticisms. Well, the criticisms weren't great listening, but they were interesting. This fellow enjoyed running the "heavy metal." Anything less than a .65 wasn't worth discussing. He wanted to know when I was going to start writing about real model boats and not those whimpy .21 outboards and deep vees that clutter up this column most of the time.

Well, I tried explaining I could run three of those whimpy .21s for the same price as one "muscle engine." Besides that, there isn't much racing for the bigger engine classes in my area outside of the very popular R/C Unlimiteds. Besides those two reasons, I told him I just like the smaller engines. My explanations didn't satisfy his request for more information on riggers and big engines. It does, however, explain where I'm coming from. I don't see a change in the type of material that appears in this column when it comes to reviewing boats.

Most times this column tends to be another chapter in the continuing story of, "What's Jerry Playing with This Month?" I realize that this probably isn't going to interest everyone who might run model boats. To be honest, I really don't care if my column doesn't meet the needs of everyone involved in model boating. That would be a totally unrealistic endeavor. However, it has always been my policy to use information sent to me whenever possible. That's why the information about Terje Haugen appeared in this article.

The fellow from Texas is not alone when it comes to enjoying fast riggers powered by big engines. I can certainly appreciate the thrill of tearing up the pond with a 70 mph boat. For the present, my involvement with riggers will probably remain in the area of appreciation rather than involvement. Enough of this editorializing. Jerry Dunlap, 119 Crestwood Dr., S.W. Tacoma, WA 98498. •

Amanita. . . . . *Continued from page 59*

fuselage, fin, rudder, stabilizer, and elevator with lightweight silkspan, using water thinned white glue (aliphatic resin) to attach. Cut trim designs from tissue as desired and attach. Apply five or six coats of clear dope thinned about

50% with dope thinner and sanding lightly between coats with #600 finishing paper. Apply a finish coat or two of Glaskote synthetic varnish.

Cut control handle from 1/16 ply . . . drill 3/32 holes as shown on plan . . . sand handle smooth. . . seal edges with cyanoacrylate adhesive and apply a coat or two of Glaskote.

Separate rudder from fin and fuselage by running razor edge along the seam on both sides.

Hinge elevator to stabilizer with heavy duty nylon thread. Wrap each hinge three times in the figure-of-eight pattern as shown on plan . . . tie off ends as shown on plan . . . trim ends and seal each hinge hole top and bottom with a drop of 5-minute epoxy. Glue rudder in place and seal seams with cyanacrylate adhesive.

Form the control lines guide by wrapping a length of 1/32 music wire 1-1/2 times around a 3/16 shaft so that the wire resembles the loop end of a safety pin . . . bend ends over to right angles as shown on plan . . . trim ends to 3/8 . . . rough sand and press ends carefully into wingtip as shown on plan . . .pull back and coat ends with cyanoacrylate adhesive.

Bend 1/8 inch of one end of 1/16 music wire pushrod material back to a right angle . . . clasp the long length next to this bend with narrow pliers and bend the long length forward to a right angle.

Re-drill and trim nylon bellcrank to outline shown on plan . . . fabricate 1/4 diameter washer from 1/16 nylon to fit between bellcrank assembly bottom and wing spar top . . . drill 1/16 hole through inside wing as shown on plan and screw bellcrank assembly and washer into place.

Trim top of short nylon elevator control horn to outline shown on plan . . . slide onto short end of pushrod and around the first bend . . . tape control horn in place on elevator so that the pushrod length between the bends and through the control horn is directly over and in line with the elevator-to-stabilizer hinge line . . . set elevator to neutral position . . . position bellcrank so that there is equal movement from each tip to fuselage side . . . place pushrod over outside bellcrank pushrod hole . . . mark pushrod at point over forward edge of hole . . . clasp pushrod at this point with inside edges of pliers and with outside edges of pliers forward of this point and bend up to a right angle. Check that the up length is very nearly in line with the bellcrank hole . . . trim pushrod up length to about 1/4 inch . . . unscrew bellcrank assembly . . . slip outside bellcrank pushrod hole over pushrod end and screw bellcrank assembly back into position. Move bellcrank to and fro and see if elevator movement is about the same up as down . . . untape and adjust elevator control horn back or forth if necessary . . . when in position so up and down elevator movement is about the same, mark through control horn base plate holes to elevator control horn mount with a safety pin . . . set control horn to the side . . . drill 3/32 holes through marked locations . . seal inside edges of holes with cyanoacrylate adhesive . . . mount control horn and bottom plate . . . trim mounting screws with a razor saw and file flush with bottom plate. Unscrew bellcrank assembly . . . place a drop or two of cyanoacrylate adhesive in the mounting hole and screw bellcrank assembly back into position.

Examine the plan and note that the Cox Black Widow engine used to power the Crystal Amanita is adjusted so that the cylinder and fuel pick up are to the outside and the needle valve and fuel tank vents are to the inside. Though it does require a bit of extra work, the glohead and needle valve are more protected in these positions in the event of upright or inverted emergency landings.

Unscrew backplate-to-engine screws . . . separate backplate from fuel tank . . . remove fuel line from intake fitting . . . cut fuel pick-up tube mount from 1/16 nylon and trim to fit inside backplate as shown on plan. Drill tight 3/32 fuel pick-up tube hole. Set mount in backplate and mark mount through backplate screw holes with a safety pin. Remove mount and drill 1/16 holes through marked locations . . . set mount back in place and screw two backplate-to-engine screws through the fuel pick-up tube mount; so that they hold the mount securely against the inside of the backplate. Cut a 3/8 length of 3/32 brass tube . . . smooth ends and rough sand body . . . press tube into mount hole and seal mount hole to fuel pick-up tube body seam with cyanoacrylate adhesive. Slip one end of a 1-1/2 inch length of medium Sig silicone fuel line over the fuel pick-up tube . . . slip the other end into the tank and around the fuel tank vent tubes and back, while bringing the tank back so that there is just enough room between the tank and the backplate to slip thin-nose pliers in and gently clasp the fuel line about a 1/4 inch from the end and slip the end onto the fuel intake fitting. Slip the pliers back out and making sure that the two screws through the backplate are lined up through the forward tank screwholes, press the tank and backplate together . . . fit the remaining two screws into place and secure the engine to the tank.

Hold the engine to the firewall and mark through the tank mount screw holes to the firewall with a safety pin . . . set engine aside . . . drill 1/16 holes through marked locations and secure engine to firewall with #2 x 1/2 inch sheet metal screws. Install Cox 263 silencer and attach a Cox 6 x 3 black or Tornado 6 x 3 white propeller.

Cut two 32-foot lines from a spool of Conso 721 white bonded finish heavy duty nylon thread . . . slip one set of ends through the lines guide to the bellcrank and tie one line end to one bellcrank end hole and the other to the other with clinch knots as shown on plan. Hold

line end with thumb and forefinger . . . clasp line behind windings and pull to close clinch know . . . seal knots with cyanoacrylate adhesive and trim ends. Tie the other end of the up control line to the control handle with a clinch knot . . . seal and trim and tie the other end of the other line to the other end of the control handle with two or three simple overhand knots and don't seal or trim so these knots can be loosened and retied to adjust control handle to most comfortable flying position.

Wrap lines around the hollows at the ends of the control handle up to about two inches from the wingtip . . . wrap a small rubber band around the middle of the handle to secure the lines and secure the handle across the wing with a large rubber band.

Use 5% nitro fuel . . . adjust the needle valve so the engine is running just between a crackle and a buzz . . . wipe the exhaust residue off after every flight and your plane will fly really good and last a long time. •

Big Birds . . . . . *Continued from page 25*

enjoyable flying. So you see, there is a lot more going for a 12 to 15 pound bird than the diehard chainsaw people would have you believe. As I mentioned last month, I fly both methanol and gasoline-powered machines and thoroughly enjoy them all. And contrary to one of our old wives tales, I have not had a logistics problem because of the two different types of fuel.

GETTING CONTROL

Although you can safely get away with hooking up control systems in the lighter BIG Birds the same way you've been doing it in the smaller airplanes, it is, as the saying goes, a whole new ballgame when you're confronted with installing control systems in a twenty pound plus birdie. Entering the realm of BIG, *HEAVY* Birds requires a hard look at the way full-scale planes are built, flown and maintained.

The Gold-N-Rod Push-Pull system outlined in the drawing has been used for almost four years with nary a problem. I feel that, as with "real" aircraft, a push-pull system is an absolute must for precise control and maximum safety.

I don't use, nor recommend, cable, 'cause most radios cannot tolerate so much wire strung about. This system eliminates those kinds of radio "funnies", while allowing solid control and full usable trim range.

To preclude the possibility of clevis pin failure, I remove the pins and anchor the 4-40 clevis to the CB Heavy Duty Horn with 3-48 socket-head cap screws and aircraft-grade self-locking nuts; this is a must for safety and peace of mind. And avoid using the thin, white horns and other hardware/fittings made for use on the lighter birds, because if you don't, you're sure to experience premature failure at these points.

Please don't forget that you *need* good, heavy-duty servos driving those large control surfaces, to overcome the fantastic amount of air loading that's always present in flight. And naturally, a heavy-duty battery pack (at least 1000mah) should be part of this specialized airborne system.

Plastic servo trays are a NO-NO, and all servos must be mounted on well-secured hardwood beams. Once again, the bottom line is SAFETY.

The split-elevator pushrods (4-40) coming off the bellcrank should be well wrapped and silver-soldered. The 4-40 rods and clevises that connect the ailerons to the bellcranks are secured to the crank with a 90 degree bend and a wheelcollar with Loktite on the set-screw threads.

The Gold-N-Rods should be just free enough to allow movement, but not so loose that there's any slop. Close spacing of the wing ribs gives the aileron rods good support, but the rudder and elevator systems will require a number of standoffs to be added between fuselage bulkheads; these standoffs can be made of 1/8 or 3/16 inch ply, and Hot Stuffed or epoxied in place so that the rods are supported every 4 to 5 inches.

The Birds this system has been used in weighed between 27 to 35 pounds, and have been very aerobatic. I'm not saying that this push-pull system is the only way to go; I am saying that it's worth serious consideration 'cause it's been problem-free for hundreds of hours.

QUADRA

Frankly, up until now, I've been lukewarm about the Quadra, in spite of its popularity. But the Quadra people have finally won me over with their latest change; the '82s now have needle bearings on the top end of the conrod and all the engines that U.S. Quadra has been shipping since the beginning of the year have this important mod. But you'd better be careful who you get your Quadra from, because even though you'd be buying it in '82, you might be getting one of the older models that have been stockpiled.

How important is the upper end of the conrod? Well, from what I've seen of a good many Quadras, one of the major reasons for (non-crash damage) repair has been galled and seized wristpins. With the addition of needle bearings, we're looking at a probable increase in performance and a marked improvement in longevity. These new Quadra wristpins must be very happy with the prospect of living a much longer and fruitful life.

Inflation seems to have caught up with U.S. Quadra, because Dario is now charging $19 for overbalancing *ALL* flywheels. It's still a terrific value when you consider how well this overbalancing does its job.

And by the time you read this, Dario should have the BIG 3.05cid Quadras ready to go. This new piece of machinery has a whole cubic inch more power and weighs only a pound more than the smaller Quad . . . and here's something that's gonna make you smile from ear to ear: *it'll fit on the same mount,* so there's no need to tear the front end apart and do a complete face-lifting in your quest for more power. I don't have any figures yet, but this 3.05 should breathe hard on the heels of the big Kawasaki. . .

SCALE INFO

Even though I haven't yet succumbed to the bite of the scale-bug, I fully appreciate the time, effort, and expense (both in research and building) that go into a scale project. And so does Don Moody, editor of the Prince Georges Radio Control Club newsletter "The Flyer," who compiled a list from various sources that might aid you in obtaining the details and documentation you're looking for:

Castle Graphics (3-views)
P.O. Box AD
Greenbank, WA 98253

U.S. Marine Corps Museum
Quantico, VA

Confederate Air Force
Harlingen, Texas

Squadron Shop
Silver Springs, Maryland

USAF Museum
Dayton, Ohio

US Naval Aviation Museum
Pensacola, Florida

US Army Aviation Museum
Ozark, Alabama

USAF Museum
Cocoa Beach, Florida

Repla-Tech
48500 McKenzie Hwy
Vida, Oregon 97488

Collect-Air Photos
P.O. Box 14234
Milwaukee, Wisconsin 53214

National Air and Space Museum
Washington, DC

Scale Craft
P.O. Box 4231
Whittier, CA 90607

EAA Museum
P.O. Box 229
Hales Corner, WI 53130

Wylam and Nye Scale Drawings
Model Airplane News
837 Post Road
Darien, CT 06820

Glen H. Curtis Museum
Hammondsport, NY

Flying Circus Aerodome
Bealton, VA

SERVO-SAVER

Dave Gauer, who hails from Hanover Park, Illinois, must have messed up his share of servo gears by ramming control surfaces against garage and car doors while transporting his BIG Birds . . . 'cause he did something about it, and the drawing shows how. I vaguely remember similar items in the past, but they weren't as solid nor made out of such heavy wood. Dave has only one end of his "keeper" rubber-banded, which means a lot more strength available to keep the control surfaces in place when bumped.

FLY-IN

Although I'm writing this in early January, you won't be reading it 'til early April . . . so you've only got three months left to get your butt in gear and make sure that dream machine will be ready for the 5th Annual Jumbo Fly-In . . . which has been getting bigger and better every year.

As many of you know, the Jumbo is sponsored by Chuck Cunningham, and this year will be co-hosted by both our local IMAA Chapter 21 (also known as the North Texas Miniature Aircraft Association) and the Ft. Worth Thunderbirds. Mark July 17 and 18 on your calendar 'cause you're not going to want to miss those two days of pure flying fun.

If you've been here before, you probably know the way as well as I do; if, however, this'll be your first time at the Jumbo, let me bid you a big "howdy" in advance and urge you to write for an information packet that contains a map and other essential info. As with all IMAA fly-ins, this is traditionally a no-contest, low-key, fly-if-you-want-to get-together that allows you to really relax and enjoy. Start making your plans now so we can look forward to meeting you in July.

And while on the subject of IMAA and fly-ins, next month I'll be able to tell you where and when the 2nd Annual IMAA International Fly-In Festival is going to be held. We (the IMAA Board of Directors) are deciding on it at the present time and I should know within a week. Since the first Annual Fly-In at Louisville last September turned out to be so successful, this years festival should be a real "Barn-Burner."

Also, let me throw in a reminder that, like this BIG Bird column, IMAA is also for *all* BIG Bird Lovers. You don't have to have, or even like, scale flying machines to belong to this great organization that's truly dedicated to the BIG airplane movement. And your ten bucks gets you four copies of High Flight, our outstanding quarterly publication that's chock-full of goodies, how-to's and information that'll help make your every flight safer and (if possible) even more enjoyable.

TIP OF THE MONTH

NEVER, but NEVER, lay your Dremel tool in your lap with it turned on!!! Al Alman, 2609 Burningtree Court, Arlington, Texas 76014. •

Electronic. . . . . *Continued from page 31*

There have also been some up-dates and additions to the well known Kraft 7C, now being called the MKIII, in the form of reversing switches on the four flight control channels, as well as dual rates and roll button.

If you are into competition, or a competition calibre flier, be sure and take a close look at this one before acquiring your next system.

RAM

RAM (Radio Controlled Models) was showing not one, but eighteen (count them) various lighting, fail safe, and control electronic devices. They are all interesting and useful in various applications; one of them I find exceptional, both in concept and in actuallity.

It is called the RAM Battery Backer, and I wish I had gotten around to developing it. This device will save your airplane from one of the biggest airplane eaters, defective, discharged, or improperly charged airborne batteries. It is a small, light weight (one ounce) device, into which you plug your airborne battery, plus an auxiliary receiver battery pack which can be as small as 100 MAH capacity, or even a pack of alkalines. The Battery Backer is in turn plugged into the receiver.

The airborne system then draws it's power from the main battery pack as it normally does, the Battery Backer and extra battery pack merely enjoy the flight. In the event the main battery goes flat, intermittent or defective for any reason, including a broken wire, bad switch, etc., the Battery Backer senses the voltage loss, and goes into it's act. It switches over to the auxiliary battery, and your system continues to work normally. In addition, it sounds an audio alarm, so that when you are back on the ground and have turned off the Margarita blender up front, you'll hear it and know you are on auxiliary power: one saved airplane.

The Battery Backer is priced at $39.95, which along with another good quality Ni-Cd pack and harness, will make the total around $50, but that is a cheap price to pay for saving an airplane. I really like this, and plan to see that mine gets a lot of sight seeing in my airplanes.

EMS

EMS (Electronic Model Systems) showed its fine and extensive line of airborne systems and accessories; servos of all sizes, receivers, battery packs, switch harnesses, and servo trays. All of these items exhibit exellent quality and workmanship, and use the latest available components and techniques. They cover all applications, from car and

boats to Big Birds . . . or whatever it is we are calling the big ones now. They are available with the connectors of your choice; the list reads like a Who's who of R/C manufacturers.

Of interest primarily to those flying the big ones is the EMS "Eagle" servo, a husky brute capable of 156 oz. in. of thrust. Like some of the other larger EMS servos, it uses a special four-transister bridge output circuit amplifier that is capable of handling over two amps of current . . . that mechanical power has to come from somewhere! The Eagle is built into a ball-bearing, watertight case measuring (inches) 1.7 H x 0.75 W x 1.5 L, and weighs 3.6 ounces. The transit time is 0.5 seconds for 100°, which is not at all bad for such a brute. It is furnished with a T-arm, and a long arm; the color is ivory. At $44.95, it is not unreasonably priced.

McDANIEL R/C SERVICE

It has been pick-on-McDaniel time at MB lately . . . our January Over The Counter Column, while describing the McDaniel Ni-Starter in glowing (sorry about that!) terms reported the whole operation as taking place in Bellevue *Washington*, instead of in Virginia, where it really is. *(It was in Washington when O/C was written. wcn)*

Then, in this column, in the March issue, I reported that none of the independent service centers were serving the Cox/Sanwa system, though I did say "as far as I know", which was true at the time. I have learned differently, so to set the record straight, Bob McDaniel is manufacturing the Ni-Starter, the Bo-Starter for boaters, and servicing Cox as well as most other systems, at McDaniel R/C Service, 13506 Glendundee Dr, Hernon, Virginia; (703) 435-5805.

CIRCUS HOBBIES

The guys in the pink coats were busy showing their extensive line of everything from JR super radios to gas tanks. The Pasadena show was the first public showing of its new line of budget priced Jr. R/C systems, called the "Apollo" Series. While it does not have quite all of the features of its competition big brother, the Apollo does have enough of them to put it out of the just-another-radio category.

For example, it features dual rates, mixers, reversing switches, ratcheted trims, adjustable length sticks, plug-in RF modules, watertight servos, and rechargeable batteries and chargers. It is available on all 72 MHz frequencies. The airborne components are of average size and weight, and should not present any installation problem in the normal size model.

Three Apollos are available, a five and six-channel, two-stick system for fixed wing models, and a six-channel, two-stick system containing all of the above features plus those extras required by egg-beater pilots.

Call or write Las Vegas for complete information, as well as who is playing where on the strip. . .

CANNON ELECTRONICS

Did you ever hear why Dolly Parton has such small feet?

Cause nothing grows big in the shade!

I actually heard that on the radio, so it should pass MB's censors. What it has to do with the subject at hand is that maybe that is also one of Bill Cannon's secrets, everything he manufactures is so small it too must be grown in the shade.

Would you believe a four-channel receiver at .58 *ounces*, and measuring 1-9/16 x 7/8 x 39/64 inches? How about servos at .47 *ounces*, measuring 31/33 x 1-5/64 x 29/64 (less mounting ears)?

It is called a Super-Micro System, and is available either as Flite Packs to match an existing transmitter, or as part of a complete Cannon system including also your choice of the 820T average sized transmitter or the a grown-in-the-shade 810T, with un-Dolly dimensions of 1-11/16 x 4-13/16 x 5-3/8 inches.

Though obviously, this super-small super-light equipment is the perfect answer for control of super-small machines, it does have enough muscle to handle larger models, up to and including .40 powered equipment. In fact, the 1980 Quarter Midget racer record, set by Pennsylvania's Dave Latsha, was done using a Super-Micro System.

Oh yes, trays and appropriately sized airborne batteries come with the Super-Micros . . . think seriously about using one in that new shade-tree built project of yours.

TOWER HOBBIES

The Tower Hobbies booth was a regular cornucopia of modeling goodies, except that I missed some of the staff *(He means girls. wcn)* they've had at other shows. Maybe they feel that California has enough native attractions, while Toledo, for example, on the other hand, needs all the help it can get.

Anyway, they did have some noteworthy items. One being the now familiar System 4 Six-Channel R/C system, which is an excellent value at $160. I have a considerable amount of flying on one of these, and can attest to it's workmanship and performance. No bells and whistles; just everything required to get your trainer or sport airplane in the air, and to keep it there.

HEY QUARTER SCALERS !

Q.S.A.A. Chapter 7 Hosts The 1st West Coast Happening of 1982.

WHEN? **May 1 & 2**

WHERE? **Sepulveda Basin Recreational Area.**

(Camping Available, No Hook-Ups)

GIANT RAFFLE!!

C.D. Walt Clark
Call 213-345 3910 (Evenings)
For Information

At this IMS, I was introduced to another Tower Hobbies bargain, the Astro GX202, for those applications requiring only two channels. It consists of a two-stick, Mode One, small compact receiver, two small servos, switch harness, battery case, servo accessories, and hardware, on any 27 or 72 MHz frequency, for only $69.95. This is a dry-cell system, requiring twelve "AA" cells. (We recommend only the best quality alkalines be used, and tested regularly). Tower also furnishes "Eveready" cells at attractive prices. The 180-day warranty makes this system even more attractive when less than four channels are required.

Tower Hobbies is also the US distributor of the Canadian built Isotronic Master Series R/C System, a more advanced, more feature-loaded radio than either of the other two described. It comes standard with seven channels, open gimbals, dual rates on elevator and ailerons, electronic cross trims, and servo reversing switches. Ni-Cds and charger, too. Tower priced at only $249.95, this one is worthy of more than a passing glance if you need or can use some of the more exotic features.

ACE R/C, INC.

Whatever you need, and a lot of things you never thought of, you will see at the Ace R/C booth, and in their catalog. There are Pro Line's (isn't it great to see them back?) There are Silver Seven's, both assembled, and in kit form, and there is all manner of electronic accessories and equipment, like the Digipace digital readout battery cycler, chargers of various types, Ni-Cd Extended Scale Voltmeters, batteries both cased and replacement, and even pulse type systems and actuators, which I don't believe any one else makes any more, and which, believe it or not in this day of pushbutton flying, people are still flying and enjoying.

One of the new soon-to-be-available Ace R/C products that caught my eye is called a "Datamaster"; and is a combination Digital Pulse Meter, and Servo Driver. The DPM, as it is called, is one of the best ideas to come along in a long time. It is of uncalculable value to the technician, but still has many uses for the flyer, who can use it to adjust transmitter channels, set low rates, reestablish trim settings, monitor transmitter drift and performance, and many other uses. Married to a servo driver such as this one, it permits one to accurately set all servos to the same exact center, assuring complete interchangeability. It can grade servos for more or less travel; in short, it can let you select your servos for installation in the most advantageous position.

It is just about the time of the year when Ace R/C releases it's new catalog; you should make it a point to send for one, you'll find it full of interesting and needed items of all kinds.

ROYAL ELECTRONICS

Fully assembled, US made servos for less than $20 . . . that is just one of the pleasant surprises from this Colorado company. It is called the RS-21, is of average size and weight, and is priced at $18.50 without connector, $19.95 with the connector of your choice, which includes most of the current and some not so current systems. There is a smaller brother (or is a servo feminine?) called RS-23, for $23.50 and $24.95, with and without connector.

There is also the Royal Classic Custom system, in kit form, eight channels, which includes many of the so-called super radio features, like low rates, slow roll switches, servo reversing, throttle trim at slow speed, plus one rather unique feature that gangs two channels to the throttle stick for twin engine models, with independent throttle trims yet! The receiver features double-tuned front end, FET mixer, and low current drain. Servos can be your choice of five different types in varying sizes.

Royal Electronics has a number of worthwhile items, such as a one ounce two-channel receiver kit, a dual digital battery Cycle/Charger, the original Digital Pulse Meter, and what many of us consider the ultimate in meter type tachometers, the expanded scale Pro-Tach, which lets you measure the performance of your engine on five overlapping expanded scales with the stability that is only obtainable with a meter type unstrument.

Most of Royal's products are available in kit form, but if you are strictly anti-kit, take a close look at the Royal Omega transmitter, with many features of the Classic, plus plug-in RF, mixers, timers, and a host of other features. Royal is also an excellent source of hardware and electronic parts for service technicians and tinkerers. Write in and aks for a catalog.

TAXI TO THE PITS

Well, thanks for taking the time to walk through the 1982 International

Modeler Show with me, hope you enjoyed the tour. Next month, we'll get back to the type of subjects we've been covering in the past issues since the column started. I am happy to report that after taking some weeks to gather momentum, the mail is now coming in steady; we are even beginning to hear from our overseas readers, and we will be into some interesting subjects in the future. If you've been meaning to write but haven't yet taken the time, don't worry about overloading the system, there is always room for one more.

There are a couple of short tidbits to pass on. We had a call from Mr. Joe Penaz, of Leisure Dynamics, distributors of the Cox/Sanwa R/C system, who informs us that they are very definitely servicing all types and models of these radios. Address them at: Leisure Dynamics, 4400 W. 78th St., Minneapolis, MN 55435, or call Joe at (612) 835-3000, Ext 363.

Had a comment too about my dissertation about normal normal normal, and normal reverse normal servos; what if you do it in front of a mirror? *(Wouldn't touch that with a ten-foot Ukrkainian. wcn)* •

Thornburg. . . . *Continued from page 51*

the poor tires had been flat for months . . . that's what I get for trying to use Trexler airwheels in the desert.

The idea for Stan began when I found a piece of super-light Sig tapered balsa among my supplies. It was four inch wide stock, almost warp-free, and it weighed under 30 grams. "Two handlaunch glider wings!" I thought immediately. But I already had 19 handlaunch gliders on hand. That seemed like enough.

Then how about an .02 flying wing? Some sweepback, some dihedral, elevons, a nice big rudder . . . it turned out that I didn't have an extra .02 engine. But I did locate a couple of sick Babe Bee .049's. And a strange, tankless engine salvaged from a Cox ready-to-fly plastic model. How about a small bipe, built around one of the Babe Bees?

A WINDY DIGRESSION, FULL OF PITH AND VINEGAR

It turned out later that the tankless engine would have been a better choice for sport free flight. A lot of free flight models are destroyed in the process of trimming them out, simply because the length of the engine run can't be controlled accurately without an overpriced timer of some sort. If you can run the engine rich and slow, and restrict the run to four or five seconds on the first few flights, your chances of getting a new model sorted out without a crash are improved a hundredfold.

This kind of accuracy is impossible to achieve with a stock Cox reed valve engine: the gas you put in the tank is always too much or too little, even if you measure with a hypodermic syringe.

But the Cox "plastic plane" engines have no tank. So you substitute a 6-inch piece of clear fuel tubing, coiled neatly around the plastic engine mount (made by Goldberg; 85¢). The end of this tubing you hook temporarily to a small control line tank, and fill it with fuel.

This temporary tank is for priming and starting only. Just before launching, you pluck it off like a sour grape. The engine sucks the tubing dry in a few seconds, then quits. Perfect timing.

A regular Cox engine (Babe Bee, Golden Bee, Black Widow) can be adapted to this method. Just drill a hole through the top of the tank for the tubing to pass through, and hook it in place of the short pickup tube inside the tank. With a little concerted cleverness you can figure a way to use the engine's integral tank as your "temporary."

BACK TO BUSINESS

The original One Night Stan had a hollow fuselage, using 1/16 balsa sides and bottom. The top was pinched together around the pylon to give a triangular cross-section. Too much work. Build the profile version instead, and pocket the time saved. Use medium 1/4-inch balsa for fuselage, doublers and pylon. Note that the pylon grain is vertical. Leave it a half inch or so too high, for the present; it will be cut down and trimmed to shape later. Attach everything with 5-minute epoxy . . . especially the engine mount.

Wing airfoil isn't critical . . . you're not going to get much lift out of a flat board,

no matter how fancy you carve it. Ditto the fuselage shape: what's important isn't the shape so much as the moment arms. The long tail and short nose are good for stability, and seem to work out about right for balance, as well.

Like all free-flying creatures, balance and angular settings make all the difference. Here's the steps I followed to set up Stan:

1. Use the lower wing for reference. That means gluing it in place before you cut the stabilizer slot, or mount the upper wing, or sand the nose flat for the firewall.

2. Place a metal straightedge along the bottom of the lower wing. Mark off the stab slot so that the rear of the stab is 3/16 inch higher (i.e. further from the straightedge) than the front.

3. Using the same straightedge position as "zero line," scribe a line across the pylon that's parallel to it. Use this new zero line to set the top wing at 1/4 inch positive incidence . . . i.e. 1/4 inch higher at the leading edge than the trailing edge.

4. You can "eyeball" the firewall for down and right thrust if you wish, but I find it easier to set it true and then make thrust adjustments with grommets or washers as needed. The Cox Babe Bee has mounting lugs at eleven o'clock, one o'clock, five o'clock, and seven o'clock, when viewed from the front. The original model flew with four washers at one o'clock, two washers at eleven o'clock, one washer at five o'clock and no washers at seven o'clock. Izzat clear?

Don't invest in those huge Trexler airwheels unless you particularly like their funky look. And if you do use them, don't fly them into cactus. One last tip: never fill Trexlers by blowing into them with your mouth. I did this for years, and couldn't understand why the valve stems would gum up, stick together internally, and finally rot and fall off after just a few uses. Couple of years back I popped for a genuine Trexler inflating syringe, and now I can use the wheels over and over without problems. Seems the humidity from your lungs does a bad number on them.

Now: does anyone know how to make them cactus-proof?

(You can also extend their life by an occasional treatment of Armor All. wcn) •

Old Timer . . . . *Continued from page 38*

leading edge. R/C glider builders will relate to the two-piece stab, each half of which plugs into 1/32 wire "rods".

A most unusual feature is the use of a rubber motor (12 strands of 1/4-inch flat) without slack. Struck went for a near vertical initial climb, and got sufficient altitude in the 35 to 40-second motor run to get well above much of the competition. He put 750 winds into the motor and did not have to worry about slack rubber shifting back and forth to disturb the carefully adjusted glide.

Struck's flying instructions are worth repeating . . . so we will.

First check the balance of the model and the incidence of the surfaces. The model should balance in a normal flight attitude when supported on the fingertips at the diagonal wing-tip braces. Rest the wing flat atop the mount for preliminary flying. The elevator should be at a negative angle of about 3 degrees. (Raise the trailing edge about 1/8" above the leading edge.) Now try a hand-glide in a grassy field where the landings will be soft. Correct any diving tendency by inserting small slivers of balsa under the leading edge of the wing until a long glide is obtained. These adjustments are not final, as constant minor changes are made during tests. However, they do serve the useful purpose of preventing crackups under power.

Warping the wing is a necessary part of adjustment to offset the torque of the propeller. Viewed from the front, the left leading edge of the wing is warped up about 3/16". The leading edge is warped from the center . . . where its shape is unchanged . . . reaching a maximum near the tip of 3/16". The right leading edge is warped down about 3/32" in the same manner. The leading edge of the rudder should be offset about 1/8" to the right (viewed from the front) for an against-torque circle.

Power flights should be made first with a limited number of winds . . . 50 to 100 turns. Circles should be to the right during both power and glide. On successive flights when increasing the number of turns, it will probably be necessary to add a little down-thrust to prevent stalling. And possibly right thrust will be necessary to hold the right circle. Make these adjustments in the thrust line by inserting small balsa slivers between the nose plug and the front of the fuselage.

A good glide should always be the first consideration when making adjustments. It should be as flat as possible, near the stall, but still not mushing. For windy-weather soaring, a very slight stall and a sharper circle are excellent. Otherwise a steady glide and 40-to-50-foot circle are the best. Once the glide is obtained to your satisfaction make final adjustments for the power flight.

In the climb, the size of circle is not so important as long as the maximum altitude is attained. Slight stalls in fairly large circles may be eliminated by a little right thrust if the glide is good. Under full winds the first part of the flight is almost vertical with a slight lean to the left with the torque. The circle gradually tightens to the right as the motor runs out. •

Plug Sparks . . . *Continued from page 38*

some respects I was disappointed at the lack of interest, but at least it was a good excuse to get some cross country flying time in.

"The main thing I remember about the contest was a fellow from San Francisco called the 'Mad Russian'. He was a tall skinny kid with wild bushy hair (columnist note: this is slightly incorrect. The only 'Mad Russian' was John Drobshoff, who used to pal around with Charlie Werle, who really answers the description; Charlie always loved large free flights). Anyway, he had a wing that would fit well on any sailplane. It seemed to have a tremendous wingspan, approaching 12 feet. Of course, the inevitable happened, the center section gave way in flight. Instant re-kit! I don't think he ever got over that or tried to fix it. (Knowing Charlie, he would junk it and proceed to build a better model.)

"Unfortunately, I had to leave the contest before its completion and the awarding of prizes. Neither Howard Roberts or Pete Bowers won anything. The flight home in the open cockpit was delightful in comparison to the rough-as-a-cob flight up. It was cool on the way home, hence, the air was very smooth. It was almost dark when I got home and had to make my first landing in the dark. I'll always remember that flight with the lights beginning to come on below. Certainly won't forget the good time at the State Fair either!"

Columnist note: Right on, old boy. Those were really great days, with everyone experimenting with all sorts of gas model designs. Most everyone is still alive, with "Mad Russian" Drobshoff living in San Francisco, Charlie Werle in Sacramento, Pete Bowers still up at Boeing (moved up there from Palo Alto), and of course, Irwin Ohlsson still living in East Rolling Estates. And ya know, they are pretty active in model or full size avaiation yet! How about that?

BRUCE LESTER PHOTO

Well, time for another Bruce Lester "goodie", this time a shot of Bill Redeker with an unusual pylon design with a rare 40 to 50% lifting tail.

Photo No. 5, taken at the Detroit Nationals, shows the influence of pylon designs that were starting to spring up in the wake of the successful Zipper.

BRUCE LESTER!

After all the photos we had run that were contributed by Bruce Lester, it is about time we ran one of the old master himself.

Photo No. 6 shows Bruce with one of his favorite projects, a scale glider, R/C of course. As Bruce sez, at his age, he can't shag them anymore.

Bruce has just recently gotten out of the hospital in fairly good shape. As he says, as long as the hospital people have blood for him, he will keep going. All the best to you Bruce!

CODDING CUTUPS

Trust Gordon Codding to try every form of flying. His latest, as can be seen in Photo No. 7, is his idea of flying electric and gas models on the same day.

According to Gordon, he started off with a Civy Boy 51 with a McCoy 19 Red Head and Austin timer with fuel shutoff setup. For electric, the 51 has motor and batteries from a Black & Decker Cordless Hedge Trimmer found in a local pawn shop. Made five flights using a 10-8 C/L Tru-Flight prop. Finally replaced that with an electric motor from a Western Auto Co. "Wizard" grass trimmer and Astro Flight 05 prop adapter for 9-6 Power Prop.

Five flights last week. The idea is to charge overnight and then fly all day without recharging. As Gordon says, if the cells will hold enough charge to trim a hedge then they will handle repeated thirty second engine runs. Very smooth, gentle climb and easy transition to glide. More fun!

Finally succumbed to charging on the field idea, and now has a 100W power unit. Can't wait for the great weather!

PHOTOS! PHOTOS!

Rather than make up some heavy writeups, thought we would run some pictures of fellows and their models. After all, didn't *LIFE* magazine hit it big with nothing but photographs?

Photo No. 8 shows Jack Albrecht's latest hot iron, a Spitfire powered Sailplane. Jack, who is the service manager for Kraft Systems, is also a died-in-the-wool old timer flyer, and as such, is an active member of SAM 49. That Sailplane

certainly looks like a winner to us.

Photo No. 9 was taken by Harold Johnson (our unofficial SAM photographer), of Minneapolis, at the recent SAM Championships at Taft. Seen is Tom Hammond, who has dropped gassies in favor of rubber models. This one, of course, is the biggest favorite among all modelers, the Megow kit version of the 1939 Wakefield Winner as designed by Dick Korda. It is interesting to note that with the re-entrance of good rubber, the trend toward rubber powered models is quite noticeable in all parts of the country.

Photo No. 10 is a shot of Jack Jella's brand new Playboy Senior that flew literally off the drawing board, as he won on his very first time out. As can be seen, Jack not only flies well, but turns out an excellent model.

Jella, who owns an aircraft service company called "Air Trails", is a terrific supporter of both free flight and R/C Assist old timer events. When it comes time for a group of trophies or a special perpetual trophy, Jack can always be counted on. His "Bent Prop" Trophy, put up for the Annual Texaco R/C contest, is an excellent example of what he donates.

The trophy was made up of a propeller from a Piper Pawnee that had one of its propellers bent. With Walt Parker, a cabinet maker par excellence, making up a beautiful walnut base, this trophy has become a highly coveted trophy that is awarded by SAM 49 annually. Great guy, that Jack Jella!

Clarence Bull, of SAM 8 up in Portland, Oregon, loves to build those real early birds! Photo No. 11 shows his handiwork, a Quaker Flash, at the Salt Lake SAM Champs. As Clarance sez, maybe the Quaker line of models weren't the greatest models for competition, but they are great sport flyers; slow, steady, and *durable*. The last item is what appeals to many modelers.

Although the Quaker models are tough to trim out as a free flight, the huge rudder is a real boon for modelers who want to add a black box to their mode of flying. Believe it or not, this little box has made the Quakers quite competitive in the Texaco and Antique Events. There is nothing wrong with a Quaker floating at 1,000 feet of altitude!

SAM ABROAD

Man! Have we got the news this time of SAM Chapters, members, and just plain modelers interested in old timers. This writer can't say how pleased he is to find old timer activity constantly spreading.

SAM IN GERMANY

The latest information from Gerhard Everwyn, Cachsteiner 12A, D-8000 Munchen 82, West Germany, is that the SAM Chapter there has taken off like a skyrocket with over 60 members already.

Gerhard freely acknowledges the help he received from Dave Baker, who has attained an astonishing membership of 350 for the SAM 35 organization in England. At the rate the German club is expanding, Gerhard thinks that perhaps there should be a major SAM organization for all of Europe patterned after the USA SAM organization. You never can tell. Who is to say we might have an International SAM Championship one of these days?

ENGLISH ECHOES

This columnist has been actively corresponding with Ben Buckle, who he personally met and stayed with for several days during the last trip to England for the O/T Champs at Sculthorpe Air Base.

During this time, Ben Buckle broached the idea of going into the old time plan business. This writer can well remember saying, "Welcome to the Poor House". Ben, however, was undeterred and continued to add to his stock of plans.

Early in 1981, Ben Buckle was a victim of the recession, and lost his job as an electronic engineer. Unable to catch on right away, Ben decided to go full time into the plan business.

As can be seen from Photo No. 12, Ben is with his everloving wife, Sheila, at a typical English O/T Contest. Ben, not satisfied with the plan output, has gone into the kit business to augment his income. The photo further reveals he is also selling balsa, accessories, and reference material. Many a manufacturer got started this way. Who knows, you may be looking at a future Keilkraft or Veron!

Performance Comparison of FOX EAGLE III with other Popular .60's:

How Does Your Observation Compare with Ours?

Test Run December 22, 1981 in our Plant (warmed air).

	FOX EAGLE III $125.00	O.S. SCHNUERLE $165.00	ROSSI .61 $?	ENYA XFTV $158.98	WEBRA .61 $206.82	SUPER TIGRE X.60 $134.95	RJL (KRAFT) $?	O.P.S. BIG RED $?	PICCO P.60RC SE $219.95
11-7 Prop Gold Star Fuel Conv. Muffler	12,900	12,300	13,000 (Fox Muffler)	11,500 *		12,600	12,200		
11-7 Prop Duke's Fuel 10% No Muffler	13,100	13,000	13,200 (Fox Muffler)	13,000		12,700	12,500		
11-7 Prop Gold Star Fuel No Muffler	13,500	13,200	13,700	12,000 *	13,100	13,000	13,000	12,300	12,800
11-7 Prop Gold Star Fuel Tuned Pipe	13,800 Stock Sleeve 14,000 Opt. Sleeve		14,100					13,500	13,500
12-6 Prop Gold Star Fuel Conv. Muffler	12,000	11,500	11,900	11,000 *		11,700	11,300		

Easy to Start — Schnuerle Ported — We're Proud of It!

The FOX EAGLE III engine used was the middle performer of three pulled off the line at random. Other engines used were bought on the open market and presumed to be good specimens.

*ENYA ran very well on 10% Nitro, but rather poorly with no Nitro. PICCO had above average fuel draw, perhaps would run faster with a larger carburetor.

CONCLUSIONS: The FOX EAGLE III with conventional Muffler and No-Nitro Fuel runs slightly faster than a ROSSI on a large prop (12-6) and slightly slower on a small prop (11-7). It is faster than any other engine tested.

HOWEVER: There is more to being happy with your engine than how fast it runs. How does it throttle? We think ours is the finest — try it! How durable is it? The FOX EAGLE III has the largest Crankpin — the sturdiest Rod and the highest Load Rating on the rear bearing of any of these engines.

AVAILABILITY OF PARTS: Fox maintains the largest stock of parts in the United States. Phone us and the part is on the way, often the same day.

WE THINK THAT IF PRICE WERE NO FACTOR, THE FOX EAGLE III WOULD BE YOUR FIRST CHOICE.

At the Price we are offering it, this new .60 FOX EAGLE III has to be your First Choice. Power and Performance!

FOX "EAGLE III" .60 BB-RC

The FOX EAGLE III has many improvements over the EAGLE II, resulting in considerably more power, longer life, and a less cranky nature. Also, the EAGLE III runs best on our lowest cost fuel. Physical improvements are a re-designed piston, shorter conn rod, improved cylinder porting, new head contour, heavier duty rear main ball bearing, improved taper lock and thrust washer. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation. Fuel cost for 10 minutes flying approximately 25¢ based on drum prices.

Bore: .907 Stroke: .937 Displ .61
R.P.M.: 13,000 plus with 11-7 Prop
Weight: 17 oz.
Fuel Consumption: 1¼ oz. minute

#26500 FOX .60 EAGLE III Side Exh.	$125.00
#90262 Tilt-Down Muffler	19.95
#90263 Tilt-Up Muffler	19.95
#50604 Engine Mount	10.00

Our Hot Line: (501) 646-1656

FOX MFG. CO.

5305 TOWSON AVE. FORT SMITH, ARK. 72901

For Attention of CANADIAN HOBBY DEALERS:

You can now order Fox Model Products direct from the factory. Standard discounts apply. Freight Prepaid on all except fuel. Most Fox Products should be Tariff Free under provisions of Tariff Item 62435-1. Call us or write for further details.

AUSTRALIA ANCIENTS

Jim Palmer, of Lot 25 Palmers Road, Caniaba N.S.W., 2480, Australia, sent in several photographs taken of two models that were built during the early years of WW-II. These models, built by Joe Habib of Lismore, were left hanging under a house when the builder went off to war. When the war was over, Joe Habib decided not to come home. Jim came across the models and has volunteered to restore them for possible hanging in a museum.

Of the two models, the larger one (as can be seen in Photo No. 13) is equipped with a Brown Jr., while the smaller has a Baby Cyclone in it. Joe, and his brother Habib Habib, were very well known throughout Australian modeling circles. Starting with designs like the T-D Coupe, they constructed larger models such as the 10 foot Brown Jr. powered model.

Jim has kindly offered to work up plans on these two ancient crates. This should be of interest to all old timer enthusiasts! Hope Jim doesn't lose his enthusiasm!

NEW ZEALAND

Recently received from Frank Zaic a reduced drawing of the "Red Bird", as designed and built by W.B. Mackley, 310 Hurstmere Road, Takapuna, Auckland 9, N.Z. This columnist was not even aware that Mackley was alive, and in response to a letter of inquiry, received the following correspondence:

"I was delighted to receive your letter of Dec. 10, 1981. John, I designed the Redbird close to 50 years ago and don't recall where the full size plans might be. I will go back to Modelair for whom I worked at that stage and see if by any chance they have the plan filed away. I am enclosing another copy similar to the one Frank Zaic sent you. You might be able to have it photostated up to original size.

"Those days when we sent models to the States for you boys to fly by proxy have resulted in some life long and most treasured friendships. Vern Gray, I see from time to time (Bert Pond will like this). *Vern has just retired and is talking of more model building. I visited Frank Zaic and Ed Lidgard on my last trip to Los Angeles a few months ago. Through strange circumstances, I caught up with Carl Goldberg again and when in Washington last October, I had a telephone conversation with Bill Winter who I hadn't seen since the war.*

"I started flying before the war, spent seven years in the Air Force in Euopean and Pacific theatres of operations, then went into civil aviation. I flew as a captain for Air New Zealand till I retired from flying in 1971. Then spent 10 years in the office, retired, and was recalled last year. Finally retired just last week!

"Have several models underway, a C02 job, not very successful. Motor doesn't want to run more than 10 seconds. My electric model was incredible! (As can be seen in Photo No. 14.) Next step is to lighten the fuselage and put in radio control. I have one of Frank's Sailplanes underway as an R/C glider. That should be plenty to keep me out of trouble!

"Hope to come to the States this summer and drive from Los Angeles to Salem, Oregon. Hope to take in the scenery and pop in to say hello."

To receive letters like this is simply great. Best part about it all is that "once a modeler, always a modeler". Just hope I am home when Bill comes by.

THE WRAP-UP

This time it is with distinct pleasure I present a write-up on the Taft O/T Nationals as written by Jack Abbot of South Africa. It is truly astonishing to see how the modelers viewpoint is the same regardless of where he comes from. This is a direct transcript.

Various constraints had to be considered when trying to organise the Sprinkbok Soaring Team's transport to Sacramento. Finance, SAA flight schedule, Independence Day, were among the factors which were listed on a voting paper circulated to the team. The democratic result of the voting had the Team Manager scurrying off to the travel agent, as there was now just a chance of attending the last of the three-day Old Timer Nationals at Taft.

And so it proved. A few hours changing planes in New York, and then a couple in San Francisco, getting the team into a wagon and pointed in the general direction of Sacramento. Any weariness from the many cramped hours in airplane seats was dispelled by the shock engendered by the price of the whiskey and soda dispensed at the airport bar. This sobering experience kept me wide awake on the flight to Bakersfield and fortunately I was still sufficiently alert to tackle the problem of driving on the right in the dark in an American car. I emphasise the American, because having driven three different examples, I remain baffled by the paradox that a nation that produces such vile automobiles can be so successful with moonshots and Mariner space probes.

With the concept of jetlag firmly banned from making itself known, it was up early next morning to experience another distinct problem in the U.S. of A. . . . finding breakfast before 9 a.m. Eventually the Pinto was pointed towards Taft, reached two hours later. This interesting oil town was still firmly asleep and only consented to start stirring at 9 a.m. The local traffic cop, the bank, the shop next door, the garageman did not know where the most famous model flying field in the World was located! Eventually I was directed to the State Trooper's headquarters and he (large hat, sunglasses, leather legs and all) gave me the necessary directions.

Taft field. A square kilometre of flat, bare, baked, gritty soil surrounded by low rolling scrub-covered hills with horse-head oil pumps plunging away, and all shimmering under a blazing sun in a cloudless sky. Summer in the Central Valley of California is dominated (away

from the irrigated areas) by two colours . . . straw-yellow and deep blue.

The deep blue sky was being continuously invaded by the nostalgic shapes of well remembered aircraft and, because of the continuous distraction, it took a little while to locate our Fearless Leader, John Pond. A great welcome, which continued for the rest of the day. Uncharacteristically, I would just stroll up to a group co-operating in getting an ignition motor to run and introduce myself as a nut from South Africa. And they accepted me as though I had been a friend of theirs for a long time, and immediately got down to the important business . . . exchanging views on Old Timers.

After a couple of hours, the well-known South African thirst made itself felt and I looked for the refreshment centre. None. None? One side of the field was flanked by cars with caravans in tow or by recreation vehicles, all with their air conditioners, fridges, tee machines and deep freezers humming away. There is no need to supply a refreshment booth . . . all Americans are over-equipped. My inherent shyness making itself felt, there was no way that I was going to spend the day begging drinks from people who, had they known my predicament, would most certainly have been completely open-hearted about keeping me lubricated. I was miserably contemplating the necessity of getting into the oven-heat of the Pinto and driving back to Taft, when I was introduced to Englishman Ken Hinton who, with his charming wife, had attended the last three or four Old Timer Nationals simply because he knows of no better way of spending a vacation.

Eyes twinkled at me from a bearded face: "Are you thirsty?"

"Yus" I croaked.

"What would you like . . . coke, beer. . .?"

Two quivering hands reached into the proferred coolbag, broached the ice-cold can and poured. But even as the throat lining relaxed under the stream of passing liquid, the taste buds recorded a nagging doubt . . . this is beer? A later can of another make confirmed the disturbing diagnosis being simultaneously realised hundreds of kilometres away in Sacramento by the other three team members. Was there a potable American beer? It took us days of experimenting to find an acceptable beer (you see, a lengthy period of acclimatisation is necesary), and eventually "Bud Weiser" was elected as the sixth member of the team.

But this is not to denigrate Ken's hospitality. After all, he didn't make the stuff. For the rest of that day, I was fed and watered by the Hintons. They had had exactly the same experience when they attended their first Nationals, and had quickly divined my predicament. Thanks, Ken. Hope to meet you at a future Nationals.

Most of the events had been completed in the first two days. The R/C Assist section was busy with Texaco . . . you are given a miserable quantity of fuel related to the weight of your plane . . . and that's it. Stay up as long as you can. The other half of the field was finishing off free flight gas and scale. To my disappointment, the rubber events were over, but it was sheer pleasure to watch Sal Taibi tweak his motor to full revs as a "Taft trashmover" approached, and launch into a soaring climb which continued right on up when the motor cut. Sal and son leapt on a scrambler and headed for the hills while the model disappeared overhead. To my astonishment, they returned with the model half an hour later. You can't teach that man nuttin'!

Silk and tissue covered models were rare, most of the R/C Assist models relying on predominantly transparent plastic film. In amongst the modern glow-plug motors were a sprinkling of Ohlssons, Andersons, Cyclones, with modern ignition engines like the 77 Special and Simplex.

The competitions petered out about 3 p.m. as the temperature went off the clock, and everyone disappeared for siesta before the prize-giving dinner. I wandered into an ice-cream parlour and discovered one of the delights of American life . . . they placed garlanded mountains of ice cream before me and I put it all away!

At the cocktail hour before the dinner, I found that the price of drinks served in unpretentious surroundings could be quite reasonable, and it was fun to mix with fellow beings who make and fly Old Timers for the pure enjoyment of it all. Overseas visitors were individually introduced at the dinner, and loudly acclaimed by the gathering. But one look at the triple row of trophies extended for 5 metres, and I resolutely left at 9 p.m. to fight drowsiness on the drive back to Bakersfield. Once in the motel, I surrendered to jetlag and tomorrow a Greyhound driver would be responsible for getting me to Sacramento, while I slumbered on.

Going over the team expenses later, I found that that one day at Taft had Cost R550 and it was worth every cent of it to enjoy the great camaraderie, and to

realise that in the jungle of life, there are some pockets of sensible people who can make common cause to have some fun!

Columnist note: I'll say amen to that!! •

Control Line . . *Continued from page 57*

middle and all. Those guys are doing it, let's you and I go out and do it in the road, too. AMA-sanctioned event, right? Picture is in the AMA magazine, right? It must be *ok* and only fellow rockers will fully understand the third sentence back, in case you don't. And what are you doing, sitting there counting out the sentences!?

But maybe I'm wrong. What if doing something, anything cross-country is really worthwhile and it must be if our AMA gets so involved? OK, I'm wrong (I know I'm not, but this is just pretend, you know?) Anyway, here is the promotional vehicle of all time. And here we are with an event, dear ol' CL, that obviously needs some promotion, as it is holding its own well enough, but is not seeing the growth it is capable of.

I know you're ahead of me already, Cross-Country Combat, right? Sure, but let's really do this right, let's have a Cross-Country CL Contest. Let those RC guys fly foofers across the U.S. Let's go them one better by using for-real, go-fast, turn-tight, fly-smooth, start-quick, land-short, look-pretty, light-weight (just wanted to see how many hyphenated words I could sneak in), equipment for the tens and tens of spectators that must be attracted to this kind of thing. Razzle-dazzle, show-biz . . . sorry, won't do it again.

All we need are some of those oversized flat-bed trailers and a few tractors to pull them. Stick WIDE LOAD signs on them, run them side-by-side down the road and we've got an area for takeoff and landing and another for the pilot(s). Landings? No sweat. The Carrier Guys could just drop in on the deck laid out on the adjacent trailer; would probably be easier, what with the automatic head wind blowing directly down the center of the deck, than doing it at contests. Racing fliers are used to having to hit the landing on the first time and also smoke the model into the pit-person anyway, so with the practice they already have, a shut-off to kill the motor at that critical instant and an excess amount of air-speed for insurance, shouldn't have any trouble at all in hitting a huge trailer, they work to much tighter areas in contest flying. The Speed Folk might have a problem, but as there are only seven or eight of them left anyway, landings (and dolly retrieval) are their problem. The lightly loaded, by design, models are what would be fun. Ever see anybody wind-fly? That's where you do lazy eight's downwind, after the motor cuts. It's a little like flying a kite that you can control and takes not much wind at all to do successfully. Riding on the back of a tractor/trailer rig flailing along at 70 per, it would be very easy, any decent flier would be doing vertical eight's, square loops, square eight's, might even be able to sneak in some really tricky maneuvers. For the actual landing, with the rig slowed up some, the model could be floated right into the hands of a catcher on the other truck or flopped down on a pad erected on the top of a following truck.

Say, maybe there is something there to fool with further. The RC guys have to stop for fuel, but if we wind-flew a CL model, we could do the whole trip non-stop! Yeah, that's it, in addition to the Cross-Country CL Contest and What-You-Can-Do-I-Can-Do-Better Bazaar and Fashion Show, we'll challenge them RC ducks to a *real* cross-country race. No namby-pamby rally scoring; first one to get from the Atlantic to the Pacific wins and for every mile the caravan drives, the model must be flying. We build a stout (but light) model that would probably end up looking a lot like a Combat machine. It would be carefully streamlined, of course, to the point of building a pod that would contain lead (for balance purposes only) and this pod would be attached where the normal motor mounts are located. The motor itself could be a small one and mounted on a strapped-on power pod, much like glider guys use. It would be rigged to drop off at the first full-blown control movement, so we could leave Atlantic City with a model being powered, at least for the initial launch, by an engine. About the time the RC guys quit laughing at us, Hero Pilot would snap in with full-down, jettisonning the power pod and we would be off, wind-flying our way to the Pacific.

Fuel stops for the truck? Hell, if they figured out a way to refuel jets in-flight, we can do it with a truck. Night travel? Any good Combat flier can fly a model without looking at it, they do it all the time in Combat matches where you *have to* watch the other guy's model. Over-passes might be interesting, though.

It really is possible, you know. And using current technology, nothing very trick at all. Not only is it possible, we could simply humiliate those RC people. By the time they were figuring out how

to get out of Virginia, we could be playing in the surf at San Diego or relaxing before having Charlie Johnson show us the sights. Cripes, we could hire a fast boat, wind-fly to Hawaii and back before the RC Team showed up!!

Yep, guess I was wrong after all, the AMA has once again shown us the way to True Universal Acceptance of Toy Airplane Fliers and Accompanying Toy Airplanes. All we have to do . . . is to do it. I can see the headlines now. . .

IT'S NOT CROSS-COUNTRY, BUT. . .

The '82 Northwest Regionals will be yet another super CL contest in a very long line of truly outstanding CL meets held in Eugene, Oregon. Usual time slot, Memorial Day weekend, May 29 and 30, to be exact. Contest site is right next door to the Mahlon Sweet Airport, for those who want to fly in, and every year a number do.

Most every CL event will be held. In Racing, they will have Rat, AMA Slow Rat, Goodyear, Mouse I, Mouse II, Northwest Sport Race, and Northwest Super Sport Race. Combat events are Fast, Slow, FAI, and 1/2A. Speed fliers are offered 1/2A, A, B, D, Jet, FAI, and Formula 40. Carrier events will be Profile, with Class I and II combined. In Stunt there will be two PAMPA class groupings. Even Scale is represented, with AMA Precision Scale and Profile Scale. If none of these events fits your present equipment, how about Balloon Bust? Yes, they have that, too!

Of course, all of this is supplemented by various side-line activities . . . for instance, there is a very good chance that Oba St. Clair, inventor of CL modeling in the U.S.A., will be there with all manner of amazing things, including very early CL models and his have-to-see-it-to-believe-it ground-based CL trainer. For more information, contact Mike Hazel, 1040 Windemere Drive N.W., Salem, OR 97304. Or call (503) 364-8593. •

Free Flight . . . *Continued from page 63*

which would be safer for the first flight.

Wrong again! The first flight was similar to that with the fin on the tailplane model; i.e., tight right at the start and very under-elevated. Sub-fin area was increased to cure the right turn at the start, and more incidence added progressively. One-eighth inch (+1°) was required to get the climb right, necessitating the addition of lead to the nose again to cure the glide stall . . . There was also a marked reluctance to roll, the model tending to 'wingover' rather than roll-out when slightly over-elevated. Any further increase in tailplane AR being undesirable for structural reasons, the only cure for the lead in the nose was to lighten the back end. A new tailplane was constructed and weight reduced by just over 1/4 oz. The only cure I could think of for lack of roll was to increase the wing warp, so a further 1/16 in. was added, giving 1/4 in. on an eight-inch chord at the outer panel joints. Next time out, the climb trimmed out very nicely, but it wouldn't flick off the top into the glide. It was realized that rudder offset for climb turn had now almost doubled compared to forward fin, leaving little rudder movement for the pullout. Rudder area was increased by 50% to overcome this problem, the resulting tight glide circle being countered by tail tilt for left turn. Performance was now 20 seconds up on 'fin on the tail' due to more height gained on the climb. After flying it for awhile, it was apparent that signs of insufficient fin area had reappeared (presumably because the fin operates in disturbed air behind the tailplane) and fin area was increased again.

PRO

1) Best duration of the three layouts tried.

2) Best handling; i.e., easiest to launch

3) Climb faster/steeper and generally more stable

4) Most consistent power pattern in windy weather (less tendency to go over the top in heavy gusts).

CON

1) Short on roll, requiring more wing warp

2) Extra warp should mean worse glide (but not apparent)

3) Requires more rudder offset for power turn (inherently less safe)

Of course, the main advantage in the days before VIT was the ability to handle much higher power without recourse to funny tailplane shapes, etc. This raises the question, 'Is this still important with the now universal use of VIT? The answer is that it is less important, but still offers some advantage in that this layout flies with a higher wing/tail incidence difference and is therefore inherently more stable. The climb is steep with the tail up because more lift is generated.

The fin-on-tail layout is not much inferior in performance, the difference being due to slightly less height gained on climb, presumably due to higher tailplane drag. The practical points against it are the need for tailplane keys, the difficulty of packing, and integral fin/tailplane assembly. The 30 second performance difference between fin on the tail and forward-fin would be much less with current VIT models, but the forward fin model would still be a bit down on height gained, again due to tailplane drag.

To avoid the need to adjust fin area to get an even power turn, it was realized later that the same effect can be achieved by adjusting the tailplane incidence relative to the slipstream. If the model tightens up under power, reduce incidence of both wing and tail by the same amount. If the tendency is to barrel roll or go left towards the end of the climb, increase the incidence of both.

(To be concluded next month)

SOME SUGGESTIONS FOR PAYLOAD

In a recent issue of the CIA Informer, Harry Murphy wondered in print about what to do to those events in the AMA rules book for which support was weak or virtually non-existent. Rather than suggesting the abolishing of some events which have been in the book for years without gaining any real popularity, Harry made some suggestions for "revitalizing" one of them, Payload Gas. As he says:

"Those of us who participate in the current event consider it to be quite challenging and 'lotsa fun'. Many who do not participate admit they like to follow, observe, or have future intentions of participation. As one of the promoters for initial adoption by the AMA, I once thought it to be an ideal beginners event, however, apparently the beginners don't think so as few novices are found among the current active participants. Whereas the annual Nats event is always hotly contested, little local activity is apparent for the remainder of the year. What, then, may be some of the problems?

"It has been my experience that any negative comments directed at the event appear to center on the .020 engine size requirement. Although the Cox .020 is a fine little engine, some consider its power to be too puny to be 'manly', and some may even log it into the 'contrary' category. Those occasional rumors . . . whether true or false . . .that Cox may cease production of the engine, probably do nothing to increase activity either. So, what medicine can be possibly suggest?

"Well, suppose we simply upgrade the event to include .049 engines and increase the wingspan limit to 48 in., and increase dummy weight and size to the old Pan Am specs, etc.? The pro comments should include that .049 engines are more plentiful and more flexible for use in other events as well, more dependable, more power might increase participation by those who currently shy away from the .020 and many currently obsolete 1/2A models could be retrofitted rather quickly to comply with the rules of the event.

"To better evaluate the assumed upgrade and to prevent obsolescence of those models already built, suppose the .020 rules are retained in direct competition with the new.049 size? Would this not 'rejuice' the event without much damage to present man, model, or machine? Also, should .020 production cease, the Payload rules would already contain a safety 'bailout clause' . . . the .049 regs. Sure, we could simply add 1/2A Payload Gas as a separate entity, leaving .020 on the books, or delete .020 in enchange for 1/2A, but wouldn't it be fun to see how this combo might compare competitively? Whatever the eventual conclusion, we can 'fix the problem in the next two-year rules cycle.' What say, you all? Rules Proposal time is soon upon us again . . . do we submit a formal suggestion?"

I think Harry's got a good idea here (as a matter of fact, it's the same suggestion I made back in 1964 when Payload was reinstated in the AMA rules after Pan Am dropped its sponsorship of the event.) ●

Soaring. . . . . . *Continued from page 27*

the ceiling. "There's the original, the prototype Windfree that won the 1970 SOAR NATS. You've seen that very plane in hundreds of ads and on the cover of *Model Builder* (March, 1973).

"What's it worth?" someone asked.

"I don't know. It's in good shape and would fly well with a radio installed . . . but it's worth much more than that to me."

"Well, how much?"

"I give up. What would you offer?"

And so we had a fictitious auction that started me thinking. After they left, I looked at some of my other planes. Some I fly regularly. Their value is in their utility. Others I fly rarely . . . but I may come to fully appreciate them again sometime in the future. Some are of value because they're "classic"; others because they're "out of print."

I began to realize that the overall value of anything is a composite of its utility and scarcity. The plane you use day after day is high in value because of the great pleasure it provides . . . its utility. The value of a collector's item depends on its rarity. In general, an item

is of greatest value when it is both useful and scarce. I value my Grand Espirit, not only because it flies well, but because it is now an "endangered species."

You can judge the utility of each of your planes on a ten scale: 10 if it's always useful (you fly it at every opportunity); 5 if it's moderately useful (you fly it, say, half the time); and 0 if it's unflyable. Similarily, you can judge scarcity on a ten scale: 10 if it's one of a kind; 5 if it's not uncommon; 0 if everyone has one. But, adding these two measures of worth is an oversimplification. Utility and scarcity may not contribute equally to overall worth. Some people are primarily collectors. The philatelist judges the value of his collection in terms of the scarcity of each stamp. He cares little about their lack of direct utility (beyond the pleasure he receives from mounting, viewing, and showing his collection). And there are those whose only concern is utility. If given the original Windfree, they would fly it to tatters!

To find each plane's overall worth, first estimate the relative importance you place on utility and scarcity. To what degree are you a builder/flier? To what degree are you a collector? Here again a ten scale is convenient. If the importance to you of both flying and collecting are both zero, why read this article? If both are ten, you're probably torn by the desire to fly that fragile museum piece just one more time. Most of my flying buddies place a higher weight on utility than scarcity. Now to find the value of each of your planes, multiply the importance of utility to you by that plane's usefulness, then add the product of the importance of collecting and its scarcity.

To complete the story, include another factor . . . dependency. A drink is worth far more to the addict than to those who casually sip and slurp. Here again a ten scale is in order. If R/C soaring is only a casual interest, your planes are worth very little. If, on the other hand, you are a devotee, the same planes are worth an awful lot. To take this into account, multiply the utility/scarcity worth of each plane by your degree of dependency on this hobby/sport. If you're an addict, don't be bashful. Multiply by ten.

Here is a way to compare the value of the different planes to different people. Now I understand why I treasure that original Windfree and, at the same time, greatly value my Legionair.

★ ★ ★

If you're a beginner or simply want to update your technique, you ought to read the *Sailplane and Soaring Manuel* by Al Doig, R/C Modeler Corporation, Los Angeles, 1981. With a broad background in engineering, Al now devotes himself to R/C soaring. This book takes you through the construction of an Olympic 650, a plane that flies well and is easy to handle. He then offers some basic aerodynamics, describes launching equipment, and how to test, trim, and fly your sailplane. He then indicates the various kinds of contests. The book also contains a Glossary of terms commonly used in our sport/hobby. All in all, here's a fine book. I take my hat off to Al for a job well done!

Every soaring enthusiast should read and reread *Model Aircraft Aerodynamics* by Martin Simons, Model and Allied Publications, Argus Books Limited, 14 St. James Place, Watford, Hertz, England. This book is crisp and concise, easy to follow, and eminently practical. For example, (from page 13):

"Gliders hardly ever need to fly at the speed which yields the best L/D ratio or flattest glide. As a rule, they are either soaring or penetrating. When penetrating, a speed other than that for L/D max is needed, except in completely still air. For example, in making headway against a wind, if the model's best L/D airspeed is 10 metres/sec., and it faces a wind of slightly more than that speed, flight at best L/D will cause it to move backwards relative to the ground. A higher speed would enable some forward progress to be achieved, albeit at a higher rate of descent. In addition, between upcurrent zones, thermal or hill lift, there is almost always sinking air. A detailed analysis of the behaviour of sailplanes in such conditions is to be found in most books about fullsized gliding, but the modeller does not have the benefit of instruments and computers in the cockpit to tell him what his best speed to fly should be. As a very rough approximation, the model might achieve best results on many occasions by flying between lift areas at about twice its stalling speed, and faster still if it needs to make ground against this wind. This requires efficient, low drag aerodynamic design over a wide range of lift coefficients, from, perhaps, C_L = 1.0 down to C_L = 0.2 or 0.3. While the best L/D ration remains a useful indication of a model's all around efficiency, it is rarely important in practice."

For more casual reading I recommend *Incredible Machines, An Anthology of Eccentric Aircraft* by Michael Jerran, Exeter Books, New York, 1980.

See you next month. •

Electric . . . . . . *Continued from page 34*

good and looks right." It has a lively manner in the air which is very crowd pleasing. At the other extreme was Tony Naccarato and Addie Naccarato's quarter scale Farman Moustique, powered by an Astro 035. A quarter-scale that weighs 23-1/2 ounces! It was flown indoors at the IMS show, Pasadena, the previous week, and is an excellent indoor flyer. Outdoors, it practically hovers! Tony did a four-minute flight in a total length of about 200 feet, one pass up, one down! This was a crowd pleaser, too, because of the slow motion flight.

In R/C pattern, the big impression was the smooth, powerful flights by the 05 pylon racers. These are fast, and capable of good vertical maneuvers. The overall impression is that you are seeing a much bigger plane. Tony Naccarato's pattern plane, powered by an Astro 40 samarium cobalt motor, used the other approach; a light wing loading for slower, and very smooth, pattern flight, much like the U/C pattern type flying. This made it very easy to see every detail of each maneuver, much like the philosophy of the Las Vegas pattern champs. The vertical capability of the plane was

excellent, and Tony would most likely have done even better than he did (third), if he wouldn't try to fly with the receiver antenna wrapped around the receiver! After he had some glitches on his first flight, he found he had done just that! It does show how good radios are now, and that motor noise in electric flight is not a problem!

Control line scale featured the beautiful scale planes built by the Black Sheep Squadron, most from Guillows kits, and powered by the Astro 020. Lon Tar Diss's F4U Corsair featured folding wings, and well deserved its first place. These planes flew in the IMS show the previous week, with carrier deck landings (the deck is neat!), which increased the drama considerably.

I think Bill Stroman will cover most of the free flight, so I'll keep it short on that. The most outstanding mini-old timer I have ever seen was the Powerhouse by Jim McMahon. This was powered by an Astro 020, and was super light. It had an excellent climb, and the most clever timer, from a Tomy wind-up toy, that I have ever seen. The cutest free flight by far was Linda Cope's "Garfield Special," piloted by my favorite grouchy cat, Garfield. Garfield was a little overweight, as usual, so he couldn't fly very high, but he had the right spirit!

Well, enough, except for one last post script. I had a chance to talk to Roland Boucher, at Leisure Electronics, about powered flight times, and this will appear in a future column. The six-minute flights I mentioned in an earlier column are really minimum flight times based on a four ampere charge for fifteen minutes, as specified in the instructions I got with the digital charger. As it turned out, I got one of the first digital chargers, and the instructions were for earlier models (non-digital). These instructions have now been updated to use the full capabilities of the charger and allows quite a bit more flight time. I get eight minutes on the Astro Sport if I charge up to 9.8 volts (six cell, 1.0 /ah G.E.) on a cold pack and then fly at altitudes up to 600 feet. This is the worst case situation, as once the pack warms up, times should get better. In my Drifter, with three motor runs of about two minutes each, I can do fifteen minutes quite easily. Anyhow, as soon as I get enough testing done, I will go into this in the detail necessary for the sport flier, so that we all can enjoy longer flight times, and hog the field (a new experience for electric fliers!)

Till next time, build electric for spring flying! •

Peanut . . . . . *Continued from page 55*

lightweight canopy. If these four approaches were taken, then a fifth would be necessary; the use of a lightweight carved balsa propeller.

Construction follows standard practice in most respects.

The fuselage is constructed using two main side frames that are built directly over the plans. These frames are shown hatched for clarity. After they are completed and the cement is completely cured (build one of the other components while the cement is setting), remove the frames from the plan and carefully separate one from the other using a thin single-edge razor blade. Now add the cross pieces top and bottom, using the top view to determine cross piece lengths. Check the basic frame against the plan for accuracy as it is being assembled.

Cut sheet balsa formers to the shapes shown and cement them in place at the proper locations and at the proper slopes. The former at the front and the former at the back of the cockpit are not vertical, but lean away from the cockpit opening. The most forward former is made from 1/16 sheet, all the others are made from 1/32 sheet balsa.

The fuselage top and its sides and bottom forward of the wing is covered with 1/32nd sheet balsa. The top covering must be soft "A" grain flexible balsa sheet, while the sides and bottom, which are flat or nearly so, can be stiffer "C" grain. The use of thin strips of masking tape to hold the top covering to the model and help bend the sheet is helpful, and tends to minimize the chances of cracking the sheet where the bends are very tight, like at the very back end. A small triangle of 1/16 sheet should be used to fill in between the bottom longerons at the extreme rear end to support the tail wheel wire. Bend the main landing gear wire to match the shape shown in the front view and install it in the fuselage structure. Do likewise with the tail wheel wire.

The cowl cheeks are carved from soft balsa blocks. Hollow them out at least as much as shown. Make a nose block assembly to match the detail drawing. The cheeks are cemented to the noseblock to make an integral assembly.

Carve a balsa spinner and either fit it to the propeller or use it for a mold and mold a plastic spinner for the model.

The tail surfaces are conventional structures, built directly over the plan, and then covered with 1/64th thick sheet balsa on both sides in the areas shown. After the assemblies are completely dry, they are sanded to a thin airfoil section. The sheet covering is thereby feather edged both at the leading edge and at the spar. Note that the plan shows a scale tail thickness, but the model in the pictures has basic tail structure before sheet covering only 1/16th thick, which is slightly thinner than the plan shows. This deviation from scale was unintentional and is almost imperceptable. (Much more perceptable in the photos, I now note, is the lack of the small triangular dorsal fin in front of the vertical tail . . . forgive me.)

The wing airfoil section on the model is symmetrical. It uses a top and a bottom spar, a leading and trailing edge stick, and thin sheet balsa covering from the leading edge back to the spars both top and bottom. Cut two ribs to each pattern except Number One, which requires three.

Build the wing directly over the plan. Pin the bottom spar to the work board. Support the 1/16 by 1/8 trailing edge 7/32 above the workboard over its entire length, and then cement the ribs in place. Now add the top spar and the leading edge. The wing built in this fashion will have about 3/32 of washout at each tip because of the decrease in rib depth towards the tips (as long as you remember which side of the wing was built as the down-side!) Cut the wing structure at the dihedral break, just outboard of the outer Number One ribs and prop up each tip about 7/8 of an inch. This will require the removal of a very short length of top spar at the joint and an even smaller almost imperceptable length of the leading and trailing edges. Do this cutting carefully by the cut-and-try method. When you obtain the proper dihedral and fit, cement the wings back together at the breaks.

When the dihedral joints are dry, cover the leading edge back to the spars with 1/64 sheet balsa, using three pieces for the top and three for the bottom.

The tips are carved from soft balsa blocks.

The wheel pants are constructed in the standard fashion, using a thick balsa center piece cut out to clear the wheel diameter and two 1/16th thick side pieces laminated into a single piece and then carved to shape.

Before covering the model, sand it all over with fine sandpaper to remove any rough spots or other imperfections that would show through the covering. Then cover the model with your favorite covering material. The model in the photos was covered with blue Japanese tissue and the balsawood fuselage top, cowl cheeks, and wheel pants were left bare for the color contrast. The canopy framing was simulated with masking tape which is a fairly good color match with the balsa decking.

The registration letters were white decals and are imaginary, although the "VH-" is correct for an Australian registered aircraft.

Control surface outlines are black ink, and wheels and the bottom cowl inlet are painted with flat black paint.

A loop of 1/8 rubber is about the right power for the model in the photos. •

Scale. . . . . . *Continued from page 28*

utilize our time. We will continue to work on additional Saturday time, however, there should be no problem running our four rounds. The static judging on Friday will require some hustle and real cooperation from the competitors, but it will work. Therefore, we have compressed the schedule by one day for Precision and *two* days for Sport and Giant. Let me have some feed

back if you wish.

THE BIG NEWS AERO SCALE '82

What are you doing from Sunday, June 13 to Saturday, June 19? How about Aero Scale '82? The International scale community will convene for their every-two-year event in Reno, Nevada and you are invited. A supporter package comes in several types. For $50 you receive a site pass, program, patch, and banquet ticket. For $30 you are provided the site pass, program, and patch. The full supporter package is most attractive. It includes seven nights in the brand new Circus Circus Hotel in Reno (completed late 1981) as well as seven breakfasts, six lunches, six dinners, and the banquet. Of course the site pass, etc. is included in this. The rate of $270 per person is based on double occupancy. Single occupancy is $320 per person.

At the double occupancy rate, this adds up to something like $38.50 a day per person for lodging and three meals, plus the banquet. In this day of super costs, that is a hard price to beat short of a cave in Tasmania. Of course, in addition to the flying events, there are many attractive reasons to visit the area. Aside from the local Reno attractions, such as the Harrah's Museum of cars and aircraft, there is the nearby Tahoe area. Top entertainment, silver towns like Virginia City, the Ponderosa Ranch, are just a few available sights. San Francisco is just hours away by auto through the Donner Pass, one of the most beautiful passes in the world. If you are a camping nut, you'll find many interesting places to camp among the tall pines.

Monty and Patty Groves and the Underwoods are planning several other special events. There is a good chance that a tour of the Lear Jet plant, which is right on Stead Field, will develop. On Saturday of the final day of competition, the Northern California Antique Airplane Association will be flying in antique, experimental, and homebuilts, weather permitting. They will make their aircraft available for photo sessions and will be present for the banquet Saturday evening.

Stead Airport (5,046 ft. alt.) is located 10 miles northwest of Reno (about 15 minutes from the Circus Circus Hotel). This airport is the scene of the yearly Reno Air Races. The hotel is newly-built with large, air conditioned rooms, color televisions, private bath, two double beds or one king-sized bed. There is even a safe in the room (for your casino winnings?). The meals are buffet breakfast and dinner. Lunches each day will be provided at the flying site.

It is shaping up to be one very special event. For our family, personally, the hit of such an event is the ability to meet modelers from all around the world. While there are subtle difference in some modeling and flying techniques, there is a general common bond which makes being around them a thrilling experience. Contact AMA Headquarters for the necessary forms. Do it now . . .there is a deadline, of course.

Let's all gather in Reno for Aero Scale '82.

SCALE BREEDS SCALE

It's interesting to note how the success of one or two members in an area breeds newcomers to the activity. The KCRC club in Kansas City is an excellent example of this axiom. For a good number of years, Charlie Reed and several other stalwart souls have fought the pattern wars. The enthusiasm generated by a few swelled the ranks to a goodly number of very active pattern "contesters". When they hit the St. Louis contests, there usually will be almost a dozen ready to compete. In the R/C arena, where you *rarely* find 10% of any club that is contest oriented, their percentage is high. Charlie and Pat even married off their daughter to a pattern nut who doesn't do *too* badly. John Britt has been known to fly a rather respectable Masters pattern.

In the scale area, KCRC has had an "old" timer in the form of Bud Atkinson. Those of you who have followed scale for many years will remember seeing Bud's name and pictues scattered through the magazines forever. He *really* isn't that old; he's just been doing it for a long time and he's good.

Len McCoy travels to the Tangerine in Florida and Tuscon for the "Winter Nats" and most things in between.

If those two aren't hard enough to beat, KCRC has a member who goes by the name of Tom Cook. I've heard it said that Tom has enjoyed a little bit of success. You know . . . winning little contest like the Nats, Scale Masters, etc. with twin ducted fans when most fellas can't keep a single fan plane going.

I don't want to miss one other name many of you may not recognize. I guarantee, however, when you've flown against him, you'll remember it. Fred Hulen has not hit the contest trail as heavy as the other three. As a competitor I sincerely hope it stays that way. He gets hard to beat!

The point of all this is that the success of these men feeds on itself and it breeds

ADVERTISERS INDEX

CLASSIFIED ADS

Non-commercial (personal items) rate is 25 cents per word, with a minimum of $3.00. Commercial rate is 40 cents per word, with a minimum of $5.00. No advertising agency discounts allowed.
All ads are payable with order, and may be for any consecutive insertion period specified. Name and address free, phone number counts as two words. Send ad and payment to: MODEL BUILDER, Classified Ads, Box 335, 621 West 19th St., Costa Mesa, CA 92627.

FOR SALE: Santa Barbara sail yacht $164. All original, Halcyon servo, C tizenship 10 outfit with instructions. 73" O.L. $500 or best offer. Dave Bianchi, 210 W. Elm St., Kent, OH 44240; (216) 673-3066.

HELICOPTER: Shark 60. Good condition, with engine, extra blades and open doors. Mike Turner, 3200 E. Genesee, Saginaw, MI 48601

HOBIE OWNERS: New Wing Design Available, Improve performance, lower wing loading, SASE. ESS, Box 437, Lemont, PA 16851

EMBLEMS-Direct from manufacturer. Swiss embroidered. Custom made to your design. Send sample or sketch and quantity needed for free qoutation. David Haemmerle & Sons, Inc., Box 711J, West New York, NY 07093.

FLYING ACES — Trail Blazer plans by Henry Struck. Wright Flyer, Curtiss Tripod, Deperdussin, Cierva Autogiro, Taube, Bleriot, Vickers Gunbus. Construction article included. $2.25 per plan. P.P. RET Plan Service, P.O. Box 7893, Midfield, AL 35228-0293.

TOLEDO WEST HOBBY SWAP MEET. Gotta lot of hobby things that aren't needed? Want to buy kits, engines, cars cheap? Come to our Big Swap Meet. Everything sells. Only $2.00. Antique Engines, cars and kits wanted. Saturday, April 10, 9:00 to 12:00 noon. La Palma Recreation Hall, 7821 Walker St., La Palma, CA, (714) 826-0589.

1934 YEAR BOOK REPRINT: Plus reprints of #1 and #2 Model Aviation (1936); 1932-33 Guide & Logbook; 1934, 1935, 1938 and 1942 JASCO Catalogues; #1 Model Aeronautics magazine; Paper Clip Beam Scale and 49 Plans. 192 Pages. Only $5.50 P.P. Model Aero Publications, Box 135, Northridge, CA 91328.

FLYING HAMBURGER BOXES. Models from McDonald's styrofoam. FREEBEE FLYER instructions-plan catalog ... $1.00. "STYRO FLYERS". Book of 8 plans ... $5.00. Platt Monfort, RFD #2, Box 1490, Wiscasset, ME 04578

$2.50 IS A SMALL PRICE to pay to insure top performance from your engine. Glow fuel test kit, a sure-fire method that really works! Include SASE. L. Boling, 22630 Foothill Blvd. #220D, Hayward, CA 94541

WANTED — OLD MODEL ignition engines, cars, etc. Paying top dollar. Bill Simpson, 7413 Via Lorado, Rancho Palos Verdes, CA 90274. (213) 377-3532

WANTED: Old model airplane engines, gas model race cars, related items 1935-55. Arthur Suhr, W218 N5866 Maclynn Court, Menomonee Falls, WI 53051

Twelve full pages of ready-built models plus used equipment bargains in the last issue of "Hobby Swap News." Buy-Sell-Trade, your first ad free (35 words max. B&W photo $2 extra) with subscription: $10/yr. (10 issues), $19/2 yr., $27/3 yr. Add $3/yr. for 1st class postage, (required for Canada & Mexico). MC & Visa accepted. Hobby Swap News, Dept. FLC-32, P.O. Box 834, Santa Maria, CA 93456.

WANTED: A.J. Interceptor, Hornet, and small hand launch Interceptors; originals or replicas, top price. L.J.B., P.O. Box 997, Ocala, FL 32678.

PULSE JET — Japanese scaled down version of post WWII Dyna-Jet engine. Never run, collector's item. Newton B. Griffin, M.D., 201 Rex Medical Office Bldg., Raleigh, NC 27607

ULTRALIGHT CLOUDBUSTER. Peanut has flown 1:56 indoors. Plans: $1.00, SASE for list. David Aronstein, 50 Pasture Lane, Poughkeepsie, NY 12603

Tired of buying dry cells, battery eliminator for glow plugs. Inexpensive, simple, reliable. Plans $3. Mautz, Dept. B, 6107 Hwy 133, Carbondale, CO 81523

great interest by others. As I read the KCRC newsletter, I see more and more members joining the scale scene. The KCRC club deserves a salute for generating the enthusiasm other clubs just dream of. If you are in the Midwest area, watch for their all scale event in May. It is a qualifying event for the Scale Masters.

WATCH THE STATIC

Recently, while installing the huge chunk of plastic that makes up the windshield of the Hiperbipe, I encountered a problem I've not run into before. I have normally used Hot Stuff or gap-filling variety along with a bead of RC-56 by Wilhold. In this case, the rather cold basement and dry atmosphere found with forced air heating resulted in tons of static electricity in the huge 9-1/2 x 9 inch piece of plastic. As I placed a bead of *gap filling* variety glue along the edge, strings or threads of the glue pulled away from the main body and deposited themselves across the surface. At first I wasn't aware of this activity because I was concentrating on the joint. What a mess it was! I had to replace the entire sheet. In running a little test on the ruined piece, I found the threads would jump or fly several inches. So-o-o-o you fellas in the northern clime, watch your static. I suspect the Florida and Louisiana contingent have no problems with this. One to One, Bob. •

R/C World. . . . *Continued from page 13*

sively well, but are not full competition type designs. Covering is the same plastic film of the Mini-series. Final step up is a line of four actual microfilm models. They even put the solution and instructions for making microfilm right in the kit.

Sport R/C is my current bag, so I was pleased to see a few new models appear at this show. Two of them were in the Sterling booth, being shown off by Betty Boyle and Joyce Mallerman. Their new Stand-off scale model is of the "Real Sporty" Formula One race plane. Scale is 2-1/8 inch to the foot, and the model is designed to fly with .15 to .25 size engines. The wing is fully sheeted, so it can take those high-g maneuvers. The model meets all specs for 1/4-Midget racing. All that lovely contouring of the cowls and wheel pants is preformed plastic. That's the way to reduce effort and weight at the same time.

Joyce and Betty also showed off the new Piper Vagabond. Trust me, it isn't that it is so heavy they both had to hold it; it is so cute, neither wanted to let go. The model is admittedly a scale up of one of their "Kid-series" models, and is all balsa construction except for the molded cowl. You can fly the model as a free flight with rubber power or gas engines, or fly it by U/C or R/C control. I was amazed at just how light the model comes out with that type of construction. It definitely falls into the Schoolyard scale category.

Final aircraft to be presented here is the new Cowboy 15 from Craft-Air. Features include a very generous wing area and ample tail moment and area to result in a very docile trainer. Tom Williams seems to really understand the needs of the beginning flier, and manufactures kits designed to minimize the speed and difficulty of flying (who else would design a 6-foot span 1/2A model and kit it?). The Cowboy .15 takes any .09 to .19 engine and carries it around with 450 in^2 of wing area. All-up weight is specified at 2-1/2 pounds. You can fly with 3 or 4 channels.

At this point, let's move over to the engine category. Testors and Cox still make engines, but I did not see them displayed. What I did see displayed was pretty interesting, though. Enya caught my eye first with five new beauties. In order of decreasing size, they showed a .40 four-cycle, a .35 four-cyle, a .25 Schneurle, a .19 Schneurle, and an .11 size engine set up for car racing. Hope they also release the .11 in aircraft form!

HB engines also had an interesting bit of hardware on display, a new ball-bearing, Schneurle ported, ABC piston/sleeve engine in the .21 size. They said that it will be priced competitively with the K&B 3.5cc. The engine has squared off fins which give a tremendous cooling capability. The engine is not especially heavy, though. They state in their introductory letter that this is the first of their entries into the racing engine field. The engine is rated at 1.05 HP at 24,000 rpm. WOW! Weight is specified at 10 oz. The exhaust may be rotated to exit to the right, left, or rear of the engine, depending on your needs.

Since there was a tremendous craft contingent at the HIA show, I was careful to tour all the areas with an eye toward new tools and materials. Sure enough, I found a couple well worth your consideration. The first is the Olfa "rotary cutter". This is a knife styled after a pizza cutter, but featuring a high quality tungsten steel blade. I got to try exactly the test you see in the photo: cutting through several layers of cloth simultaneously. I was amazed at how little force is required, it seems magical it is so easy! I see this as the ultimate solution to cutting silk without snagging it, and the knife ought to be superb for cutting plastic film coverings too. The product is reputed to do a good job on balsa wood, but I haven't had the opportunity to verify that, or find where it would be especially useful. I bet you could make a superb rubber stripper based on this knife or the blades.

I stopped by the Intermatic booth to take a look at its spray equipment. There is a new line specifically aimed at the hobbiest. The most remarkable item I saw was its Model HS830 airbrush. It features many plastic parts, so the cost is held down, but also, it pops apart for cleaning. No more desperate search for the wrench as the epoxy paint slowly sets, turning your expensive airbrush into a gaily colored lump of useless metal. This unit can handle pressures up to 45 pounds in either a bleeder or non-

MB BRINGS YOU

A FULL DECK

OF OUR MOST POPULAR

CLASSIC OLD TIMER PLANS

SEE PAGE 100 FOR ORDERING INSTRUCTIONS.
COMPLETE R/CMB PLANS LIST SENT WITH EACH ORDER.

No. 1180-O.T. FOKKER D-VIII $4.50
Very stable F/F flying scale ship for .23 ignition engines, 57" span. By Earl Stahl.

No. 980-O.T. DOLPHIN $10.00
Beautiful planked-fuselage 9' streamliner from 1939 M.A.N. By Thracy Petrides.

No. 880-O.T. HAYSEED $4.00
Hot A/B pylon (no-window cabin) never before published, 4-ft. span. Carl Hermes.

No. 780-O.T. STRATOSPHERE $3.50
Streamline cabin rubber ship from May 1941 M.A.N., 36" span. By Henry Cole.

No. 380-O.T. FLAMINGO $6.00
Rare old-timer appeared in 1938 JASCO catalog, 89" span. By Roger Hammer.

No. 280-O.T. RED RIPPER $5.00
Sort of a 'squared off' Zipper, from 7/40 Flying Aces. 72" span. By Jerry Peeples.

No. 180-O.T. SUPER CLODHOPPER $3.00
Highly refined version of 1937 Moffet winner, from 1941 A.T. By Jim Cahill.

No. 1279-O.T. MISS TINY $4.00
Well known and sharp little 1938 gassie for .19-.23 ignition, 46". Barney Snyder.

1179-O.T. MISS PHILADELPHIA $8.00
Maxwell Bassett's famed 8-ft. parasol gas model, kitted by Scientific. By MB staff.

No. 979-O.T. LANZO '37 STICK $8.50
First R/C Nats winner, 4th in Famous R/C series. Spans 9 ft. By Chet Lanzo.

No. 879-O.T.-2 CHALLENGER $4.00
Easily-built Class B gassie with 50" span from May '41 Air Trails. H.A. Thomas.

No. 579-O.T. TAYLORCRAFT $12.00
Quarter-scale in 1941! Famous 9-foot design kitted by Miniature Aircraft Corp.

No. 379-O.T. PRIVATEER $6.00
Very clean cabin design from Sept. '38 M.A.N., 87" span. By Thracy Petrides.

No. 878-O.T. .020 RECORD HOUND $2.50
Classic Henry Struck design. Could dominate .020 Replica class. Dave Sweeney.

No. 778-O.T. CURTISS ROBIN $6.00
A 1937 Sport Scale ship! From Comet kit, 72" span. Designed by Joe Konefes.

No. 678-O.T. MISS DELAWARE $5.00
Steve Kowalik's 1937 Junior Motors Consistency winner. Easy to build, 7' span.

No. 1277-O.T. HURRICANE $2.50
Earl Stahl's 33" span 1940 rubber powered low winger. Northrop & Patterson.

No. 977-O.T. "GUFF" $4.00
Walt Good's 1938 Class 'C' gas winner, from '40 AT. Span 72". Al Patterson.

No. 877-O.T. PB-2 $7.00
Payload gas model winner from Aug. '38 M.A.N. Spans 8 feet. By Thracy Petrides.

No. 777-O.T. NEW YORKER IV $3.00
Frank Zaic's 1938 Stout Trophy winner, also for Wakefield. Patterson & Northrop.

No. 577-O.T. GLADIATOR $5.00
Class C free flight from March 1941 Air Trails, 68" span. M. Schoenbrun design.

No. 477-O.T. CLOUD CHASER $1.50
This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.

No. 377-O.T. GAS CHAMP $5.00
The famous 1940 "Eastern States Champ" by Russell Simmons, span 76". Al Patterson.

No. 1276-O.T. RAMBLER $4.00
Good 72" span contest gas model from 1939 Flying Aces. By Gilbert Shurman.

No. 1076-OT CALIFORNIA CHAMP $3.00
1940 Wakefield with retract wheel, twin rudders, anhedral stab. Tom Engleman.

No. 976-OT WINGED VICTORY $5.00
Classic and realistic gas model from 1937 MAN. Radial cowl, 5' span. Joe Weathers.

No. 876-O.T. RECORD HOUND $5.00
Shoulder-wing mono-wheeler with anhedral stab. Span 72". Hank Struck design.

No. 576-O.T. SCRAM $5.00
Clean Class C cabin job from July 1938 Flying Aces. Span 83". Heit/Patterson.

No. 476-O.T. CABRULER $4.00
Never-before-published Class A cabin model New Ruler, by designer Hank Struck.

No. 276-O.T. "LONG CABIN" $5.00
Good looking, stable cabin gas model of the 1937 era. Span 78". Phil Bernhardt.

No. 176-O.T. KORDA WAKEFIELD $2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt.

No. 1175-O.T. FOO 2-U-2 $3.00
A pre-Zipper design by Dick Obarski, reduced to .020 Replica, by Ron Sharpton.

No. 875-O.T. '38 MOFFETT CHAMP $3.00
Canadian Roy Nelder's beautiful rubber ship. A real classic. By Phil Bernhardt.

No. 775-O.T. BOMBSHELL $4.00
Famous winner of Class C gas at the '40 Nats, by Joe Konefes. Phil Bernhardt.

No. 575-O.T. MERCURY $5.00
Designed by Ben Shereshaw, kitted by Scientific. 72" span. By Phil Bernhardt.

No. 475-O.T. G.H.Q. SPORTSTER $5.00
From July 1936 M.A.N., also kitted by G.H.Q. By Louis Loutrel. Phil Bernhardt.

No. 175-O.T. FLYING QUAKER $5.00
First gas model kit by Megow, 1937. Span 7 ft. Redrawn by Phil Bernhardt.

No. 1274-O.T. THERM'L THUMBER $4.00
Hot Class A or B pylon type gas model. Span 48". Redrawn by Phil Bernhardt.

No. 1174-O.T. LANZO STICK $3.50
Rubber stick winner, '40 Nats. Span 4½'. Still good in Unlim. By Phil Bernhardt.

No. 91074-O.T. BUHL PUP $6.00
Semi-scale 8 ft. span model published in 1936 MAN. Redrawn by Phil Bernhardt.

No. 874-O.T. POWERHOUSE $5.00
Taibi's famous design for Forster 99 ign. Great for R/C O.T. By Phil Bernhardt.

No. 674-O.T. RED ZEPHYR $5.00
One of the most famous of early kit gas models. Redrawn by Phil Bernhardt.

No. 574-O.T. The T-D COUPE $5.00
Classic high wing 1936 'C' cabin gas job. Span 64". Redrawn by Phil Bernhardt.

No. 474-O.T. PACEMAKER $5.00
J. L. Sadler's famous Class C low wing gas model. Redrawn by Phil Bernhardt.

No. 274-OT PACER "C" $4.00
Sal Taibi's famous 1941 Nats gas winner. 60" span. Redrawn by Phil Bernhardt.

No. 174-OT EHLING '37 GAS JOB $5.00
Frank Ehling's 8 ft. span 1937 gas model. Still winning! Drawn by Phil Bernhardt.

No. 1273-OT INTERCEPTER $2.00
An .020 Replica of popular Goldberg design, kitted by Comet. By Wayne Cain.

No. 1073-OT GOLDBERG ZIPPER $4.00
Most famous of all OT gas models, ended cabin era. Redrawn by Phil Bernhardt.

No. 973-OT SPOOK 48 $4.00
Well-known gull wing design qualifies for Antique Old Timers. By Snyder & Muir.

No. 773-OT LANZO 8' GAS MODEL $6.00
Chet Lanzo's famous "Record Breaker." Two large plan sheets. By Phil Bernhardt.

No. 673-OT ALBATROSS $4.50
Class C gas ship designed by George Reich. Redrawn by Phil Berhardt.

No 573-OT 1 AERBO 020 $3.00
Replica of 1941 Class A Nats winner. Span 30". Redesigned by Phil Bernhardt.

bleeder configuration. I wish I had one; clean up is my biggest bugaboo in spraying.

Speaking of spraying, we reach the end of the trail with Pactra's booth and its new colors of Formula-U to match the eight most popular colors of Monokote. I would say that that is pretty generous of them, since Monokote is in competition with their own Solarfilm. Be that as it may, it will prove a real blessing for us modelers who just simply want our fuselages to match the wings. By the way, I just flew my first airplane painted with Formula-U, and there was no running or degradation of the paint even though I was using 30% nitro fuel. Good stuff, but be sure to give it LOTS of drying time after painting to reach full chemical resistance.

Well that is the most significant of the product selection at the show. I could bore you at length with recounts of the many pleasurable conversations with old friends, where I had dinner, lunch, etc., but I'll just sign off with the recommendation that if you are in Dallas, be sure to find yourself some joint that specializes in REAL chili. In "Big D" they know how the stuff should really be made!

1982 NORTHWEST MODEL EXPOSITION

Text: Jerry Dunlap. Photos: Jerry Julian

Modeling activities of all forms were showcased at the first Northwest Model Exposition conducted at the Western Washington Fairgrounds in Puyallup, Washington, on February 6 and 7. This initial gathering of modelers, manufacturers, and spectators was claimed a success by those participants, as 9,000 people viewed the event. Under the able leadership of Bob Pfieffer, secretary of the Mount Rainier R/C Society, and with fantastic support of that group and other model airplane, car, and boat clubs, the event pulled Northwest modelers together for the largest event of this type ever conducted in the region.

The Modern Living Complex of the Western Washington Fair offered 49,000 square feet of club displays, manufacturers' exhibits, models of all shape, size, and variety, a swap meet, and an indoor electric racecar track. The rodeo infield immediately adjacent to the show served as a mini heliport for model helicopter demonstratins, a flying site for control line airplanes, a dirt track for model off-road vehicles, and even a runway for small, lightweight, single person flying machines.

The model club information area offered local modelers an opportunity to promote their hobby interest to many of the spectators who had questions about how to get started. In this one area, it was possible to learn how to cover a model airplane wing, trim a free-flight model, build a model boat, or find someone who would help on that first R/C flight. As one who firmly believes in the club approach to a hobby, I felt this facet of the show was of great benefit. I can only speak for the followups made about model boating and they have been very rewarding to our local club.

Plans are already well underway for the 1983 Northwest Model Exposition. The first weekend in February will once again be the date, and the location will remain the same. It is hoped that the success of this first event will encourage greater manufacturer participation for next year, for there is no doubt that 1983 will see even larger crowds of people and additional models on display.

R/C WORLD

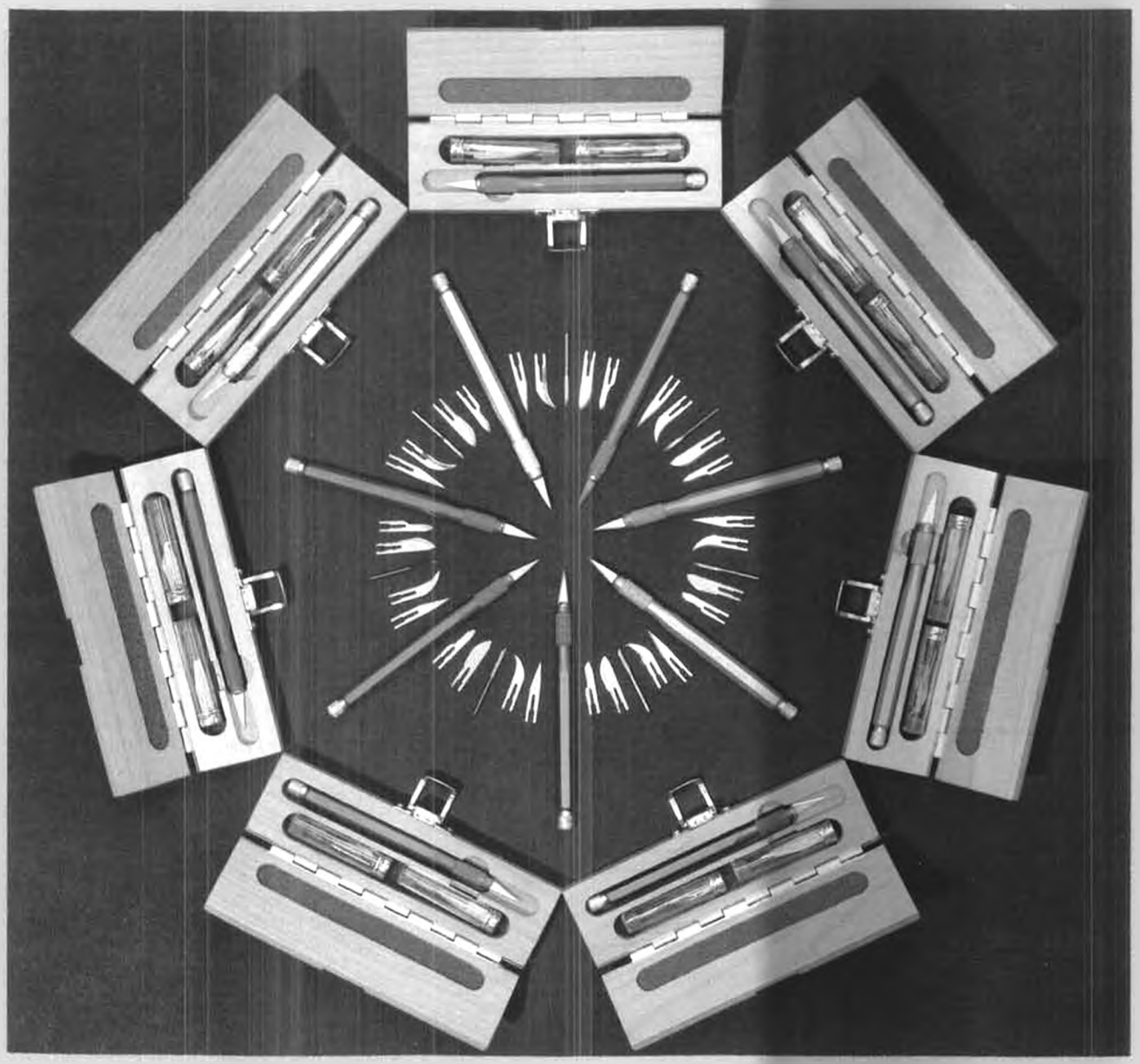
by John Elliot

Well, good grief, Charlie Brown! When I reached down into the 'quiz bag' for the wild maneuver mentioned in the March issue, little did I know what a toughie it would be. (By the way, response to the Lomcevak quiz was outstanding to say the least.) As of the middle of February, only *two* replies, both naming Jan Zurakowski and the 'Zurabatick Cartwheel', have been received. Guess we need to pick and choose a bit more carefully. Norbert Gurell's reply arrived first, even had the exact date, 9 August 1951, when Jan first performed the maneuver in public. George Gillberg was a close second. Both Norbert and George are from California, by the way... Maybe Tom Cook, of Me 262 and F-4 Phantom fame, will build a Meteor and 'give it a go.'

In the March issue, we touched on one club's activity regarding public service, namely the BIRDS and participation in the Easter Seals program. We would also like the mention the efforts of the Skynauts of Saddleback Valley, here in the Southern California area. The USMC has a 'Toys for Tots' program for needy children at Christmas time, and what could be more natural than a full-blown Air Show, R/C models, that is!

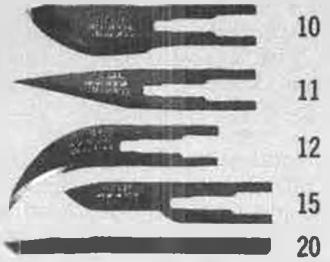
Several years ago, Skynauts club member and active reservist Dave Herbert and other members, initiated efforts for an R/C Air show at the Marine Corps Helicopter Base in Santa Ana (the old LTA station). This being its third 'Toys for Tots' show, the club put heart and soul into the effort, enlisting (drafting would be a better word!) top flyers, such as Joe Bridi, Ken and Dave Wilson, Garland Hamilton, Dave Shadel and Gary Hover, Dan Parsons, Mel Santmyers, John Simone, along with club members, Reese Meyer, C.J. Jordan, Dave Herbert, Bill Hill, Randy Bloom, Jim Whitacre, Bill Evans and Scott Reed to do the flying honors. Sam "Silver Tongue" Wright did yeoman honors on the mike, with instant information on each and every maneuver, plane, and pilot. Needless to say, many club members put in a lot of work to bring it all

IN THE BEST CIRCLES, IT'S **über skiver**



A PRECISION INSTRUMENT FOR THE DISCRIMINATING MODELER

- *Safe, Rear Draw-Bar Clutch*
- *Precision, Instrument-Quality Materials*
- *Strong-Holding Advanced Collet Design*
- *Non-Rolling Hex Cross-Section*
- *Deeply Knurled, Non-Slip Grip*
- *Long-Life, Stainless, Surgical Steel Blades*



Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, violet. Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $14.95
Individual handles (specify color) $5.95
Vial of 6 blades (No. 10, 11, or 15) $2.10
(No. 12 or 20) $3.30

See your dealer, or order direct.
Dealer inquiries are invited.
All direct orders sent postpaid in U.S.
California residents add 6% sales tax.

MODEL BUILDER PRODUCTS
621 West Nineteenth St., Costa Mesa, California 92627

Riverside Radio Control Club PROUDLY PRESENTS THE

FIFTH ANNUAL

RC SCALE OLYMPICS

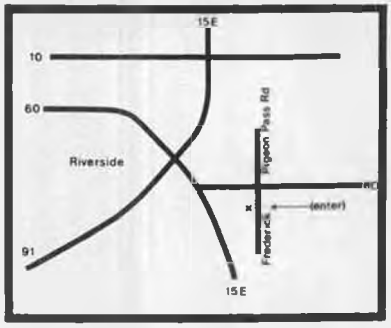
Riverside California

USPJA JUDGES

A.M.A. SANCTIONED

EVENTS:
- SPORT AND GIANT SCALE COMBINED
- SPORTSMAN AND EXPERT CLASSES
- TEAM SCALE
- BEST OF ERA

LOCATION Riverside International Raceway



May 15 & 16, 1982

- REFRESHMENT STAND
- MOTELS AND R/V PARK NEARBY
- REGISTRATION: 8:00 A.M. SHARP

for more information, please call.....
DON LIEN, C/D (714) 689-0334
MIKE MILLER, C/MGR(714) 686-1873

YOUR PRE-ENTRY WOULD BE APPRECIATED

NAME _____ AMA _____
ADDRESS _____ FCC _____

make checks payable to:
RIVERSIDE R/C CLUB
4055 MT VERNON AVE
RIVERSIDE, CA 92507

ENTERING:
SPORT/GIANT SCALE ( ) .... FREQ. _____
TEAM SCALE ( ) .... FREQ. _____

ENTRY FEE: $ 18.00 FOR ONE EVENT, $ 8.00 FOR ADDITIONAL EVENT

together. What with a lot of good PR in the local media, over $42,000 worth of toys for underprivileged children were realized.

Athletic types entered several short and long distance runs held early in the morning as part of the pre-show. The price of admission/entry for spectators, runners, and flyers was one new toy of about three to four dollar value. Monies realized from concession stands also went toward purchase of toys. What with the runs, a two-hour air show in the morning, entertainment by the Mission Viejo High School marching band, Santa Claus arriving in the Goodyear Airship "Columbia," and another two-hour airshow in the afternoon, plus static displays of many R/C models, the Skynauts are the proud recipients of a genuine, "Well Done."

As an aside, in the Southern California area this coming December, Chapter Three and Seven of QSAA, the Orange Coast R/C club, the San Gabriel Valley R/C club, and again the Skynauts, will each host a 'Toys for Tots' fun-fly or airshow. A worthy cause, well served, and, good public relations.

★ ★ ★

It's interesting to note how quickly R/C off-road racing has come of age. Tracks and organizations are being built and formed around the country, in Canada, and in Europe, too. The forthcoming SCORE Show to be held on April 16-18, 1982 at the Anaheim Convention Center, an event that draws around 30,000 plus people to see the full-size cars and accessories, will have a special 'dirt' track built for the three days of the show for 1/10 scale R/C off-road racing cars. The R/C 'Dune Buggy' (what hath Mr. Leroy Cox wrought?) has come a long way baby, but fast. . .

★ ★ ★

Every now and then, 'Murphy' and his 'Laws' surface. Picked up from Fred Hulen in the KC/RC "Contacts" newsletter are a few 'Murph's' worth repeating. So, here's Murphy. . .

"All problems begin at the end of the warranty period."

"If it jams, force it . . . if it breaks, it needed replacing anyway!"

"A five hundred dollar airplane will always hit the ground five times harder than a hundred dollar airplane!"

You got it. •

Workbench. . . . . *Continued from page 6*

or contact Frank for additional information." *Chuck Aro, Director NAG Publicity*

For those who go for it, the membership form also indicates that a four-inch official NAG patch is available (to members only) for $2.25 each.

THINGS TO DO

The AMA Nationals for 1982 are now solidified for a repeat in Lincoln, Nebraska. All events will take place in Lincoln. The dates are August 1 through 8.

★ ★ ★

The very sensational "Flying Aces Nationals — Mark III" will be held at Johnsville Naval Air Station, Johnsville, PA on July 17 and 18, 1982. A formal display ad will appear in Model Builder soon, but we thought you might like to know now, so you can start (finish?) building for it.

★ ★ ★

No time to start building when you read this, but you may want to grab your camera and head for Falls of Rough, Kentucky, for the Tenth Annual Mint Julep Scale Meet, April 24 and 25, 1982.

Events include Sport Scale Division 1 and Division 2, Giant Scale, FAI F4C Scale, and FAI Stand-Off Scale (Expert Class only). Division 1 is for aircraft with retract gear plus more than one mechanical option, or designed for racing. Division 2 is for fixed gear aircraft having no more than one mechanical option, or . . . you guessed it . . . not designed for racing.

Contact John Guenther C.D., (812) 967-2814, or Co C.D. Dale Arvin, (812) 283-5719 for more information.

★ ★ ★

The Vaca Valley RC, Vaca Skylarks, and Don's Hobbies are sponsoring a hobby show at the Geri-Town Mall, 385 Travis Blvd., Fairfield, CA, on May 15, from 10 a.m. to 5 p.m. Contact Lowell Gamble, 292 Suisun Valley Rd., Suisun City, CA 94585.

A PARTING SHOT!

BANG! •

WORLD CHAMPION AGAIN!

HANNO "HOT STUFF" PRETTNER

"It always pays to use the best. That's why all my models are built with "HOT STUFF"™ and SUPER 'T'™ instant glues. I wouldn't trust anything less."

Hanno Prettner

"HOT STUFF" & SUPER 'T'

THE MAGIC GLUES

"HOT STUFF"™
ORIGINAL **PENETRATING** FORMULA
¼ Oz. ½ Oz.
2 Oz. ECONOMY SIZE
AVAILABLE IN CANADA

NEW

ANY WAY **YOU** LIKE!

DISPENSE **THREE** WAYS!
DO NOT REMOVE SAFETY-LOCK INSERT

SUPER 'T'
GAP-FILLING POSITIONABLE FORMULA
¼ Oz. ½ Oz.
2 Oz. ECONOMY SIZE
AVAILABLE IN CANADA

LOOK FOR THE "HOT STUFF"™ DISPLAY AND PICK UP YOUR FREE TIP BOOKLET AT YOUR FAVORITE DEALER

Satellite City P.O. BOX 836, SIMI, CA 93062 • (805) 522-0062

Enya's .40 4-Cycle
AFTER 5 YEARS OF RUNNING THERE WAS BARELY A TRACE OF WEAR.

We gave it 5 years of wear in 11 grueling days . . . No backfires, breakdowns or loss of power . . . no problems at all! Once again, Enya proves that in performance and reliability, they're second to none.

The test . . . We took a brand new .40 4-cycle right off the shelf for this endurance experiment; a totally stock engine with no modifications at all. First we miked all internal parts. After bolting it down, we cranked it up – for 124 tortuous hours! We kept it running at 7,000 r.p.m.'s, and regularly went from idle to 10,000 r.p.m.'s to constantly make sure it was tested at all power ranges. In short, we gave it every opportunity to break, but it didn't!

The results . . . After 124 hours, it was still running strong – no sputtering, backfiring or missing. And all the time we ran, not once did we have to make any adjustments on the valves. So we decided to break it down and take a look inside. As expected, the engine maintained its off-the-shelf appearance with no evidence of oil or compression leaks, wear rings or grooves. The engineers were amazed at the lack of heat or burn marks. There was hardly a touch of wear. But it was only when we tested the major parts and assemblies for wear that we could measure the true success of our experiment. Miking to ten-thousandths of an inch, this chart reveals how well our engine stood up to this grueling test:

	Before	After	
Bore	.8770	.8770	no change
Stroke	.6725	.6725	no change
Piston Dia.	.8750	.8750	no change
Wrist Pin	1965	1960	
Rod Bushing Dia. At Wrist Pin	1975	.1975	no change
Rod Bushing Dia. At Crank Pin	.2172	.2178	
Valve Lifters	.197	.197	no change

This strength is the direct result of experience in selecting materials with the ideal finish, tensile strength and exact temperature coefficients . . . and then honing them to precise tolerance levels. And it's the same precision that we put into each and every Enya product. So if you buy any Enya engine, from our .09 to our monster .60XL, you'll get the same reliable performance time-after-time, year-after-year. Enya . . . buy it with confidence and wear it well.

ENYA MODEL PRODUCTS CO.

P.O. Box 286 Fords, New Jersey 08863 201-572-5792