MODEL BUILDER

APRIL 1984

$2.50

volume 14, number 147

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INTRODUCING ALL THAT'S NEW AT ROBBE IN 1984.

Come to Toledo and see Robbe's exciting new '84 models. The ultimate in high-style, high-performance R/C boats, aircraft and land vehicles that give you so much more: more detail, more durability, more engineering excellence.

You'll even meet "Charly," Robbe's remarkable new radio controlled parachutist who will jump right into your heart.

SEE US AT THE SHOW

We'll be at the Toledo R/C model trade show April 6, 7, 8.

If you can't make the show, be sure to stop by your favorite R/C hobby shop and pick up our latest full color flyer. It's a winner.

ATLANTIS

A picture perfect two-masted gaff schooner you can sail under most wind conditions. Its hydrodynamically designed, seamless Plura® hull and five large sails give Atlantis remarkable stability. Its masts, jibs and booms are aluminum. Pre-sewn sails, optional cast-iron ballast keel and proper fittings shorten building time.

Length: 55 in. Height: 68 in. Beam: 13¾ in. Draught: 9½ in. Atlantis No. 1130. Ballast keel No. 1131. Fittings set No. 1134. Other options: Genoa sail set No. 1132. Exotic wood planking No. 1133.

LEOPARD

The most sophisticated off-road, 4-wheel drive vehicle available. It has three differentials, Kardan drive and independent suspension. These features, plus four oil-filled shocks, disc brake, roll cage, crown wheels and 18 ball bearings in the transmission and axles, bring you a new standard of excellence in model car engineering. Adjustable ground clearance, spring tension, castor angle and toe-in.

Length: 19½ in. Leopard No. 3720.

PRESTO 4 X 4

A highly competitive off-road vehicle that comes completely assembled (except for engine and radio). Presto's lower Ergal chassis, with the Ergal power pod, combined with top chassis, gives Presto extra protection. Presto has two oil-filled shocks and torsion springs that let you adjust the wheel suspension for any road conditions. It also has an integrated disc brake system and a robust chain transmission.

Length: 18 in. Presto No. 3769.

ON MODELS.

REMBERTITURM

An incredibly detailed oil drilling platform supply vessel. With optional fittings you can make bow thruster, radar antenna, lights, winches and anchors workable. It's a modeler's delight.

Length: 47½ in. Weight: 26½ lbs. Rembertiturm No. 1077. Fittings set No. 1078. Winch set for crane, anchor and towing No. 1079.

FIRE ENGINE

This high speed airport fire engine features a variety of real-looking movable parts: the fire monitor, for example, can be raised, lowered and swiveled to squirt water in any direction. Optional headlamps, rear lamps, flashing lights, turn signals, brake lights, horn, siren and diesel sound all operate and add an exciting dimension to your R/C model hobby.

Length: 28 in. Weight: 9 lbs. Fire Engine No. 3625. Special functions set No. 3626.

SCHÜTZE

A sleek, swift, handsome-looking minesweeper that will catch everyone's eye, but leave other boats far behind. The optional fitting set contains more than 240 parts.

Length: 47½ in. Weight: 12 lbs. Schutze No. 1091. Fittings set No. 1092.

PIPER SUPER CUB

Inherent stability makes the Piper easy to fly. Its specially designed air foil and flaps give it short take-off, landing and low-speed capabilities. These features also permit sailplane and banner towing, as well as the launching of Robbe's skydiver, "Charly."

Wing span: 83 in. Length: 49 in. Weight: 10 lbs. Piper Super Cub No. 3106.

CHARLY

A fully steerable skydiver you can launch by remote control from Robbe's Piper Super Cub. Let Charly "free-fall," then open his "chute" and direct him right to the spot you wish. Kit contains painted Charly, pre-sewn parachute with cords and fittings.

Size of parachute: 39 in. x 27 in. Charly's weight: 1¾ lbs. Charly No. 3000.

See all our high-fashion models at the Toledo R/C model trade show April 6, 7, 8.

robbe

A New Dimension In Modeling

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APRIL

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621 West Nineteenth St., Box 10335, Costa Mesa, CA 92627-0132 Phone: (714) 645-8830

TABLE OF CONTENTS

CONSTRUCTION

COVER: Bob Benjamin, *Model Builder* cover artist, reminisces about his first time at the controls of a full-size airplane at age 16 with this painting of a standard, 65 horsepower, Aeronca 7AC *Champ*. The 85 horsepower version, known as the 7DC, had an extended dorsal. The "N" numbers for this aircraft are correct, but it is not known who currently owns it.

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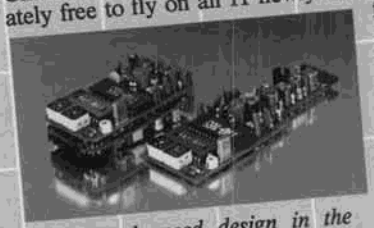

Highly advanced design in the receiver and transmitter module electronics make the Channel-Master sytem possible.

Rotary switches and advanced digital electronics allow quick, convenient and safe channel changing. In the past to change frequencies you had to have matching pairs of expensive transmitter frequency modules and receivers. With some radio control systems it is possible for you to "swap" frequency crystals but you do not maintain optimum output or matching between the transmitter and receiver without re-tuning. Crystal swapping is less expensive than module changing but with the advent of closely spaced R/C channels, crystal swapping may create extremely dangerous interference conditions and it is definitely illegal. The Kraft Channel-Master Transmitter Module features a completely self-contained R.F. section that is always perfectly tuned regardless of the selected channel. Use of two special rotary switches and advanced electronic digital circuitry allow you to operate on any new channel now authorized or planned for R/C aircraft. You simply set the proper numbers on the transmitter switches to correspond to the channel number you wish to operate on. Do the same with the receiver's rotary switches and you're on a new frequency!

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SIG KITS AROUND THE WORLD

Luigi Crugnola (Milan, Italy) bought a Sig 1/4-Scale Clipped Wing kit while he was visiting in this country, attending the Scale World Championships. The resulting model, built by Carlo Mapelli, of Milan, won 4th place at the 1983 Italian Championships. It is a fine performer using a standard O.S. .60 FSR engine swinging a 15x5 prop, has working shocks.

At the suggestion of Sig dealer Henry Barklay of Eugene (WA) Toy and Hobby, Mike Ferris modified his Kadet MKII fuselage to take a Kavalier wing. As you can see, it made an attractive combination which flew beautifully without requiring any trim changes.

Bill Orris (London, Ontario, Canada) of the Forest City Fliers flew his 5-1/2 lb., H.P. .40 Smith Miniplane in the 1983 Canadian Nationals scale competition. Photo by Cliff Tacie.

SIG

Charles O'Brien (Oak Harbor, WA) scratch built floats for his 8-1/4 lb., K & B 6.5 powered Citabria.

Deb and Scott Justice (Bensenville, IL) both fly Kougars. Picture shows Deb's Como .50 powered version done up in pink Monokote. She flew it in the Illinois State Fun Fly Championships last summer, now has over 1,000 flights logged on the model.

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Leif Litsberger (Trelleborg, Sweden) and his son Stefan built this O.S. .45 FSR powered Sig Komander, liked the kit in every respect. "We had never planked a foam wing before, but no problem there, thanks to the instruction book of yours."

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Rt. 62 Oak Ridge Hwy. Solway
PH: 615 482-2900
NASHVILLE
The Toy Mart
113 Graylynn Drive
PH: 615-883-1648
TEXAS
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Kennington Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Airline
DENTON
Yellowbird Hobbies
117 W. Hickory
EL PASO
Hal's Hobby Shop
No. 57 Sunrise Center
PH: 915-755-1914
FORT WORTH
Mott's Hobby Shop
7241 Grapevine Highway
PH: 817 281-0921
HARTLEY
Mark's Hobby Hut
804 White Street
PH: 806-365-4408
HOUSTON
Clear Lake Models
117 Camino S. Shopping Ctr.
PH: 713-488-6315
HURST
Roy's Hobby Shop
1309 Norwood
SAN ANTONIO
Clayton Hobbies
5707 E. Mabud
UTAH
OREM
Miniature Aircraft Prod
811 W. 400 N
SALT LAKE CITY
Douglas Models
P.O. Box 9276
2065 E. 33rd South
VERMONT
SWANTON
The Hobby Shop
RFD 1 Rt. 7
PH: 802 524-2715
VIRGINIA
ANNANDALE
Model Masters, Inc.
6920 Braddock Rd.
RICHMOND
The Hobby Center
1709 Willow Lawn Dr.
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N.E. 21st St.
PH: 747-9914
BELLINGHAM
Hobby Hive
111 E. Magnolia
CASTLE ROCK
Aero Motive Products
607 Spirit Lake Highway
KENT
Kent Hobby
1313 W. Meeker
Suite 110, Meeker Mall
PUYALLUP
Firgrove Model Supply
10611 - 136th St. East
PH: 845-7675
SEATTLE
Webster Supply Co
17818 Aurora Ave. N.
TACOMA
Bill's Hobby Town
13923 Pacific Ave
PH: 206-531-8111
WALLA WALLA
Harley's R/C
Route 1, Box 277A
PH: 509 529-2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W. Washington St
WISCONSIN
LA CROSSE
Hobby Hub
4336 Mormon Coulee Road
Shelby Mall
MARSHFIELD
Mad Wisconsin Hobby Center
Northway Mall
503 E. Ives St
MENOMONIE
True Value Hardware
1512 9th Street
L Mart Shopping Ctr
MILWAUKEE
All In 1 Hobby
South Gate Mall
333 So. 27th Street
PH: 414-645-4555
MILWAUKEE
Casanova's Hobby
1423 S. Muskego Ave
PH: 414-672-2700
WAUSAU
Pope's Hobby Land
640 South 3rd Ave
CANADA
BAWLF, ALBERTA
B & P Transport Ltd.
Box 6
PH: 373-3953
CALGARY, ALBERTA
Hobby World Canada
Box 958 Stn M
CALGARY, ALBERTA
P.M.S. Hobby Craft
Calgary North Hill Centre
WINNIPEG, MANITOBA
Cellar Dweller Hobby, Ltd
1354 Main St
PH: 589-2037
WINNIPEG, MANITOBA
Gooch's Hobbies
646 Portage Ave.
ST. JOHN'S, NFLD.
Capitol Hobby Centre, Ltd
6 Freshwater Road
DUNDAS, ONTARIO
Skycraft Hobbies Inc
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave. E.
PH: 416-755-1766
WILLOWDALE, ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH: 222-4721
ANCIENNE-LORETTE, QUEBEC
Passe-Temps Phoenix
1459 Notre Dame
PH: 418-872-4113
ARVIDA, QUEBEC
LeModele Reduit Enr
118 Mathias CP 341
PH: 418 548-2136
HAUTERIVE, QUEBEC
Le Centre Du Modeliste
Allard 1223 Lestral
MONTREAL, QUEBEC
Can Air Hobbies
5850 Gouin Blvd. Quest
PH: 514-332-3565
SASKATOON, SASKATCH.
Collins' Aero-Craft
238 First Ave. North
PH: 652-4775
YORKTON, SASKATCH.
Radio Control Hobbies
39 Betts Ave
AUSTRALIA
SYDNEY N.S.W.
Pyrmont 2009
Burmes
137 Pyrmont Street
PH: (02) 692-0694
ENGLAND
NORFOLK, NR17 1DQ
Pegasus Models, Ltd
Caston, Attleborough
NEW ZEALAND
INVERCARGILL
Model Shop
55 Arcade Dee St
PH: 89439
VENEZUELA
CARACAS 1070-A
Hobby World, C.A. (Dist.)
Apartado Postal 75054
PH: (02) 34 33 02

DEALERS: Write For Details On How Your Name Can Appear In This Column

from Bill Northrop's workbench

Corinne Gordon, of Bellflower, California, drew the winning number for the grand prize trip to Hawaii at the 1984 International Modeler Show. Craig Christensen, of Lakeville, Minnesota, was the happy recipient. Left to right we see: Al Tuttle, Maui; Craig Christensen; Corinne Gordon; and Anita and Bill Northrop. For all the IMS news, look for the May issue of *MB*.

• Luckily for you, our International Modeler Show is just a few days away as this is being written. With so much on my mind in regard to tieing together all the loose ends for this January 14 and 15 affair, I've had no time to create another soap-box on some hapless modeling subject.

Before going on, however, I'd like to thank the many readers who have sent in letters commenting on my February '84 column. In nearly every case, the letters are longer than normal, and the writers have really poured out their hearts on the subject. Perhaps somewhere along the line, someone with the vision to forsee the future of our hobby and the power (financially) to do something about it, will answer our plea.

Meanwhile. . .

THE MISSING "E"

We hope the folks in Kitchener, Ontario, Canada, are not mad at us for leaving out the **"E."** What we're referring to is Cliff Tacie's article about the 14th Kitchener-Waterloo Scale Rally which appeared in the February '84 issue of **MB**.

Throughout Cliff's article, and even in the title, we spelled Kitchener without the "E" after "H". Although it's really not enough to make up for omission, we hereby print all the missing "E"s, and promise not to omit them again . . . at least in the "Kitchener"!

E E E E E E E E E

That's for you, Jim Moynihan!

★ ★ ★

R/C helicopter fans in the Southern California area will be happy to know that Ray Hostetler, our *"Chopper Chatter"* columnist, is locating in Long Beach, California for several months, where his work has taken him. And speaking of work, Ray's schedule is such that he will find it necessary to cut back to an every-other-month column.

Following the April and May review of the Robinson R-22 from California Model Imports, Ray will skip to July, and then appear on alternate months . . . September, November, etc. In the meantime, if you have comments, questions, photos of your favorite heli, etc.,

Continued on page 99

Advice for the Propworn

Dear Jake:

I thought I saw something intelligent in your column last month, but it turned out to be a typo. I should've known better. Keep trying Jake! By sheer cosmic chance you may say something worthwhile yet.

—Fan in Foxboro

Dear Fan:

The Cosmic Chance was a mid-wing modification of the Cosmic Wind pylon racer built by Dexter Cheswick of Little Ferry, New Jersey in 1964; He was later killed and the airplane destroyed during a race on the Florida panhandle in May 1966, when he collided with a pelican that was flying erratically due to a case of diarrhea it had contracted by eating a spolied pompano. No model kit of the airplane is available that I know of, but plans may be obtainable from the EAA. I hope this information helps.

—Jake

Dear Jake:

Our daddy makes model airplanes. Me and my brother are too young to make our own, but we like to watch him. This morning, while he was at work, we helped him with his new model. We fingerpainted the wing. But when he got home, he hollered a lot and spanked us. Why did he do that?

—Red Behinds in Red Bank

Dear Red Behinds:

Probably because you didn't do the fuselage, too.

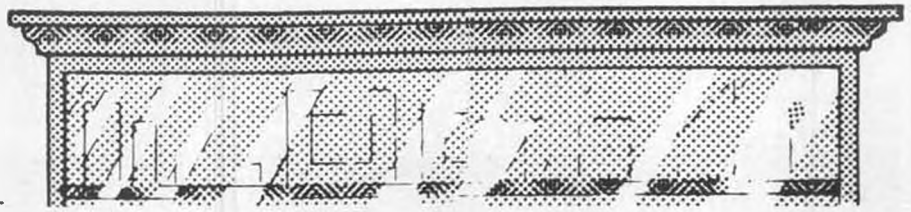
—Jake

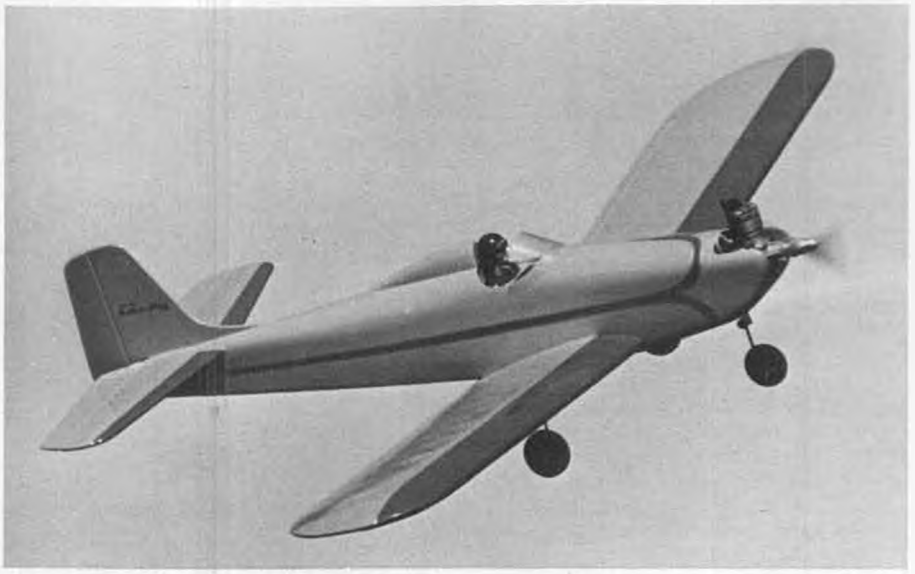
★ ★ ★

Continued on page 94

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.





Sig Manufacturing new *Astro-Hog* kit, an updated version of the famous late fifties design.

• Sig Mfg. Co. of Montezuma, Iowa, has announced the release (or should that be re-release) of the of Berkeley *Astro-Hog* kit with projected delivery by February 1984. This is the classic design that got R/C aerobatics off the ground in the late fifties. Designed by Fred Dunn in 1957, *Astro-Hogs* swept the 1958 Nationals, taking first, second, third, and fourth places.

Several improvements have been made to the original Berkeley Models kit. These include: easy-to-install strip ailerons instead of barndoors and bellcranks; bolt-on wing mounting; stab is mounted to the top of the fuselage instead of rubber banded to the bottom; tricycle landing gear for perfect takeoffs and landings (plans also show original taildragger version); and simplified construction throughout.

Of course, the *Astro-Hog* kit features the usual Sig top quality balsa and plywood parts; pretapered balsa ailerons, elevators, and rudder; molded plastic headrest; formed wire landing gear; aluminum engine mounts; complete hardware pack of hinges, control horns, R/C links, etc.; and an excellent photo illustrated instruction book with full-size plans.

Recommended engine sizes are: two-stroke engines between .45 and .60 cubic inches; four-stroke engine between .60 and .75 cubic inches.

Wingspan of the *Astro-Hog* is 71 inches. Wing area figures out to 824 square inches, and the weight comes out between seven and seven and a half pounds.

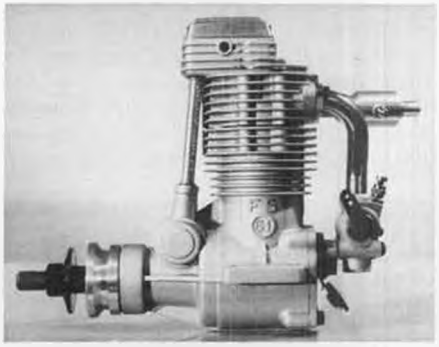
For further information contact Sig Mfg. Co., Inc., Route 1, Box 1, Montezuma, Iowa 50171, or see your local Sig dealer.

★ ★ ★

Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639, (312) 622-2630, has announced the release of its newest flying model, the *Elder*. The *Elder* is a vintage-type sport plane which provides leisurely fun for the Sunday flier, but is ideally suited as a first trainer.

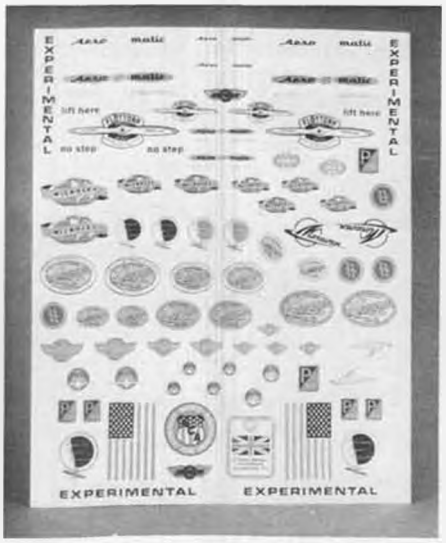
Designed by Top Flite's vice president, Scott Christensen, this model has a wingspann of 53-3/4 inches, a wing area of 520 square inches, and a length of 42-1/2 inches. Engines recommended for the Elder range from .15 to .30 (including the .21 four-cycle). Flying weight will range from 48 to 72 ounces. R/C equipment can be two, three, or four-channel.

The Elder builds quickly, is easy to fly, and maneuvers gently. It captures in a simplistic design all the fun and nostalgia of pre-1920s airplanes. Colorful covering and trim ideas are included to help the modeler achieve a WW-I look.



World Engines FS-61 four-cycle engine.

World Engines O.S. 46 VR-DF for ducted fan.



C.B. Associates propeller decals.

MRC's new *USS Gato* working submarine.

Valley Models *Shocer 600* and *Shocer 250* F/F contest models.

Indoor Model Supply's newest Peanut, the *Waterman Racer.*

The kit features top quality balsa and plywood construction; hardwood fuselage and tail sections; precision die cut parts; exclusive, printed identification system for accurate, easy assembly; unique shock absorbing landing gear; complete wire and hardware package; generous radio compartment for most of today's R/C equipment; comprehensive, full-size rolled plans with step-by-step instructions.

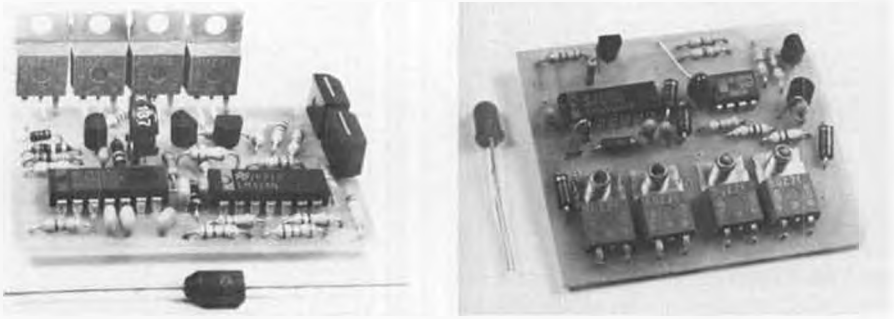
For more information and the latest catalog with Monokote color chart, send one dollar with request to: Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, IL 60616.

★ ★ ★

Dive! Dive! Now you can relive the thrilling submarine battles of yesteryear with MRC's radio controlled WW-II model of the *USS Gato* submarine.

The *USS Gato* has a well detailed fiberglass hull that features conning tower and deck fittings. The kit includes the following devices for achieving realistic operation: two Mabuchi electric motors power the subs ballast tanks; automatic pressure safety valve "blows" the ballast tanks to bring the sub to the surface if it dives too deeply; two Mabuchi electric motors drive two brass propellers to propel the sub in the water; diving planes and rudder are servo controlled . . . and all of these features are found on the 78-inch scale model, the *USS Gato* from MRC.

For further information regarding this scale WW-II submarine, write to the Model Rectifier Corp., 2500 Woodbridge Ave., P.O. Box 267, Edison, NJ 08817, or call (201) 985-7800.



Jomar Products new SC-2 electric speed controller (left) and S2B2 battery backup system.

★ ★ ★

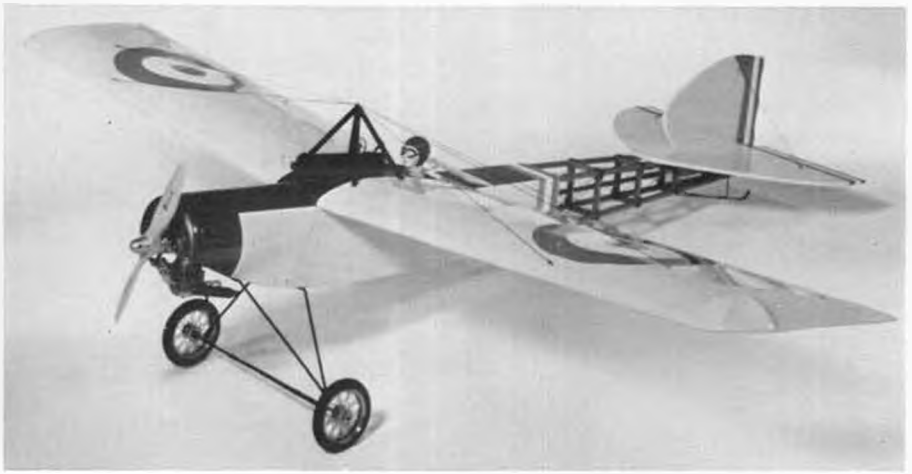
World Engines has been busy writing press releases lately as evidenced by the last two "Over the Counters." The two engines introduced this month brings the total to eight new engines.

The newly designed O.S. FS-61 represents everything O.S. Engines has learned about four-stroke engine technology since its introduction of the pioneering FS-60 model in 1975. This refined successor to the FS-60 is more powerful, more compact, and more economical, while at the same time less expensive and lighter in weight.

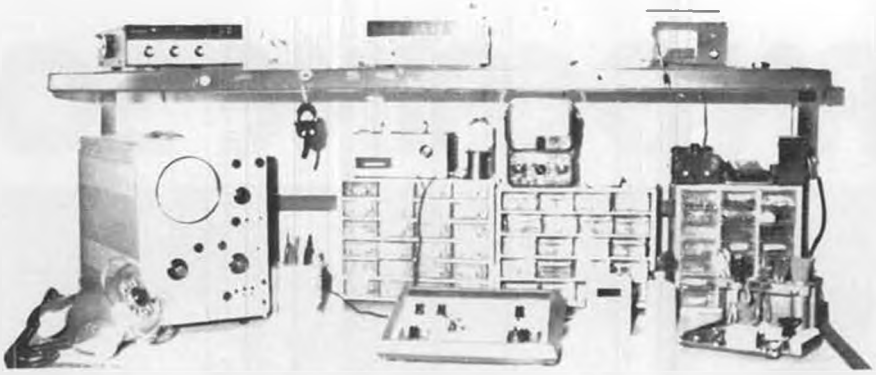
The FS-61 incorporates a cam and gear design driven off the front of the crankshaft, as used in the FS-40 model. The camshaft is supported by ball bearings. A number of useful features have been included for the modeler's convenience. The lifters are enclosed in a valve cover, and a spring-loaded, self-returning choke valve is standard equipment. The carburetor is simple, yet designed for high performance. Needle valve and throttle lever locations are interchangeable by reversing the carburetor, and the needle valve is designed to incor-

Continued on page 60

New scale book from Argus Books.



New sport model for .15 to .30 glow engines from Top Flite, the *Elder.*



Electronics Corner

By ELOY MAREZ

Hunter Tools Solvent Dispenser, a handy way of keeping those needed fluids immediately available. Prevents evaporation.

FM SIMPLIFIED

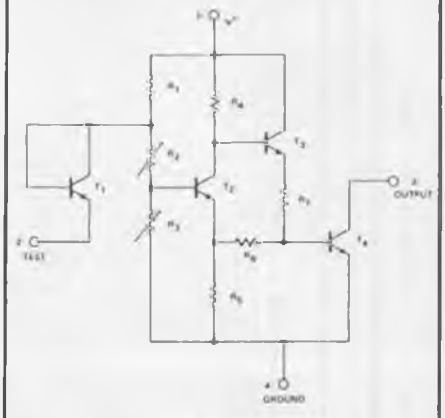
Before we get into any discussion of frequency modulation as it applies to R/C, it will be necessary to eliminate some of the misconceptions that seem to exist, caused no doubt by our previous experiences with amplitude modulation (AM) and frequency modulation (FM) broadcast radio.

Let's first take that word, *radio*, best described as a form of communication (one or two way) by electromagnetic waves transmitted through space. These waves alternate, the **frequency** being the rate at which they alternate, in times per second. Intially, we referred to these electromagnetic alternations as **cycles**, however a few years ago, the term hertz was adopted, in honor of one of radio's early pioneers. Heinrich R. Hertz. One Hertz is one cycle per second, the usable rates being much higher, we generally refer to **kilohertz** (KHz), meaning 1000 hertz, or **megahertz** (MHz), being one million hertz (or 1000 KHz). Some countries, and ham operators, instead of the rate of fluctuation, refer to a specific radio signal by the actual length of the wave in meters traveled by the wave during one cycle. A good example of **wave length** would be *six meters* for the 50 to 54 MHz band. Unless followed by a lot of decimal places, this is not as accurate a means of measurement as frequency. For ease of identification by the non-technical, specific frequencies are often assigned channel numbers, as has been done with television, CB radio, and of course, radio control systems.

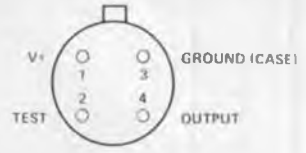
So far, we have spoken only of a pure radio wave, which when generated by a transmitter, will travel freely, diminishing in strength with distance, to be picked up and put to work by a receiver. We can use this radio wave, henceforth called a **carrier**, to convey many forms of intellegence, such as audio, video, teletype, telemetry, etc; by a process called **modulation**. Modulation comes in many forms, but here we are interested in only two of them, our old friends, AM and FM. The point is, that frequency and modulation are completely different things, in spite of always being found together. The confusion occurs because we are used to thinking of AM on 550 to 1500 KHz, and FM on 88 to 108 MHz, which we have come to speak of as AM or FM bands or frequencies. This is somewhat true, but dictated only by governmental law, and not by any electric law or limitations. We can just as easily transmitt (and receive) an AM modulated signal on the 88 to 108 MHz FM band, and an FM signal on the 550 to 1500 KHz AM band. Remember, fre-

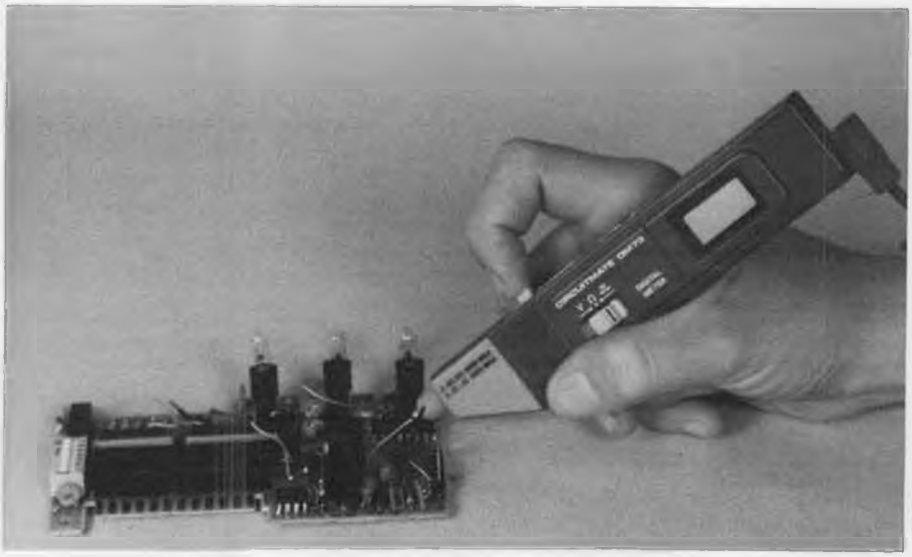
Continued on page 90

SCHEMATIC ICM7201



CONNECTION DIAGRAM

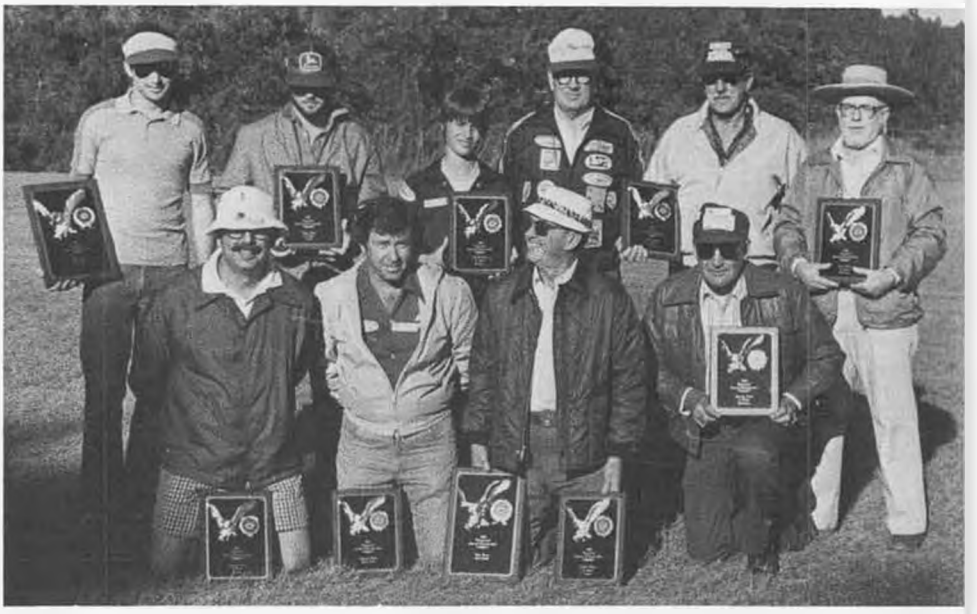




The smallest multimeter on the market, the Beckman Circuitmate (DM-73) is capable of making most test readings required for R/C equipment.

1983 TANGERINE SOA

By DICK EVERETT . . . A California glider guider ventures east to fly in one of America's most prestigious soaring events.



Two Meter and Scale winners at the Tangerine meet (front row, L to R): Fred Cotten, Stan Pfost, Woody Blanchard, and Erel Linn. Back row (L to R): Tim McDow, Brian Agnew, David Sheppard, CD Bud Moore, Don Thompson, and John Melvin, Jr.

• The 1983 Tangerine Soaring Championship, held at the Orlando Buzzards flying field just outside of Orlando, Florida, was a rousing success. It was blessed by good days, gobs of lift (if you went hunting or piggybacking), and a light wind (sometimes gusty).

On Friday Two Meter and Scale were flown. One round of Two Meter models was flown first followed by all the Scale rounds. Rich Bonnell flew a humungous ASW-20 with a seventeen-foot wingspan. This huge model's launching technique was to set it on the ground connected to the winch line, then a helper held it by the vertical tail with the wings level until the flyer (Rich) gave the signal to release. When released, it slid smoothly along the ground until airborne. The one flight it made didn't make it back to the field, mainly due to wind shift. The winches were moved 180° shortly after the scale flights were finished.

Woody Blanchard flew his *Speed Astir IIB* to the winning points of 182. Stan Post was second with 136 and Rich Bonnell was third with 76 points.

All flying events except for scale were divided into two classes Sportsman and Expert. The Sportsman class is for contest flyers who have not accumulated 12 points in contest flying (three for first, two for second, and one for third) in two years of flying, also, you must not be a LSF Level 3 or more. At one time they had a rule of six points in six months, but when they found that flyers would stay out of contests if they had three or more points, a change was made. One can declare himself an expert if he chooses.

The Two Meter class sailplanes consisted of practically all kitted competition models, *Gentle Ladies, Risers, Metricks,* a surprizing number of dihedral wing, aileron *Sagitta 600s,* and a number of originals. John Melvin, Jr. won the

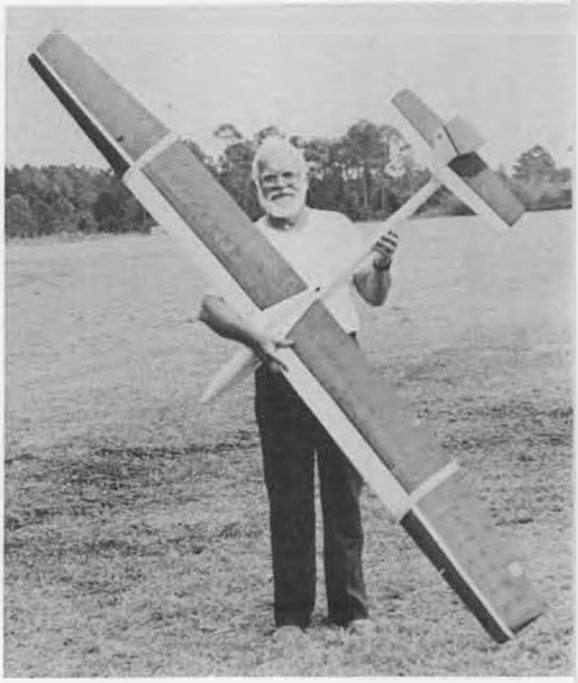
LEFT: Gene Little poses with his Open Class sailplane. It is a fine flying model and Gene is a good pilot. Both are high up in all contests.

ABOVE: A holiday atmosphere prevails at the Tangerine contest. View of the pit area.

RIGHT: A smiling John Hoover shows us his *Whisper,* now kitted by Son-Dai. Wingspan is 98.5 inches, wing area is 864. Weighs 45 ounces.

RING CHAMPIONSHIP

Models in the ready area await flight call-up.



Dick Everett, author, poses with his stretch *Gemini MTS*. Model will float like a *Paragon*, yet penetrate with the best of 'em. Excellent flying machine, and forgiving too!

Sportsman class closely followed by Erel Linn, then Don Thompson. In the Expert class, Tim McDow ran away from the field a full 200 points in front of Fred Cotter who was closely followed by Brian Agnew.

At the conclusion of the day's activities, the beautiful plaques were awarded by CD Bud Moore. Thanks for a real smooth contest, Bud.

Walt Good and his two contest sailplanes. Prototype *Gemini* on his left, and *Samun* on his right. Walt has yet to fly the *Samun* in a contest.

Saturday, for the seven-minute percision duration contest, turned out to be a real gas bag day . . . lift all over the place. When the contest started, the big birds were breaking winch lines at a rate you couldn't believe. At first it was thought that the turnaround was frayng the line, so the turnaround was changed, this didn't help. Then, a close examination of the retrieval system showed that a rusty coat hanger hook had been installed on the retrieval motorclylce handlebars to slip the line through to leave the riders hands free. In the meantime, a second winch was set up which provided a few good launches, then it started breaking. When the culpirt (wire hook) was removed from the motorcycle, and new winch lines were installed, the contest went smoothly, although the time spent winch-witching prevented the extra flight that the Buzzards usually give the flyers. Stan Post the contest director, and the other Buzzards, really worked up a sweat on this one without stopping the flights.

At the conclusion, John Melvin, Jr. was again in first place in Sportsman followed by Frank Collins with Nelson Montgomery in third.

In Expert, Brian Agnew won first with Woody Blanchard only 20 points behind him in second place. Tim McDow won third, with John Gunsaullus and Tony Rogers in fourth and fifth.

The Triathalon, Sunday's contest, started off with real good lift weather which became good lift, and then dropped to hunt-for-lift. My first flight, along with "Cousin" Leon Kinkaid, was at cloud base after 4-1/2 minutes . . . when my timer's watch stopped. Not wanting to restart when I was doing so well, I started my wrist stopwatch and asked the timer to use it. In the confusion of getting the watch off my wrist, I lost sight of my model. When I finally found which model responded to my command, I was down to approximately 200 feet and over tall pine trees. I didn't make it back, and landed in a tall pine tree at six minutes even.

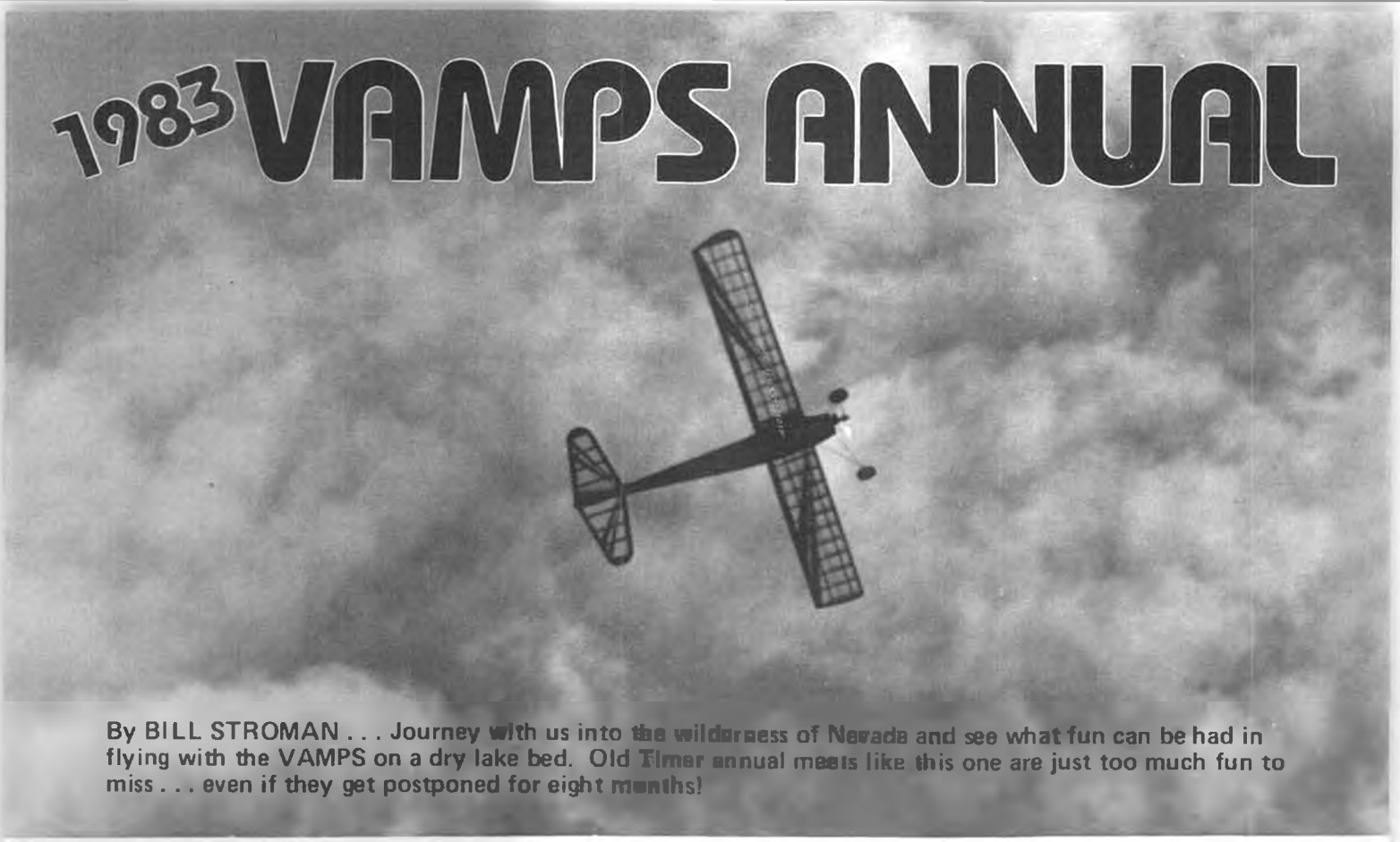
Getting the model down wasn't going to be easy. The tree was not climbable without "climbers," so time was spent discussing the problem. When Dave Davidson heard about our dilemma, he offered an immediate solution. He called his wife by ham radio, and had her contact Tam Gleason who came out to the contest. For a fee, he climbed the tree, retrieved the model, and let the *Stretch Gemini* down on a rope without even one additional puncture hole in the model. Exceptionally well done, many thanks to Dave and Tam.

With the two winches and two motorcycle retrievers, the four rounds were over very early.

Woody Blanchard, who could win with a last round, "almost perfect" flight, proceeded to do just that. With at least 25 watches on him, he proceeded to get a zoomey zoom launch with 19 ounces of balast in his *Gemini*. This put him really up high. He started looking for lift off to his right, and when he turned tail and sped across the area he had traversed, and finally found lift to his

Continued on page 93

1983 VAMPS ANNUAL



By BILL STROMAN . . . Journey with us into the wilderness of Nevada and see what fun can be had in flying with the VAMPS on a dry lake bed. Old Timer annual meets like this one are just too much fun to miss . . . even if they get postponed for eight months!

• To begin this article, please let me explain what the "VAMPS" abbreviation stands for: Vegas Antique Model Plane Society. As you know, the people in Las Vegas really know how to show you a good time. Well, the members of the VAMPS really must be the cream of the crop, because they put on the best contest ever. This meet was really different from other Old Timer functions.

The annual is usually held in late February of each year, but it was blown out early last year by high winds and dust. In fact, we were forced to sit in motorhomes and talk models, engines, flying, what our planes were going to do when the wind let up, and other subjects. As you can guess, we had a good time, but no flying. Being the fine host that he is, Bob Chambers said this isn't good enough, and rescheduled the meet for October 29 and 30, 1983.

Now it just so happened that on that same weekend, the Quarter Scale meet was to be held at the same site. Would this cause a problem? Not really . . . Eldorado Dry Lake is nine miles long and two miles wide! In fact, we flew three miles apart and never had problems. One thing did happen Sunday, come to think of it. Two of the quarter scalers walked from their contest site to ours, and were surprised at the distance. That clear desert air makes things seem closer than they really are.

One could not ask for better weather. There was no wind Saturday, and just a little Sunday afternoon. Bob Haight flew his RWD 8 (which has about a six-foot wing span, and is powered by a PAW .15 diesel engine) on Saturday morning. This had a total flight of 22 minutes and

Frank Szucs *Sailplane* takes off from the dry lake bed near Las Vegas, Nevada.

18 seconds. As soon as Bob was satisfied that the power climb was right, he got in the back of a pickup truck to prepare for a long chase. We all watched as the model circled slowly overhead for about 19 minutes, then the motor stopped and the plane started its glide down. After about three minutes, it landed, the truck

Jim Adams, "SAM Speaks" editor, flew this magnificent *Cabin Playboy*.

Fred Caballero starts his Tlush *Mite* (above). This model can be seen in flight in the lead photo (left).

Ed Tschernoscha sends off his beautiful Carl Goldberg *Zipper*. The clear desert air and fluffy white clouds make for beautiful photos.

Nyles Nagel is rightfully proud of his Corben *Baby Ace*. Diesel powered.

Bud McNorgan prepares his Corben *Ace* for flight.

Bob Haight won Scale with this RWD 8.

fired up and drove Bob 150 yards to where it landed. As I said, there was no wind.

The lack of wind did cause one problem. There was a complete lack of thermals on Saturday morning. Cathy Archer's *Strato Streek* is one of the best climbing .020 Replicas around. As she and I were flying the same event, we timed each other. Both models climbed like rockets, then would glide down for a total flight of three to four minutes. At any other contest, this would be great, a max flight!! Not so at the VAMPS meet. Due to the usual amount of thermals at the dry lake, the VAMPS require a five-minute maximum flight. If you think about it, it makes sense.

I think about the hardest working contestant in the VAMPS meet is Don Weitz. He starts testing a month before the contest, at least twice a week. I always enjoy watching him at a contest; his engines always start at once, and run the fastest. His models are always trimmed to a perfect pattern. As I am rather new at Old Timer events, Don is always ready to answer my questions with sound advice. One could say that he is the Sal Taibi of Las Vegas. Sal was there by the way, and lost a *Powerhouse* in 1/2A Texaco. Hope he can get plans to build a new one . . . (just kidding, that's Sal's design, I'm not *that* new).

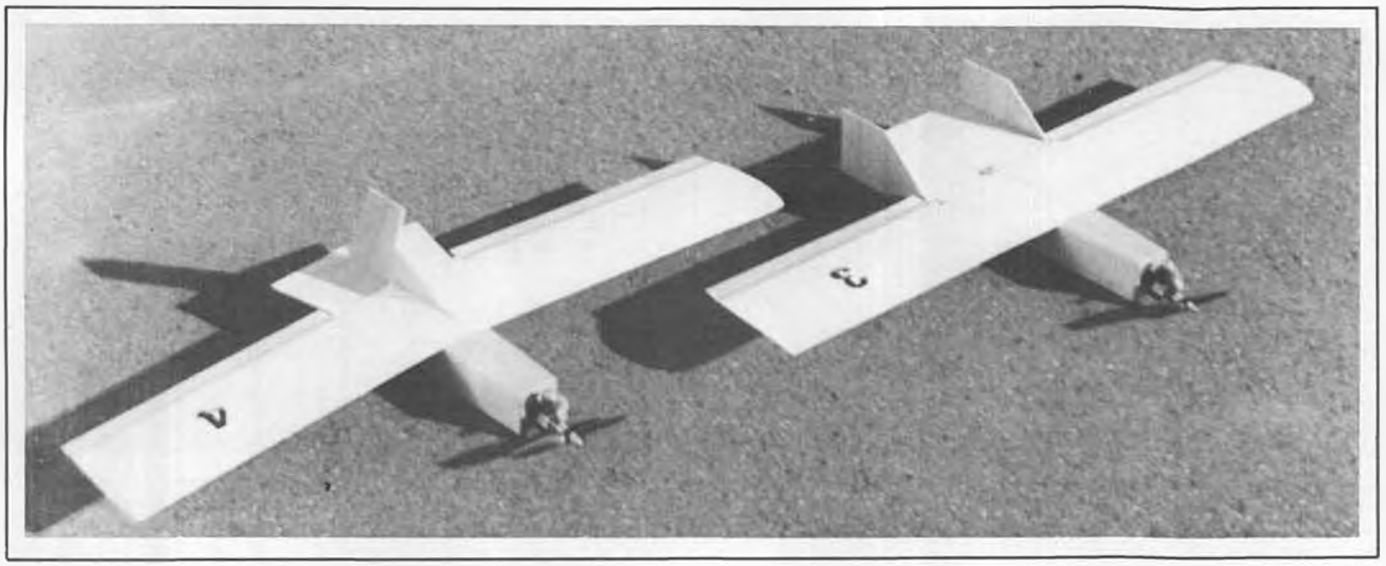
While we are on the subject of 1/2A Texaco, Fred Caballero had a great *Tlush Mite* that really reminded one of how the old Texaco models flew; slowly, steadily, and gracefully. I won't forget those flights for a long time, Fred. He also had a *Long Cabin* in full-sized Texaco that seemed to fly forever. Lee Rose entered a *Dallaire* in the same event. It didn't seem to climb too high, but good grief, it stayed in the air forever. I've never seen much a flat glide in my life.

To go from the Texaco event to the A-B Pylon event is a real contrast. These ships really climb fast! If one is used to hearing the high pitched whine of a glow engine, the ignition engines sound like they aren't at their maximum output. However, when you see them climb out, you realize that they use a larger pitch and diameter prop, and can put out a great deal of thrust. Frank Szuce's *Zipper* could compete with many of the modern ships in climb.

The one thing that always impresses me at each Old Timer meet is the craftsmanship these modelers put into their ships. Ed Tschernoscha's red, white, and blue *Zipper* was a fine example of this, it sure looked great against a blue sky, with the sun shining through the silk covering. Another fine model was Bob Oslan's beutiful *Bower's Flybaby*. Bud McNorgan's models were a sight to see with

Continued on page 64

Dave Matthews launches his *Zipper* into the winter sun.



After two somewhat unsuccessful attempts at an .049 powered flying wing design using Ace R/C foam wings, Nos. 3 and 4 were wonderful!

WEEKEND WONDERS

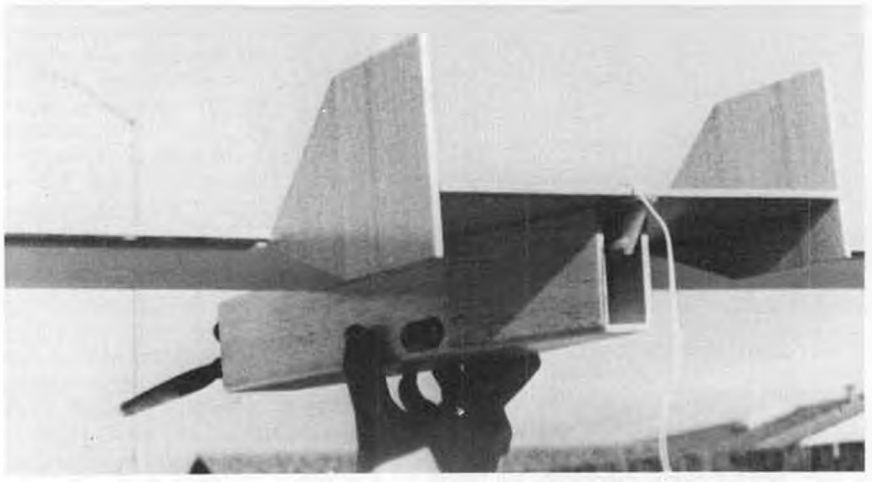
By BRUCE THARPE . . . If you've ever wanted to mess around with flying wings, but you weren't sure just how involved in a project you wanted to get . . . consider the *Weekend Wonders*. These little gems are easily built in a weekend (thus the name), and because they're built with Ace R/C foam wings, they're quick.

How would one go about describing a *Weekend Wonder*? Well, they are not really flying wings, because the elevator hnge line isn't in the airfoil cross section. hinge line isn't in the airfoil cross section. mal" model airplanes. More precisely, they are extremely short coupled airplanes. And most importantly, they are so incredibly simple that you could easily build, finish, and fly either one in a weekend.

The name "*Weekend Wonder*" wasn't my idea. Actually, I had no name at all for the first model (which I built during the course of one weekend, naturally). When my father jokingly referred to it one day as a *Weekend Wonder*, the name just seemed to stick.

The first *Weekend Wonder* had a swept back wing, single fin and a Cox Golden Bee .049. It flew reasonably well once I added a Medallion .049 and cured its noseheavy condition. On the same day that it crashed (due to a poor hand launch), *Weekend Wonder 2* was test flown. On its first attempt, it went into gyrations and crashed also, obviously the victim of an aft C.G. This was all a bit discouraging, but the models were so easy to build that I just had to continue experimenting. Number 3 was a total success (I finally got that dreaded C.G. in the right place!) as was Number 4. The models presented in this article represent slightly refined versions of the originals.

The design philosophy behind all of the *Wonders* has been to produce simple, inexpensive, fast-building models. *Weekend Wonders* may not be the epitome of simplicity, but they are awfully close. However, I wanted to have relatively high performance also. These somewhat conflicting requirements took a bit of thought, but resulted in a rather unique series of aircraft. I would like to review some of the thought process behind the models now.

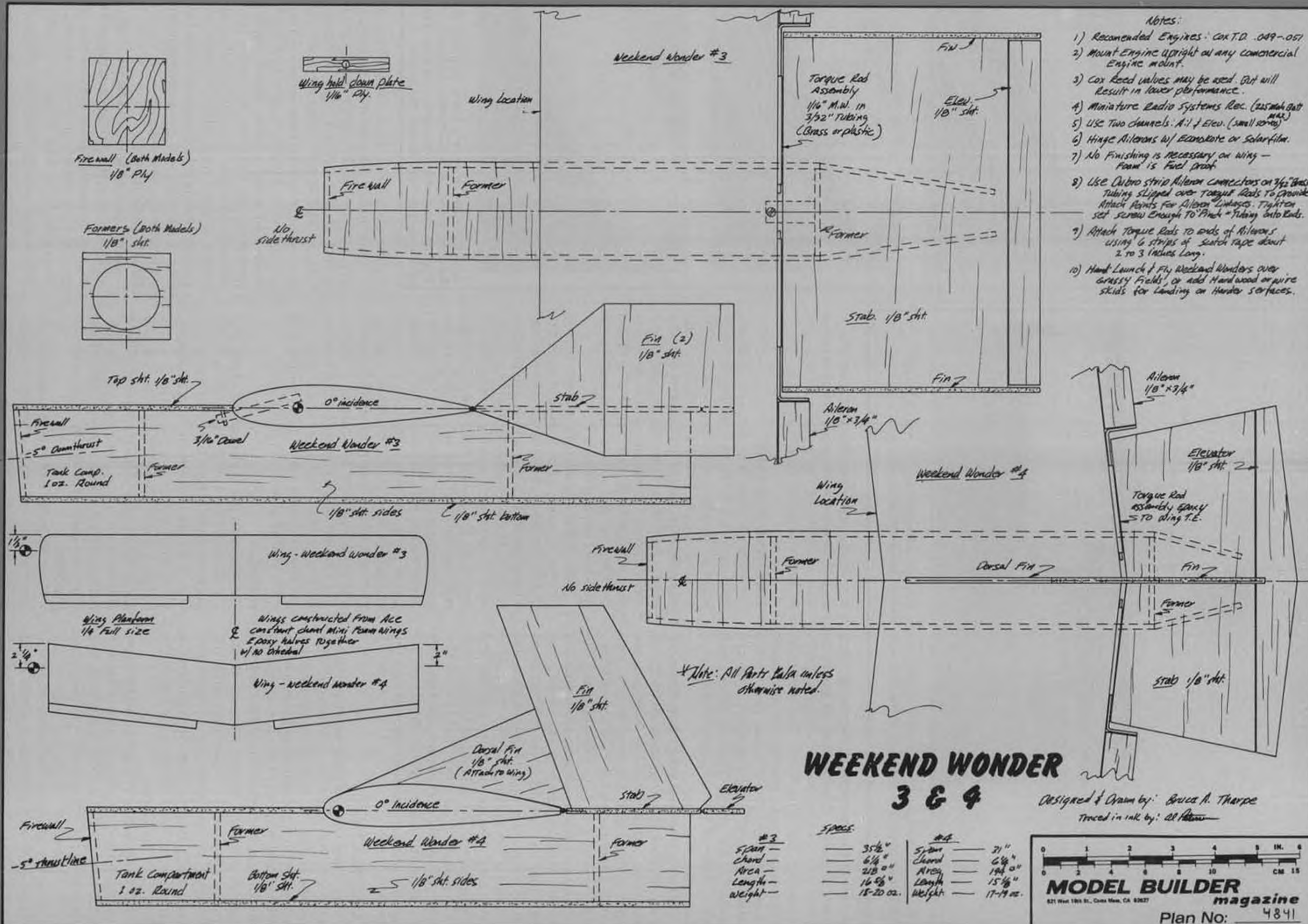


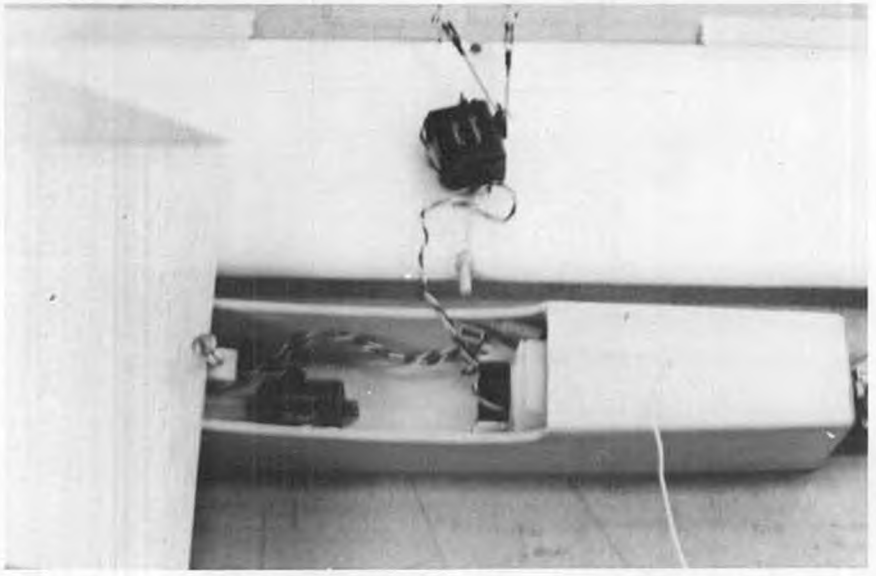
Rear view of the number three *Weekend Wonder* shows the opening for the elevator linkage. Simple, sheet balsa construction is evident. Susan Tharpe holds No. 3 for the camera.

The size of the model was dictated by cost: two-channel, 1/2A models are simply cheaper than larger models. The simple omission of landing gear cuts down building time, cost, drag, weight, and eliminates the need for a paved runway. The shoulder mounted wing makes hand-launching a breeze. The largest compromise made against simplicity was the use of Tee Dee engines and seperate clunk tanks. Bolting a Golden Bee to the firewall is certainly fast and easy, but the performance gain with a Tee Dee is well worth the extra time and cost.

To greatly speed up construction time, the Ace constant chord Mini Foam Wing was chosen as the heart of the model. The wing halves are simply epoxied together; no covering is necessary because the foam is fuelproof (saves money and time). The semisymmetrical airfoil is just fine for aerobatics, and results in a gentle glide once the engine dies.

The rest of the model is constructed of 1/8 balsa sheet, and a scrap piece of 1/8


WEEKEND WONDER
3 & 4
Designed & Drawn by: Bruce A. Tharpe
Traced in ink by: Al Patton
Notes:
1) Recomended Engines: Cox T.D. .049-.051
2) Mount Engine upright on any comercial Engine mount.
3) Cox Reed valves may be used. But will Result in lower performance.
4) Miniature Radio Systems Rec. (225mah Batt max.)
5) Use Two channels: Ail & Elev. (small servos)
6) Hinge Ailerons w/ Econokote or Solarfilm.
7) No Finishing is necessary on wing — Foam is Fuel proof.
8) Use Dubro strip Aileron connectors on 3/32" Brass Tubing slipped over Torque Rods To provide Attach Points for Aileron Linkages. Tighten set screw Enough To "Pinch" Tubing onto Rods.
9) Attach Torque Rods to ends of Ailerons using 6 strips of scotch tape about 2 to 3 Inches Long.
10) Hand Launch & Fly Weekend Wonders over Grassy Fields, or add Hardwood or wire skids for Landing on Harder surfaces.
Note: All Parts Balsa unless otherwise noted.
Weekend Wonder #3
Weekend Wonder #4
Firewall (Both Models) 1/8" Ply
Formers (Both Models) 1/8" sht.
Wing hold down plate 1/16" Ply.
Wing Location
Torque Rod Assembly 1/16" M.W. in 3/32" Tubing (Brass or plastic)
Elev. 1/8" sht.
Fin
Former
Fire wall
No side thrust
Stab. 1/8" sht.
Fin (2) 1/8" sht.
Top sht. 1/8" sht.
0° incidence
Stab
Firewall
-5° Downthrust
3/16" Dowel
Tank Comp. 1 oz. Round
1/8" sht. sides
1/8" sht. bottom
Aileron 1/8" × 3/4"
Elevator 1/8" sht.
Torque Rod Assembly Epoxy To Wing T.E.
Dorsal Fin
Stab 1/8" sht.
Wing - weekend wonder #3
Wing - weekend wonder #4
Wing Planform 1/4 Full size
Wings constructed From Ace constant chord Mini Foam Wings Epoxy halves together w/ no Dihedral
1 1/2"
2 1/4"
2"
Fin 1/8" sht.
Dorsal Fin 1/8" sht. (Attach to Wing)
0° Incidence
-5° Thrustline
Tank Compartment 1 oz. Round
Bottom sht. 1/8" sht.
Specs:
#3: Span — 35 1/2"; Chord — 6 1/4"; Area — 218 □"; Length — 16 5/8"; Weight — 18-20 oz.
#4: Span — 31"; Chord — 6 1/4"; Area — 194 □"; Length — 15 1/8"; Weight — 17-19 oz.
MODEL BUILDER magazine
Plan No: 4841



Radio installation details. There is ample room to stack a Futaba four-channel RX and 225 mah battery in the nose of the *Wonders*. Servo tape holds servos in place.

plywood for the firewall. By using stock sizes of balsa, the number of required knife cuts is kept to a minimum, actually reducing building time. For example, the fuselage sides and formers are made from 1/8-inch sheet balsa, two inches wide, simply cut to length. The tail surfaces are made from a three inch wide sheet of 1/8 balsa, and the ailerons are 1/8 x 3/4 strips.

There are several other less noticable features that add to the overall theme of absolute simplicity. The ailerons are both hinged and covered in one step using a low-heat plastic covering material such as Top Flite's Econokote. The torque rod assemblies are then epoxied to the trailing edge of the wing, and attached to the end of the aileron using strips of scotch tape. I admit that this sounds a bit crude, but this method is fast, easy, cheap, nearly invisible, and well-proven. The aft end of the fuselage is left open for easy linkage to the elevator. And by all means, use Hot Stuff or a similar glue for as much of the construction as possible (but not on the foam!).

CONSTRUCTION

Just a few construction tips should be sufficient for building a *Wonder*. The leading edge of the wing should be sanded round, the skin should be sanded lightly to remove manufacturing marks, and the trailing edge should be sanded square until it is about 1/8-inch thick. Epoxy the halves together with no dihedral. No wing bracing or stifferners have ever been used or needed. A typical wing hold-down arrangement is shown on the plans.

If the fuselage were bent into position at the aft opening, the sides would bulge out between the formers. Instead, the fuselage sides are actually cracked into position behind the rear former by scoring the inside of the balsa and gently pushing the aft portion into place. I find it easier to install the fuel tank during assembly; just leave the fuel lines dangling through the firewall. Hardwood or wire skids should be installed if you plan to be landing on paved surfaces.

FINISHING TOUCHES

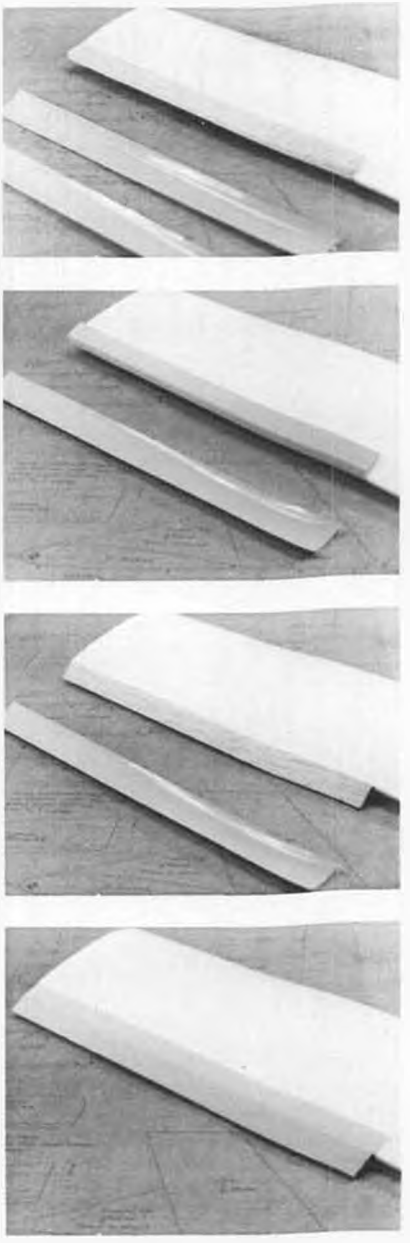
Finishing your *Wonder* will probably take as much time as building it. Mine were all finished with four or five coats of clear dope with light sanding. You may find it easier to Econokote the entire model (at least this would give it some color). I generally don't spend any time decorating, but for this article I decided to go all out and put those numbers on the wing!

The radio installation shown in the photos is quick and dirty, but so is the entire model for that matter. I know that a lot of people frown on the use of servo tape, but I have had nothing but success with it. Be sure to apply a light film of epoxy to the area where the foam tape will be applied and you will have no problem getting it to stick firmly. A miniature radio will definitely ease installation and reduce weight, but is not absolutely necessary. You may want to plan ahead for larger systems by widening or deepening the fuselage. Stick a hot engine on the nose and check the balance point. This is a critical step . . . get that balance point (CG) within 1/8 inch of that shown on the plans.

FLYING

An easy to build airplane is great, but the botom line for any aircraft is flight performance. The *Weekend Wonders* won't let you down in this category. They are fast and aerobatic . . . any looping and rolling manuever is easily accomplished, including inverted flight and outside loops. The vertical performance on an .049 is simply oustanding. They do two rolls straight up with no problem.

Your *Wonder* will eat up a surprisingly large chunk of the sky, so find a nice, grassy field with plenty of space. Get the engine screaming, take a few steps, and toss the model with the nose up about 30 degrees. It should climb out and gain speed at this attitude (no wallowing around like some 1/2As). You will find that your *Wonder* flies solidly without any quirks or surprises. The one ounce tank will empty after three to four minutes, so be sure to leave some altitude towards the end of the run. When it does quit, glide it down to a gentle landing into the wind. If you have lots of altitude, you can perform several stunts during the glide.



ABOVE: How to cover a foam wing *Wonder*. Start by covering bottom side of aileron. Flip aileron down, then cover top side. You may epoxy or tape torque rod to end.

FINAL THOUGHTS

Like I said before, the heart of these models is the Ace Mini Foam Wing. The models presented here are but two of a countless number of combinations of fuslages, fins, and wings. I strongly encourage you to change or modify the

Continued on page 66

R/C SOARING

By BILL FORREY
PHOTOS BY THE AUTHOR

• Last month I promised you a write-up on the art of fuselage mold making. This month . . . you'll get it!

WHY MAKE A FUSELAGE MOLD?

Simple . . . to make fiberglass fuselages. The real question should be . . . why make fiberglass fuselages? To this question there are several answers which ultimately justify the making of the mold.

With the cost of balsa, plywood, and spruce going up at dizzying rates every year, one has to prepare oneself for a mild shock when attempting to scratch build that "cost-saving original design." Kit airplanes may be expensive, but so are scratch built ones. If you were able to eliminate the cost of half the wood in that design, indeed, more than half the work and material in that design, you'd be ahead of the game. Fiberglass fuselages are one way to go. Let's take a look at two different ways to make them.

Before we get into the hows and whys of mold making, we have to do a little preliminary work, like, *what kind* of fiberglass fuselage to we want, and what do we want it to look like.

Careful consideration must be given to the design of the fuselage BEFORE one goes ahead and makes an unchangeable mold. My first two molds were made with only one particular aircraft design in mind. They were not very useful for anything else.

The first thing you will want to decide is fuselage length. You will be able to come up with a very good estimate of this dimension by first considering what span and chord the average wing you will be using with this fuselage will have.

I don't think that it is necessary to get all wrapped up in equations and formulas to design R/C sailplanes. Engineering structure is a different story, so we will save that for another time. For now, let's just consider what the thing will look like.

As the most popular size R/C sailplane, after the typical two-meter "beginner" gliders, is the 100-inch class, let's use this as the basis for our example.

As a general rule, sailplanes with 100-inch wings have wing chords (widths, for those totally new to this hobby) of between eight and eleven inches. Those with wing chords of eight inches will have the least wing area (of our "general rule"), the highest aspect ratio (span squared divided by area), the highest wing loading (probably), the highest sink rate (probably), but very good forward speed. This speed helps the "skinny wing" glider cover ground. The high aspect ratio wing has a theoretical advantage over the lower ones in glide ratio. Other factors enter in here, so we can't make a blanket statement, but as a general rule, this is true.

The other extreme, the wing with the eleven-inch chord, will have the greatest wing area, lowest aspect ratio, lowest wing loading (probably), and the lowest sink rate (probably). Forward speed will tend to be slower for approximately equal weight, and the glide ratio will tend to be lower as a result.

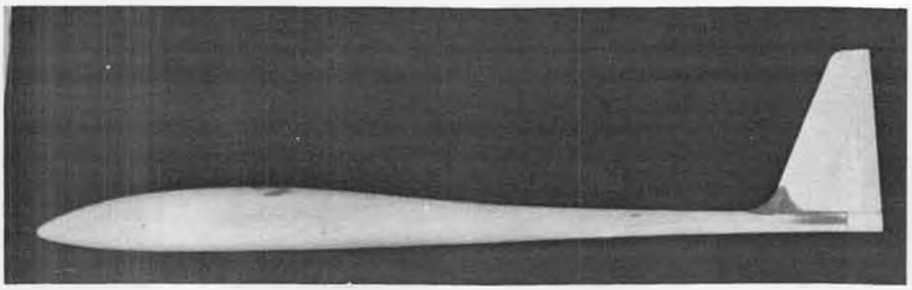
Somewhere in between these two is a good compromise. As I favor a better

Sneak preview . . . of the latest design from Larry Jolly Model Products is this prototype cross-country model called the *Comet*. Look for it at the 1984 Great Race.

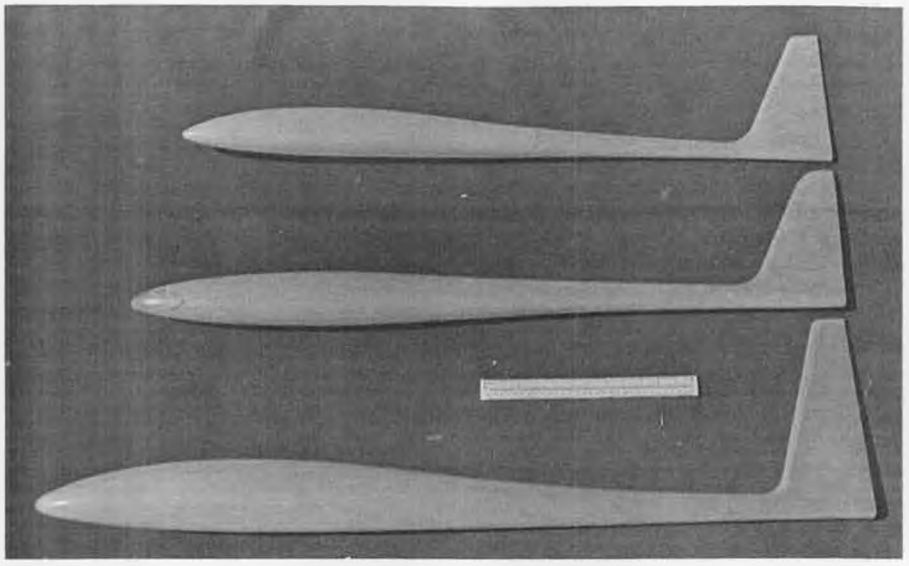
John Harrington designed and built this slope glider called *Thrasher* using a rather thin 9% airfoil with 2% camber. Features camber-changing flaperons. Flies super.

Harrington again. *Thrasher* traverses the slope near Diamond Bar, California. Fast ship!

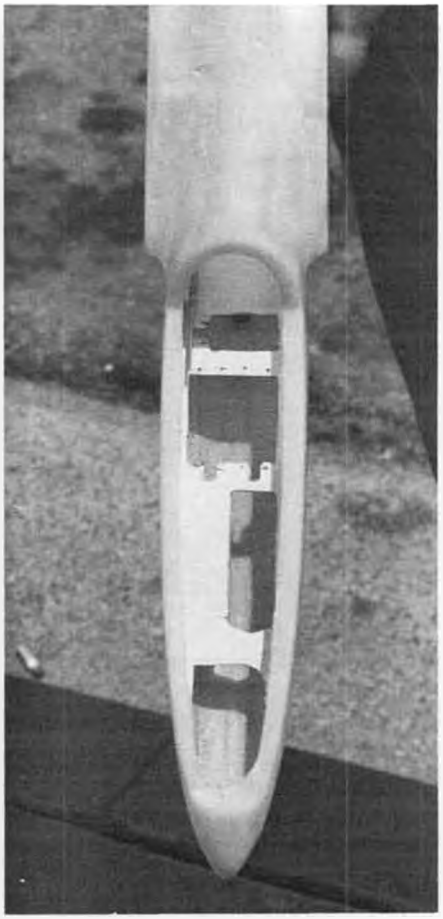
Eugene Embree skillfully guides his Bill Evans *Saracen* flying wing into his hands. Slope site is Mission Hill, near Diamond Bar, Calif.



The first major step in mold making is to decide on a fuselage design and then make a plug. Here we see a plug which was carved and shaped by Mike Bame for a 2-meter glider. The gray areas are Bondo patches over low spots in the plug. The next step would be primer painting.



Here are three designs which have been successfully molded and flown. The top fuselage is the part made from the mold of the above plug. The middle fuselage was molded by the author for 2-meter to 100-inch gliders. The lower fuselage is another Bame part for Open Class gliders.



Dan Fink made this radio tray for his LJMP *Pantera*. This particular F/G fuselage has only one option for wing root chord and airfoil, a 10-inch E-205. Limits design versatility.

glide ratio (L/D) over minimum sink rate, for this exercise I will base the fuselage length on a wing with a span of 100 inches and a chord of nine inches. For these wing dimensions, the fuselage will "look best." However, as I stated earlier, we want a *versatile* fuselage design, so we will make nose and tail moment allowances to permit the use of the wider chords.

As a general rule of thumb, most glider designs have noses between one and one and a half times the length of the wing chord. As a matter of personal aesthetics, I prefer about one and a quarter times the length, or in this case, 11 inches. To allow for the wider chord wings, or longer span wings, I'm going to call this 12 inches. With a snout this long, there will be few problems getting things to balance at the proper balance point (often called CG).

Of course, the wing chord is nine inches, so the total fuselage length so far is 21 inches. To this we must add the tail boom length.

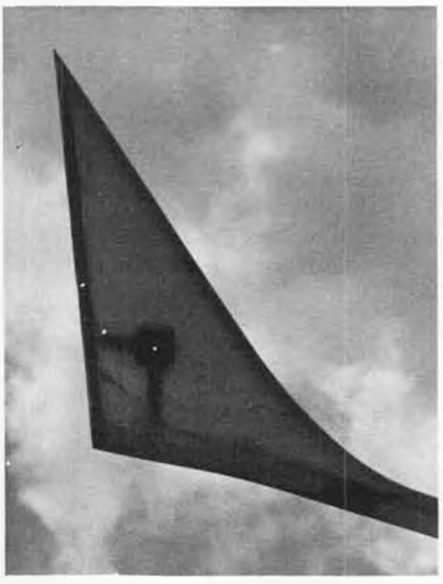
Most glider designs have tail booms between 1.5 and 3.0 times the length of the wing chord. The former yields a rather "short coupled" model which requires a large empennage (tail group area) to gain back the stability lost due to the short moment arm (tail boom length). The latter yields a scale-like rear end with smaller tail surfaces. Both extremes will work, but the longer option typically has better handling properties for the mid to high speed range.

I prefer to use a multiplication factor of two. This allows a more normal-size tail group and an aesthetic appeal. I want my sailplanes to be practical, and the small stabs and rudders which work with long tail moments just don't work for me at slow landing speeds where the Reynolds numbers of those surfaces become dangerously low. As I am not the world's best pilot, I often make sudden, last-minute course corrections on final approach, and the last thing I want is to have the stab stall at slow speed. This causes the nose to drop violently . . . and you to lose your landing points.

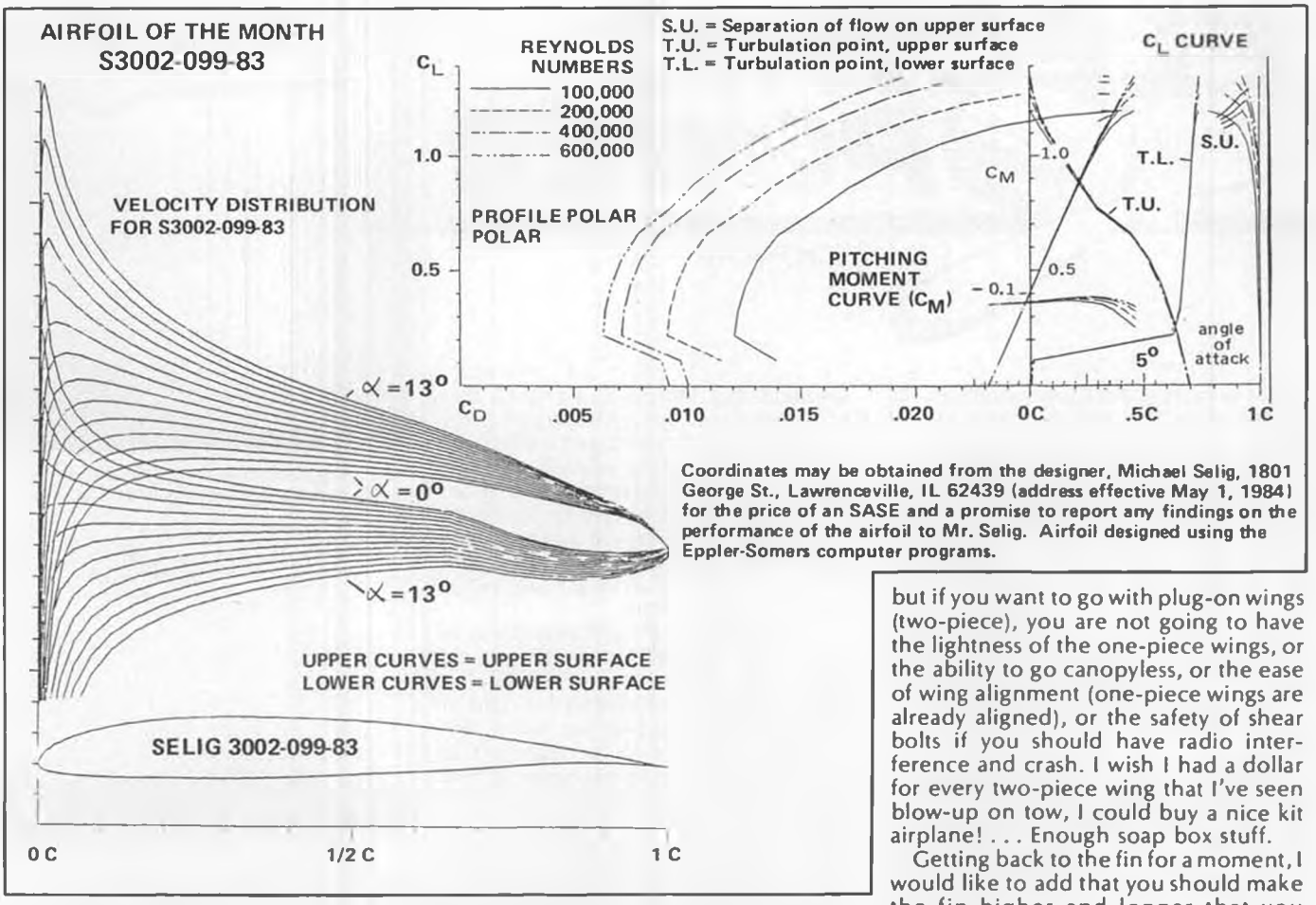
Another thing to consider here is the use of flaps in the design. With the use of flaps comes the necessity of large tail volumes (moment times area). This rules out the shorter tail booms.

Okay, let's see what this works out to . . . nine times two is eighteen. However, we must keep in mind the larger wing chords, so let's add six inches. This will give us 24 inches. The total is now 21 plus 24, or 45 inches. A fuselage of this length will allow us to design anything from a 100-inch span, 11-inch chord floater, to a 100-inch span L/D machine with an eight-inch chord, to a 120-inch F3B ship with careful planning. It's a good, versatile length.

Time to get out the paper and start sketching. This step is the most fun, as well as the easiest. However, it can also be the most frustrating for the non-artistic types among us. If you are not artistically inclined, you can always "copy" a fuselage design and alter it using large ships curves and a little imagination. Ships curves are actually a type of French curve, and they are sold



Again, Dan Fink's *Pantera* fuselage. This is one way to go in fin design. If you want to vary tail area, you must add rudder for more area, or cut off fin for less area.



Coordinates may be obtained from the designer, Michael Selig, 1801 George St., Lawrenceville, IL 62439 (address effective May 1, 1984) for the price of an SASE and a promise to report any findings on the performance of the airfoil to Mr. Selig. Airfoil designed using the Eppler-Somers computer programs.

by architectural supply stores as well as a few art supply stores.

A good way to draw your sketches is on a sheet of quadrille ruled paper or graph paper. This was you can use the printed squares to help you blow up the sketch to full size.

A few things you might want to consider are the shape of the fin and the shape of the wing root area. Cross-sectional width in these areas is important to get right. It is impractical to mold fins less than 1/2 inch in width. This is because of the difficulty of working inside the fin area when it comes time to join the two fuselage halves. Besides, a wide fin gives you a lot of strength, a wide bearing surface for all-moving horizontal stabs, adequate stiffness for T-tail designs, and no noticeable drag increase over the skinny fins. You may even want to taper the fin from 3/8 wide at the top to 5/8 wide at the bottom. This makes it a lot easier to fair the fin and tail boom together as well as giving you added strength at the fin root and enough width to fully enclose a rudder pushrod and clevise if you like to keep things "clean."

Fuselage width in the wing root area should be sufficient to allow you to fit two large servos side by side anywhere under the wing. This gives you maximum flexibility for radio layout. A simple radio layout is to have the receiver battery pack stuffed into the nose of the glider with foam rubber, followed by the receiver which is likewise packed in foam rubber. The wing saddle cutout (we're talking one-piece center sections and/or wings here) can then serve as the "canopy" cutout, and the wing as the hatch. Servos can be placed in the rear of the wing saddle area, and the entire fuselage ballast compartment is free for . . . you guessed it . . . ballast! This setup gives you the strongest nose consistent with lightweight construction (fewer layers of glass). This is also by far the fastest way to work out a radio layout.

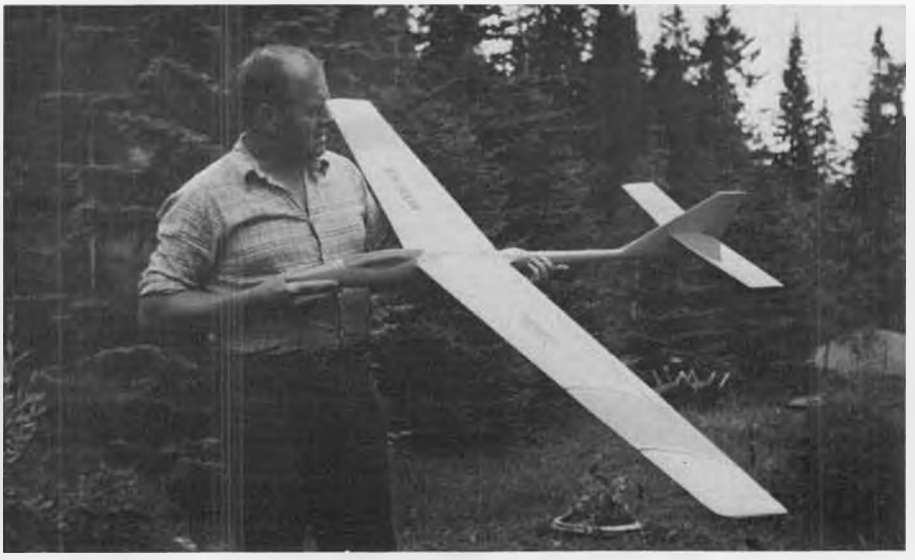
I'm not saying that one-piece wings or center sections are the only way to go, but if you want to go with plug-on wings (two-piece), you are not going to have the lightness of the one-piece wings, or the ability to go canopyless, or the ease of wing alignment (one-piece wings are already aligned), or the safety of shear bolts if you should have radio interference and crash. I wish I had a dollar for every two-piece wing that I've seen blow-up on tow, I could buy a nice kit airplane! . . . Enough soap box stuff.

Getting back to the fin for a moment, I would like to add that you should make the fin higher and longer that you expect to use in your "average" design. This way, if you should decide to make that 120-inch plane, you will have adequate fin area. After all, you can more easily remove fin area than add it after the part is popped out of the mold!

Well, I'm going to have to assume that you can sketch out your design at this point and move on.

The next step is to draw up the side view and top view to full size. When this is completed, it's time to buy the mate-

Continued on page 78



Arne Sveum, Norway, holds a rather racy looking Spanish model called the *Dardo*. Modelhob kit. Color photo reveals blue and yellow paint scheme, and beautiful Norwegian landscape.

ELECTRIC POWER

By MITCH POLING

Larry Miller test flies the *Royal Gull* designed and built by Bob Firestone. Model spans nine

The *Royal Gull* climbs out steadily until it reaches "barely visible height."

• I was looking over the September '83 SEAM newsletter, and as usual, it was full of fascinating items. One of them was mine (such modesty!), a super simple free flight model called the *"Easy One"*.

The *Easy One* uses an Astro 020 FF unit, and it is about as simple as a model can get. All you need to build it is two sheets of 3/32 balsa, a 20-inch, quarter-square spruce stick, some dowels, and wire. The flying surfaces are strapped on with rubber bands, and so is the battery pack. The wings are "clipped" at a span of 24 inches as I had to keep the area down . . . a longer span flew too well, and left the park!

The whole idea was inspired by one of Bill Winter's columns in *Model Aviation*. In this column, he wrote about a plane called the *"Souix"*, a perfect beginner's plane for free flight because it flew slowly and didn't glide very far! It rewarded a lot of kids because it was so non-critical, and would not fly far enough to be lost. The *Easy One* has those same qualities.

If you are not a member of SEAM, you could, I'm sure, get a copy of the plans from SEAM, 11632 Flamingo Dr., Garden Grove, CA 92644. I would include a couple of dollars for handling and postage. For that matter, why not join SEAM? It is only $10 as I recall, for a year, and as a SEAM smember you can get back issues for the previous year for a nominal fee.

Another article in the newsletter dealt with charging two battery packs simultaneously. I have sidestepped this type of charging because I am not at all sure of what would happen if one pack was different from the other. I have always assumed that there was a chance that one pack could get overcharged while the other was undercharged if the packs were not quite close to each other in capacity (voltage and ampere hours). So, when I charge my twelve or fourteen-cell packs, I use a 24-volt power source (two 12-volt batteries in series) and charge the pack with all twelve or fourteen cells in series.

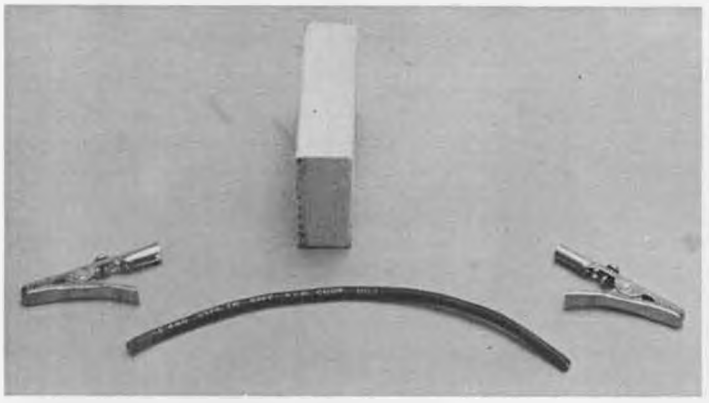
Parallel charging has been done in Europe for several years with no bad reports about it that I have heard, so it must be practical. Someday I should sit down and try it to find out for myself. Anyhow, the procedure described in the newsletter was to discharge all cells to one volt per cell (checking each cell individually) after charging them, and repeat this for a couple of cycles. At this point, check the voltage of the two packs (six or seven cells each, two packs). If the packs at full charge are within 1/4 to 1/2 of a volt of each other, they are well matched enough to make parallel charging all right.

If you are parallel charging, or are considering it, I recommend this procedure. It will also educate you about the condition of each cell, always a good thing to know. If you are flying larger planes (four pounds or more), you will be using motors that require ten or more cells. This procedure will prove to be invaluable to you.

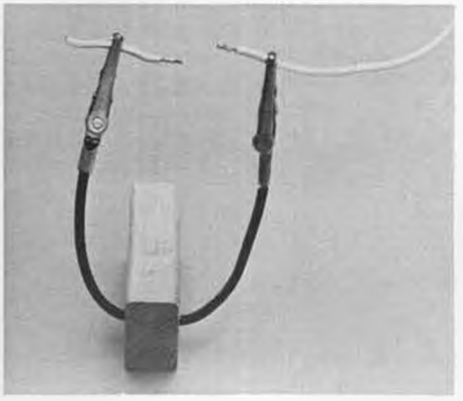
Astro Flight has a new charger that is set up for parallel charging, and Leisure Electronics does too. Right now I don't have info on these, but should soon.

One last item from the newsletter: if you are a member of SEAM, you can get a list of modelers in your area who fly electrics just for the price of an SASE. I just wrote a letter to a reader who needed to know just that! This service in itself is enough to justify the SEAM membership if you need help or would just like to fly with someone. Most beginners need someone to check out their setup and get the first flight off to a good start. Fly better with SEAM!

The *Easy One* that appeared in the SEAM newsletter is in my forthcoming book from Kalmbach on how to get started in electrics. There are lots of "how to's" in the book, so here is another one to share with you. Often you need four or five hands to solder something, and nobody is there to help you. Usually you "muddle through", with an odd looking connection as the



The following series of photos describes (pictorially) how to make a soldering holder. For less than $2 you can put one together using household wire, alligator clips, and a wooden block.



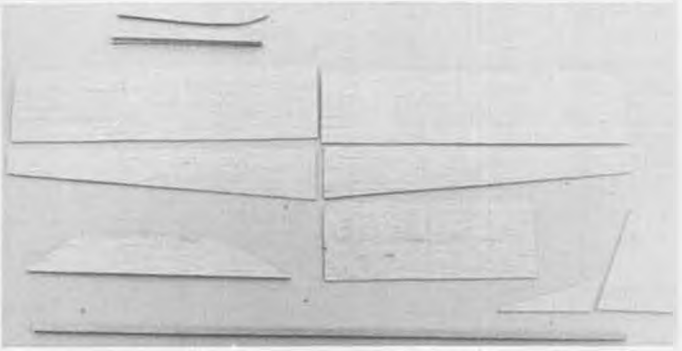
Hold it right . . . THERE! The modeler using this device doesn't need a human helper when soldering that electric wire harness

ACTION! The author tins the end of some fine guage wire to

feet and is powered by twin Astro 05s. The plane lifts off quickly from hand launch.

Plans for this *Easy One* appeared in the September 1983 SEAM newsletter. It is also in the author's book (yet to be released) on electric flight. Model is F/F electric, obviously!

Royal Gull sits in the pit area between flights, battery on charge from a hefty 150 ah car battery (barely visible).



There's not much to see when you have all of the pieces cut out for the *Easy One.* This is a good, first model project for Juniors, adults.

result. I have had that happen to me quite often, and the solution is to use a soldering holder. The commercial ones are somewhat expensive and complicated to boot, with lots of things to adjust, tighten, and fiddle with. There had to be a simpler way. . . .

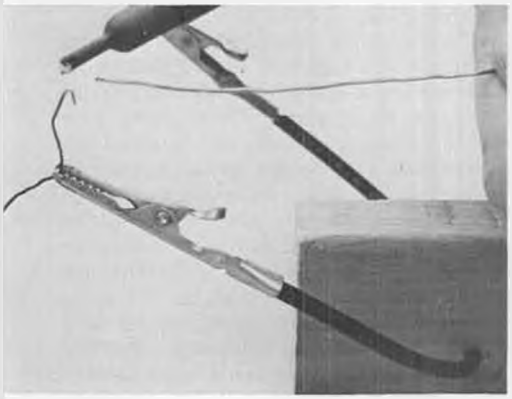
As you can see from the photos, there is a simpler way! All you need is a six-inch piece of 12 AWG wire (used for house wiring), a block of wood, and two alligator clips. Drill a hole through the block that is just big enough to get the wire through, then crimp the alligator clips on the end of the wire with pliers. Do not remove the insulation, it provides a no-slip base for the crimping.

Now you have a soldering holder that will adjust to any position, no fiddling or adjusting, and it's cheap! In fact, if you want four or five-way adjusting, drill another hole through the block, and put another wire through. Say, this could get away from us! Have fun with it, I have, and it works beautifully. Simplicity is best.

Now, how about the book that has info like this? Well, Kalmbach has it on "hold" until the end of 1984 or beginning of 1985! This is due to priorities at Kalmbach, and if you would like the book to get out sooner than that, I recommend that you write to Bob Hayden, Books Editor, Kalmbach Publishing Co., 1027 North Seventh Street, Milwaukee, Wisconsin 53233. Your letter could make the difference! A book for beginners and on basics in electric flight is badly needed. I had thought mine would be out by now, *c'est la vie.*

Bill Baker sent a couple of photos of his free flight *Powerhouse* built from

Continued on page 61



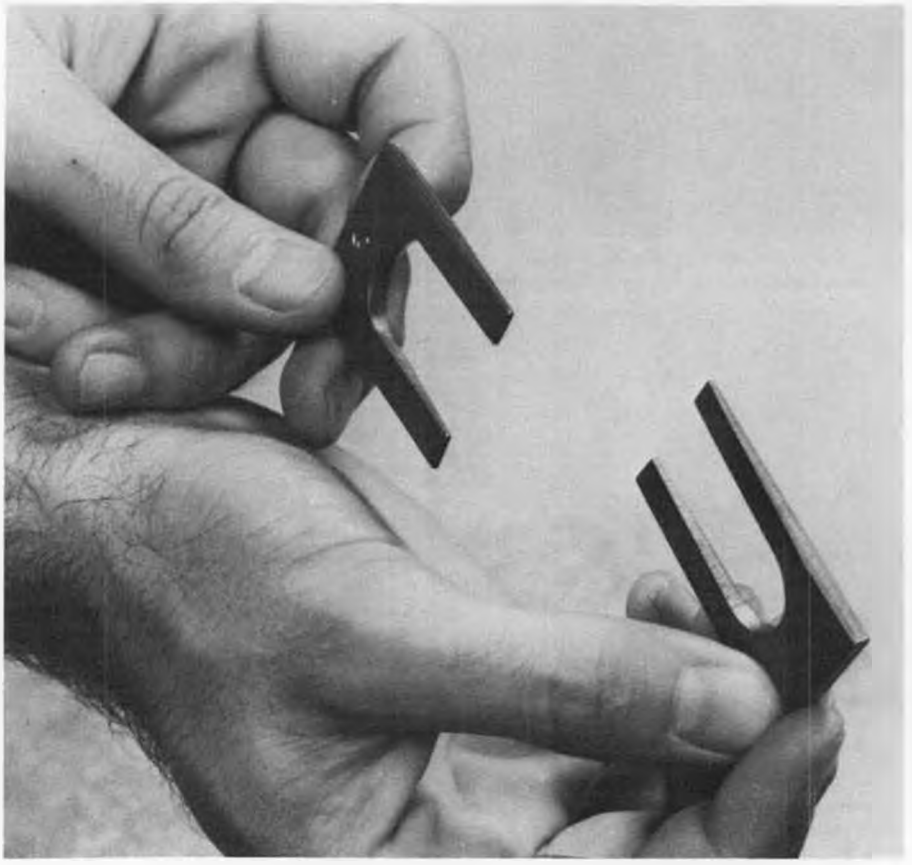
demonstrate the "third hand" aspect of the soldering holder. The 12 AWG wire is a very snug fit in the wooden block.

Chris Baker poses with her dad's F/F *Powerhouse.* Bill Baker made the model from *MB* plans. The 020 electric installation is super simple. Model flies well.

FUEL LINES

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

If you have two stubborn parts to separate, try using wedges like these. Makes it easy!



THE WEDGE

Back during our high school days, we affectionately referred to one of our classmates as "Wedge." We gave him that nickname because the physics professor had told us that a wedge is the simplest tool known to mankind. You can imagine our consternation some years later when we discovered the "Wedge" was a millionaire. At a still later reunion, we asked him how he'd managed to make a million. His reply simply was, "Careful planning, astute management, and a rich uncle who died and left me a real bundle!"

I'm not sure what the moral of that may be, or even if there is one. However, those events recently came to mind again when I had occasion to use a pair of wedges. I acquired them quite a while ago. At the time, I was frustrated at my inability to remove a drill chuck from a tapered arbor. All I could think about was the admonition, "Don't force it, get a bigger hammer." Fortunately, an older, sage machinist was kind enough to show me how to do it effortlessly. By using a couple of wedges such as those shown in the accompanying photograph, you can exert tremendous force, in the correct direction, to remove almost anything from a tapered arbor shank, spindle, or whatever. Just slide the wedges between the parts to be separated, and then gently tap them together. *Voila!* Things come apart beautifully without a single vise-grip plier mark.

Where do you need such a pair of wedges on engines? To remove prop drive plates from tapered lock cones or splined or keyed crankshafts . . . that's where. Guys, that's the good news. The bad news is that, as far as I know, you can't buy any in the size you'd need for the typical engine. Maybe some manufacturer will come up with some soon. Are you listening KK? In the meantime, you can make your own from a hunk of 1/8-inch thick aluminum, a couple of files, and some elbow grease. Just copy the principle shown in the photograph. You may curse me during the filing, but I think you'll silently thank me once you've used them.

PRESSURE, PRESSURE

There are at least two kinds of pressure . . . emotional and physical. The first kind can occur just before or during a race, or for that matter, any contested event. The latter is available in many forms. One of them is fuel pressure, and that's mighty handy in our model engines.

Suction fuel systems are nice, but they have their drawbacks. Carburetor venturi diameter is limited, and fuel tank location is often critical . . . to name only two. If we force the fuel into the carburetor, we can almost eliminate these problems. The thought of pressure fuel systems may make you a bit apprehensive, but actually you've used them many times . . . if you have a car. That's right, the fuel pump in your car is just another version of a pressure fuel system. Pressure fuel systems work extremely well, and in our models, they're quite simple.

For our purposes, there are only three basic ways of using a pressurized fuel system. The first, simplest, and sometimes most exasperating is the bladder tank. It's just like blowing up a balloon, except you use liquid fuel instead of a gas. The stretched tank squeezes the fuel out, under pressure, into the carburetor. Pen bladder tanks provide very good pressure. Baby pacifier tanks provide one heck of a lot of pressure. The more the pressure, the better needle valve you'll need to meter the fuel. As you can imagine, the exasperation occurs when the balloon/bladder molecules decide to let go of their hands and redistribute the fuel . . . in your face as well as other places.

The second basic system uses air pressure to pressurize a metal, sealed (or "hard") tank. This pressure can be tapped from the crankcase or the exhaust . . . including tuned pipes. Crankcase pressure is further broken down into timed and untimed pressure. If we tap directly into the case, it is untimed, or averaged pressure. If the tap is taken off the crankshaft area, such as the plastic nipple fitting on the right side of the Cox carburetor housing, it is timed. Similarly, a backplate tap on a rear rotor engine is timed pressure. What's the difference? Well timed pressure is higher than untimed average pressure.

At this point you may be wondering, "How much higher?" I can't give you a definitive answer. It will vary from engine to engine. That's why I've avoided using pounds-per-square-inch numbers. Don't fret, because we can place the methods in relative order of pressure. Generally speaking, muffler pressure is lowest, untimed crankcase pressure is next, then timed crankcase pressure, followed by pen badder pressure, with the most pressure coming from baby pacifier bladders. Remember though, that variations in bladder materials and/or thicknesses, and pressure

Continued on page 66

BIG BIRD THE E.T.

By LARRY JOLLY . . . Are you tired of all those sleek looking, efficient flying, electric planes that you see so often? Are you a novice R/C pilot looking for an easy place to get started in electric powered flight? Are you looking for something quick to build and inexpensive too? Try a *Big Bird the E.T.*, it's so boxy, it's so cute, you'll love it!

• Why *Big Bird?* Well, the current rage in electric flight "SEAMS" to be enlarging free flight rubber powered models and powering them with an appropriate electric propulsion system. The reasoning behind this fad is that first and foremost, these free flight designs are extremely stable, and easy to build and fly. Secondly, gear driven electro-systems use large, scale like props and are perfectly suited to these lightweight structures.

After I saw a few of the designs that were being flown and/or published, I decided that I had to join the fun. There was, of course, an ulterior motive. As a child, I could never get those darn stick and tissue jobs completed before I would give up in despair and deliver the final crushing blow. I don't want to tell you how many of those things I wadded up like a soiled Kleenex, but there were quite a few. At last I would have my chance to get even with the designers of those awful kits that were never really intended to be finished and flown. I would have my revenge; I would successfully build a straight, stick fuselage.

But why *Big Bird?* I decided that my enlarged rubber model should be as easy to build as possible. Of course, this meant that "under camber" and multiple sized ribs were out. It followed that if I wasn't going to build a sophisticated wing, why should I ruin the character of the model by putting extra work in the empennage. No way . . . not me, a simple, uncomplicated, flat, horizontal and vertical stabilizer were in order. However, the model did have to have a stick fuselage. What a dilemma! What should I build?

While thumbing through an issue of **Model Builder** one day, I saw a picture of a Peck Polymer's *"Prairie Bird"*. Perfectomundo!! That *Prairie Bird* had exactly the right shape, as a matter of fact, it had the right *everything* for my purpose. I dropped the magazine *(Reverently, we hope. wrf)* and ran to the hall closet. Years ago I had purchased a kit of the *Prairie Bird*, but (luckily) I had not taken the time to go through the strenuous effort of opening the box. This mild case of indolence saved me from even more effort by relieving me from the arduous task of half building the model. It also saved me from the frustration of losing vital pieces while I thought about finishing it.

Somebody has obviously told Cherie Jolly that a *Big Bird* in the hand is worth two in the bush, we'll bet it was her daddy, Larry Jolly. Now, how can you resist building a *Big Bird?*

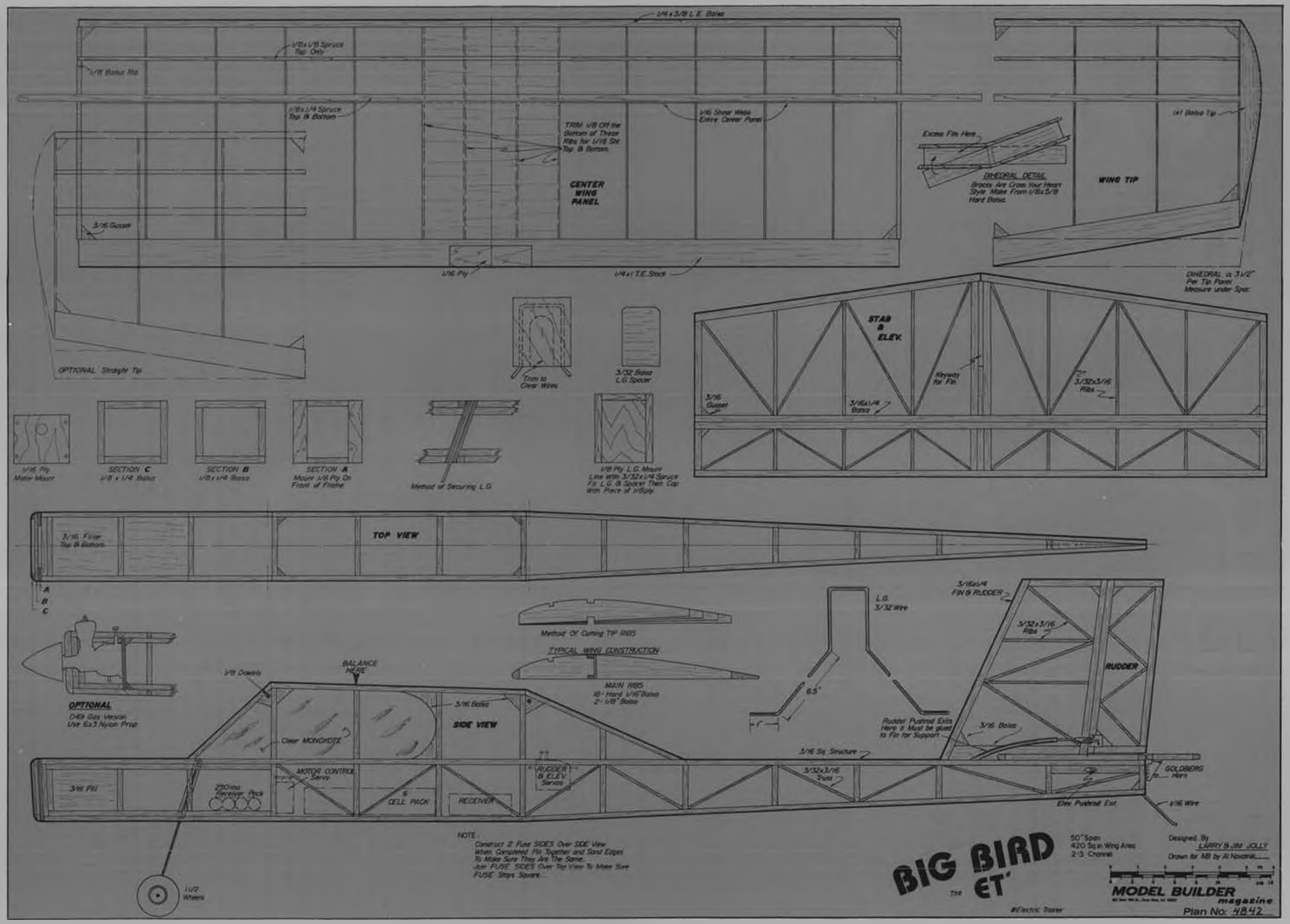
With the box in hand, I ripped off the end flap and spilled out the pieces. There they were, the *Prairie Bird* plans in all their boxy glory. I have to admit that *Big Bird* is not a total scale-up of the *Prairie Bird*, but if you were to stand back and close one eye and multiply the little one's dimensions by three, what you would get would remind you a lot of the *Big Bird*.

But why *Big Bird?* You know, even after explaining my reasons to this point, most of my friends kept asking me repeatedly, "But why *Big Birds?*" Well, here I'll give everybody the answer. I wanted to design a lightweight, scaled rubber job that would be easily recognizable, have general appeal, that could be powered by any sport six-cell system, and above all else, be easy to build and have excellent flight performance.

I believe that *Big Bird* meets the stated criteria to a tee. We have built and flown three different versions: an 05, can-type electric motor with direct drive and a 7-4 wood prop; a geared 2.5 to 1 electric system using a 10-5 wood prop; and an .049 gas version using a 6-3 nylon prop. All three have exhibited the same great flight performance. Personally, I am partial to the gear driven model. To me there is nothing prettier than watching *Big Bird* circle down to a landing with that prop free wheeling.

By the way, several novices have flown our prototypes, hence the addition of *ET* to the name.

If you want to fly your *Big Bird* this weekend, we had better get going right now!!!


1/4 x 3/8 L.E. Balsa
1/16 x 1/8 Spruce Top Only
1/16 Balsa Rib
1/16 x 1/4 Spruce Top & Bottom
TRIM 1/8 Off the Bottom of These Ribs for 1/16 Sht Top & Bottom
1/16 Sheet Webs Entire Center Panel
CENTER WING PANEL
3/16 Gusset
1/16 Ply
1/4 x 1 T.E. Stock
Excess Film Here
DIHEDRAL DETAIL
Braces Are Cross Your Heart Style Make From 1/16 x 5/8 Hard Balsa
WING TIP
1x1 Balsa Tip
DIHEDRAL is 3 1/2" Per Tip Panel Measure under Spar.
OPTIONAL Straight Tip
Trim to Clear Wires
3/32 Balsa L.G. Spacer
STAB & ELEV.
Keyway for Fin
3/32 x 3/16 Ribs
3/16 Gusset
3/16 x 1/4 Balsa
1/16 Ply Motor Mount
SECTION C 1/8 x 1/4 Balsa
SECTION B 1/8 x 1/4 Balsa
SECTION A Mount 1/16 Ply On Front of Frame
Method of Securing L.G.
1/16 Ply L.G. Mount Line with 3/32 x 1/4 Spruce Fit L.G. & Spacer Then Cap With Piece of 1/16 ply
TOP VIEW
3/16 Filler Top & Bottom
A
B
C
Method Of Cutting TIP RIBS
TYPICAL WING CONSTRUCTION
MAIN RIBS
16 - Hard 1/16 Balsa
2 - 1/8" Balsa
L.G. 3/32 Wire
3/16 x 1/4 FIN & RUDDER
3/32 x 3/16 Ribs
RUDDER
6.5"
Rudder Pushrod Exits Here & Must be glued to Fin for Support
3/16 Balsa
OPTIONAL
.049 Gas Version Use 6 x 3 Nylon Prop
1/8 Dowels
BALANCE HERE
3/16 Balsa
SIDE VIEW
Clear MONOKOTE
3/16 Sq. Structure
3/16 Fill
250 mA Receiver Pack
MOTOR CONTROL Servo
6 CELL PACK
RECEIVER
RUDDER & ELEV. Servos
3/32 x 3/16 Truss
GOLDBERG Jr. Horn
Elev Pushrod Ext.
1/16 Wire
1 1/2 Wheels
NOTE:
Construct 2 Fuse SIDES Over SIDE View When Completed Fit Together and Sand Edges To Make Sure They Are The Same.
Join FUSE SIDES Over Top View To Make Sure FUSE Stays Square.
BIG BIRD ET
The
50" Span
420 Sq in Wing Area
2-3 Channel
Designed By LARRY & JIM JOLLY
Drawn for MB by Al Navarrete
MODEL BUILDER magazine
Plan No: 4842
#Electric Trainer

Big Bird the E.T. is a scaled up and modified Peck-Polymers *Prairie Bird* rubber powered model. Really shines as an electric trainer.

The Leisure Gear Motor is a perfect choice for the *Big Bird.* Removable ply motor mount plate makes motor installation a breeze.

Before you start construction, procure the following: (1) a set of *Big Bird* drawings from **Model Builder**; (2) the necessary balsa, spruce, and plywood; (3) a length of 3/32 wire; (4) a set of 1-1/2-inch wheels; (5) one roll of Monokote; (6) Hot Stuff or Zap; (7) sand paper and various modeling tools; (8) a building board 36 inches long that will take pins.

BUILDING THE FUSELAGE

This could be entitled, "Back to Square One." There is nothing hard about building a stick fuselage. This one is even easier than most because the sticks are 3/16 square. To begin construction, cover the plans with wax paper and select four 3/16 square balsa sticks of matched type (that is, equal hardness and bending qualities). Use those for the fuselage longerons.

Place two of the four pieces over the side view of the fuselage. Pin the longerons in place. Now cut the upright sticks and glue them in place. Cut and fit the 3/16 sheet balsa for the window outline, the nose reinforcement, and gussets; then glue them in place. Now, add the 3/32 x 3/16 truss members.

When you have completed the first fuselage side, lift it from the plans and construct another one just like it. I know common free flight practice is to build one fuselage side over the other one, and then split them apart. However, I find it easier to build using my sequence.

When both fuselage sides are completed, pin them together and sand the edges with a sanding block. This ensures that both sides are the same.

Study the top view of the fuselage. Notice that the fuselage cross members are the same width from the nose to the rear wing dowel. What I did to make these was to put a stop on my saw and cut 20 or 30 identical cross sticks.

The next step is to pin the fuselage sides upright over the top view. This will help keep the fuselage square. Starting at the nose, glue in all of the cross members from the nose to behind the wing. When these are dry, unpin the front of the fuselage and rock the fuselage aft so that the rear of the fuselage now touches the plans. Bring the fuselage ends together and glue in place. Add the remaining cross members. When this is dry, remove the fuselage from the board and add the remaining 3/16-inch sheet.

Bend the landing gear as shown on the plans from 3/32 wire. Study the landing gear mount. It is made by cutting two identical plywood squares. Border one of the squares with 3/32 x 1/4 spruce as shown and glue the two squares together, trapping the landing gear between them. When the unit is complete, trim as shown so that you have access to the motor wires and such. Now glue the completed unit into the fuselage.

For you glow motor fans out there, we have a picture of the .049 version of the *Big Bird.* However, please don't call it *"Big Bird the E.T."*, rather, call it *"Big Bird the G.T."*

The next thing we have to tackle is the motor mount. The first step is to add the 1/8 x 1/2 plywood pieces to the nose of the fuselage. Note that they mount on the sides, top to bottom. Now, add the horizontal 1/8 x 1/4 balsa pieces on the top and bottom of the front cross members to bring the nose flush again. Cut the 1/16 plywood motor mount to the shape shown on the plan. Use No. 2 wood screws to hold the mount in place. Add the remaining 1/8 x 1/4 balsa border around the mount. The fuselage construction is now complete.

BUILDING THE WING

Start the wing by cutting the ribs. You can either make a plywood template and cut each rib individually, or stack sand a set, it's up to you. If you build the tapered tip version, modify the tip ribs as shown on the drawing. Also note you must trim the three center ribs to accept the 1/16 center panel sheeting. This is easily accomplished by taking 1/8 inch off the bottom of the three ribs.

Start the wing construction by building the tip panels. Simply pin the bottom spar in position along with the leading edge and the trailing edge. Add the ribs and the top spar. Decide what sort of wing tips you want to use and glue them in place. Lift the completed tip panels from the board and prepare the dihedral joint for joining to the main panel. Pin the tip panels in position on the plan, elevated to the proper dihedral angle, and construct the main panel directly to them. Don't forget the center sheet and the shear webs. Construct the dihedral braces as shown from hard balsa. The wing is now complete, except for sanding.

BUILDING THE TAIL SURFACES

The tail surfaces are super easy. Just make the outlines from 3/16 x 1/4 balsa and fill in the ribs. When the surfaces are complete, lift them off the board and round the edges. Don't try to sand an airfoil shape into the surfaces, it's not necessary.

FINISHING THE BIG BIRD

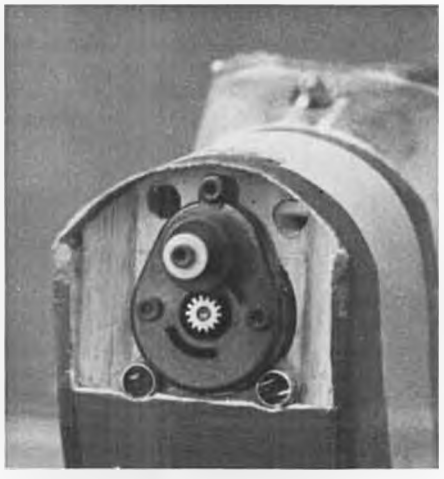
Finish sand the fuselage and tail surfaces to a smooth finish. Shape the leading edge of the wing as shown on the plan and finish sand the wing. Now cover the model; I use Monokote. Leave

Continued on page 67

Kathy Forrey, the author's wife (and expectant mother), poses with the *Feather Merchant*, a 1939 design converted to electric power and R/C.

PRODUCTS IN USE: Lehmberg's 1939 Feather Merchant

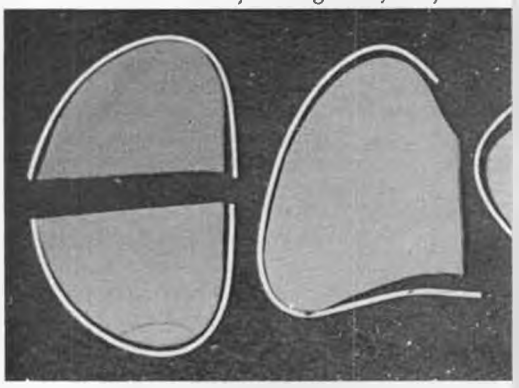
By BILL FORREY . . . *Model Builder's* "R/C Soaring" columnist reviews the Lehmberg Enterprises Old Timer model, the *Feather Merchant*. Chalk up one more convert for O/T flying! Join us for a four-part "Products in Use" on the *Feather Merchant*, the Leisure LT-50 Gear Motor, Coverite Micafilm, and Circus Hobbies Century VII FM radio system. A good combination of products for electric sport flying.



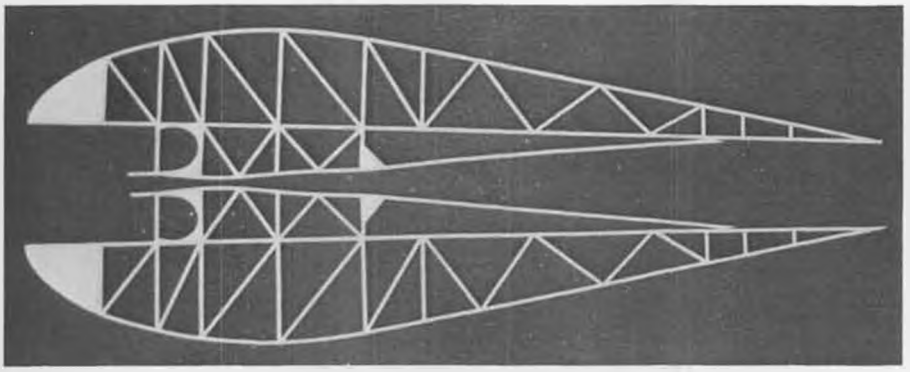
The *FM-72E* is powered by a Leisure 2.5:1 Gear Motor. Prop used is a Rev-Up 11-6EW. Top bolt and support tubes hold motor in.

• I have never before been this excited about an R/C model. Never before have I lost sleep over the prospect of building any one model . . . but the *Feather Merchant* really did a number on me! When I first received the kit from the UPS driver, I was intrigued. My curiousity forced me to pull out the plan and take a look at it. That was all it took . . . that night the plan was mounted on the bedroom wall where I could gaze upon it with a totally child-like anticipation. I studied its every stick and every curve. I fell in love . . . with an Old Timer model!

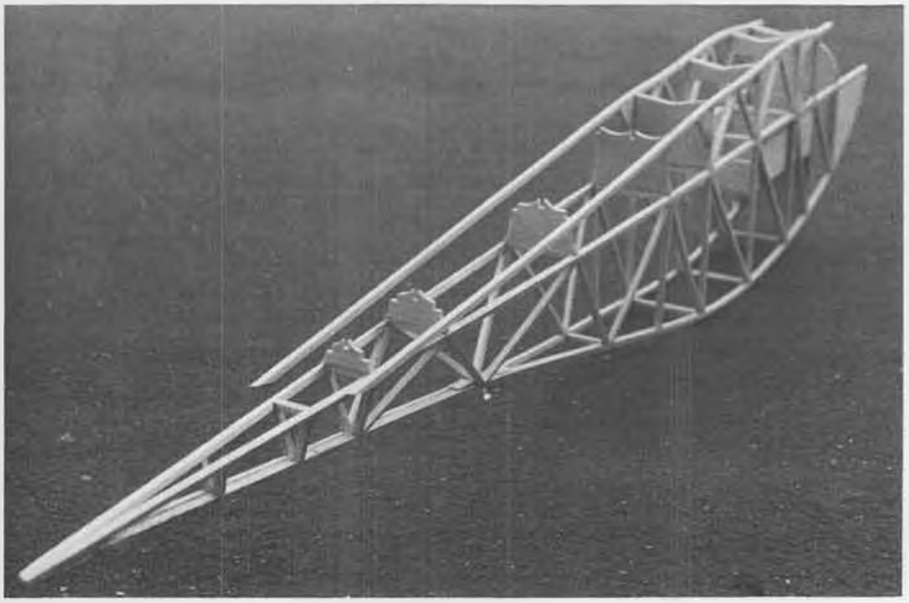
It was about a week before I could begin work on the old bird, a week which seemed to drag! During this time, I planned out my stategy. Firstly, I would build that curvaceous fuselage. Secondly I would build the stab. Phase three would be the fin and rudder. Finally, the wings would come together. All of this was worked out in my mind during that agonizing week, but it was part of the fun. It was a little like picking someone else's brain, like trying to figure out "who dunnit" halfway through a mystery



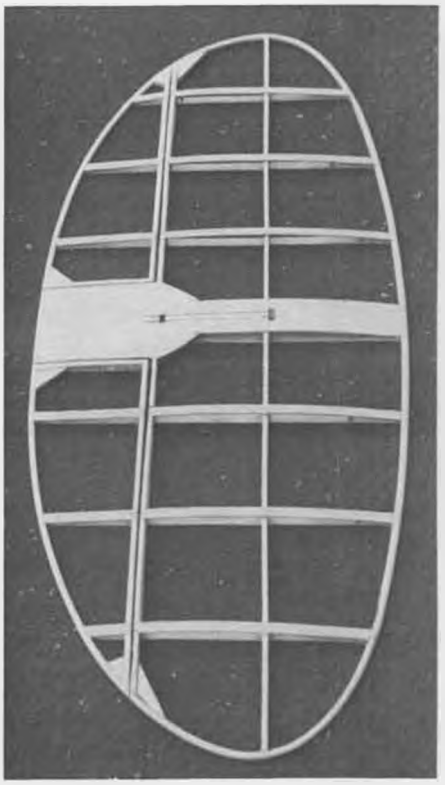
Author's method of "molding" reed parts to fit exact plan outlines is to make cardboard



Fuselage construction starts with the two sides, built identically from the plan and sanded together for a perfect match. Top longeron is left "hanging loose" until final steps.



The two fuselage sides are now joined together with the 2-1/2-inch cross pieces and formers. Top rear fuselage formers are cut from sheet wood supplied. Fuse bottom forms V shape.



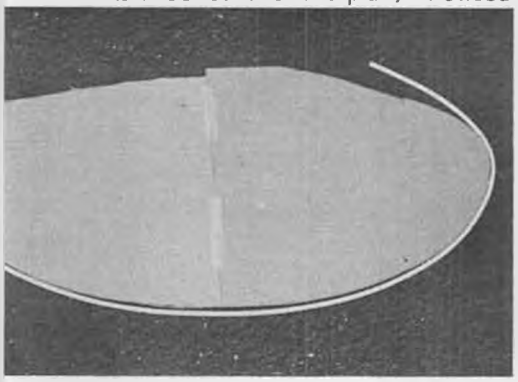
Modifications to the basic F/F stab are evident: elevator spar added, center sheeting widened, gussets added, and holes added to sheeting for fin spars to be inserted later.

novel, or putting together a puzzle. I was challenged, and my mind was obsessed.

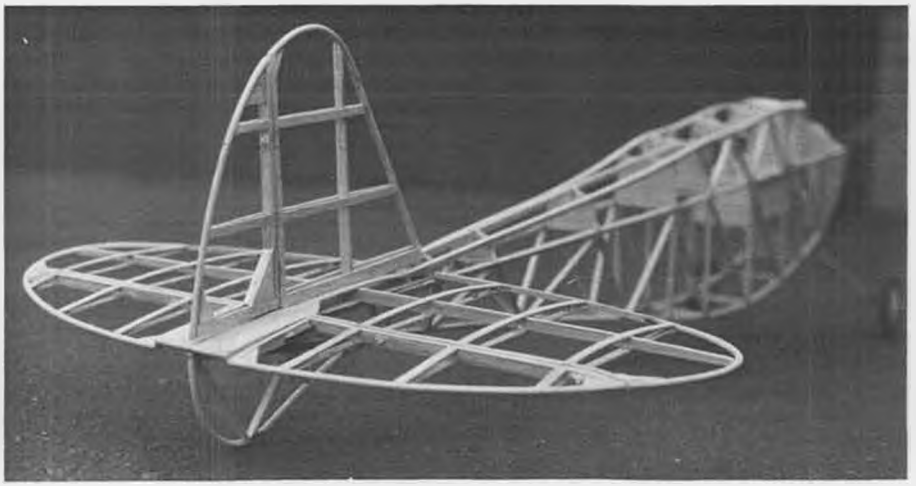
The *Feather Merchant* kit is a little unusual in my limited experience with kit models. There is no step-by-step instruction manual. Perhaps this is not unusual with O/T kits, I don't know. When I asked the manufacturer, Lehmberg Enterprises, about this, I was told that although there was no such manual included in the kit, there soon would be a procedural manual which would lead the builder through construction in a general way. In my opinion, this would be all that is necessary.

As I looked over the plan, I noticed that there were plenty of building notes written all over the place. Their positioning coincided with, or pertained to the part being built. For example, the wing plan reads: "Sand trailing edge to match airfoil upper camber. Don't get too ambitious, leave it about 1/32 to 1/16 at the edge. Fair round reed into trailing edge." Now that pretty well sums up the shaping of the trailing edge. I don't have any problem with notes like these, in fact, I had no, problems at all in constructing the *Feather Merchant*. However, a beginner who has never built a model before would be well advised to have someone, preferably a modeler with a few models under his belt, available to answer questions.

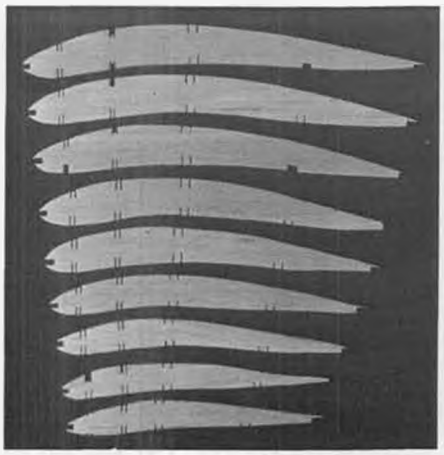
A supplemental information sheet is included with the kit which covers the areas of spar doubling for R/C versions of the three *FMs*, servo locations, pushrod locations, CG location, balsa soaking recommendations, incidence, dihedral and washout in the wings, and engine recommendations for the three *FMs*. That's a lot of information . . . but the modeler is the one who is left with the question, "Where do I begin?" This can be a tough question for a rank beginner. I believe the procedural manual will



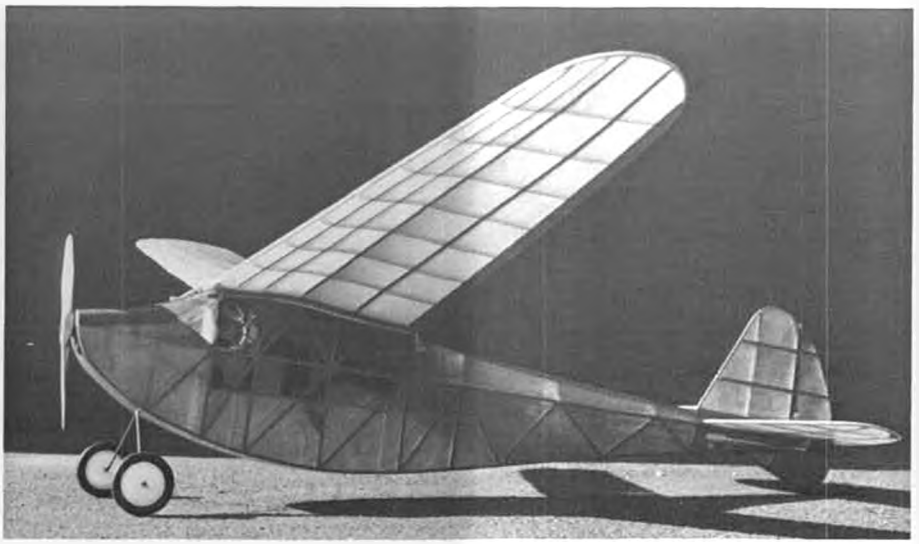
forms (traced from the plan), soak reed parts, wrap parts around forms, and allow to dry.



The graceful curves of the *Feather Merchant's* tail surfaces really make her an attractive model. Reed is an easy material to work with. Stab and fin/rudder are very lightweight and strong.



Common practice in OT kits is to band saw the ribs to shape. These ribs needed a little sanding and filling to be uniform. No biggie.



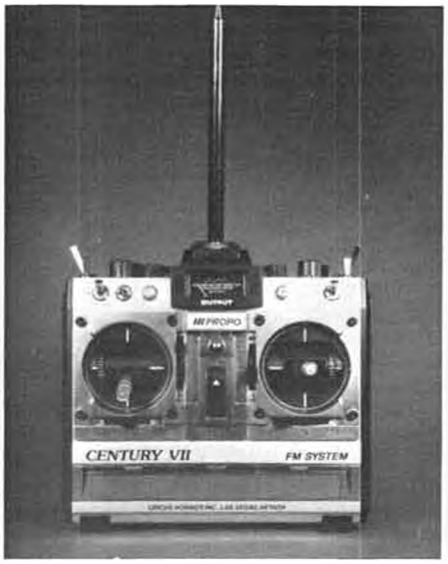
Completed *Feather Merchant*. Coverite's Micafilm was used to keep weight to a minimum. It has the look of Silkspan, the gloss of Monokote, but 1/2 the weight and twice the toughness.

provide an adequate answer for this modeler.

Along with the notes on the plans is a brief and enteraining history of the first *Feather Merchant*. As there are actually three versions of this model, perhaps an explanation as to which came first would be in order. The *FM-72* (the model featured in this article) came first in 1939. It was designed for the Brown Jr. ignition engine. After this model came the *FM-46*, a 73% version of the original with shortened wings and a slightly altered nose. This model was the direct result of Santa Claus' generosity as he left Fred Lehmberg a Bantam ignition engine under the tree on December 25, 1939. The big daddy in the *Feather Merchant* family is relative newcomer. The *FM-80* was designed in the last weeks of 1981. As it is a scaled up version of the *FM-46* which was designed in 1940, it is legal for SAM (Society of Antique Modelers) competition in R/C Assist only (which allows scaling of legal models).

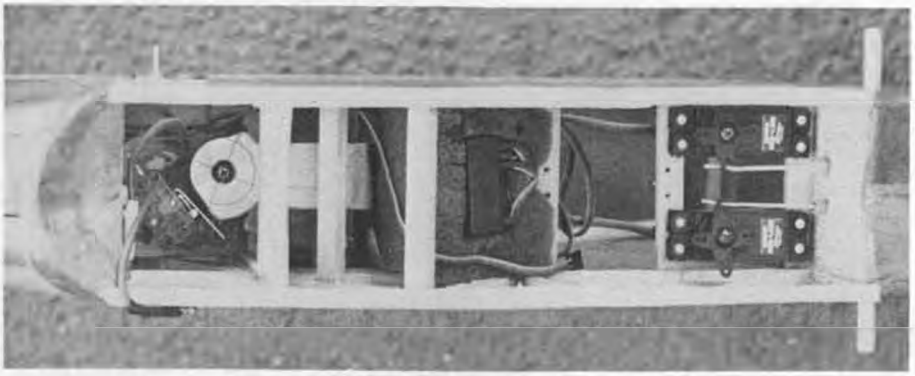
On with the review!

Continued on page 80



The Circus Hobbies Century VII Tx is a "all the whistles and bells" type radio. Flawless.

Electric snout and gas snout . . . just to show you how it looks either way. Glow engine is an H.B. .25 non-Schneurle. Ask Lehmberg Ent. about engine/kit combos.



Feather Merchant 72E equipment layout (left to right): safety motor switch and receiver on-off switch on outside of fuselage; motor on-off servo with Leisure microswitch glued on, 1/16 ply cam with 1/4-inch throw operates switch; Rx battery pack; Rx; elevator and rudder servos.

LAUNCH! The electric *Feather Merchant* is absolutely a pleasure to fly. No messy fuels, quiet flight . . . you can fly almost anywhere!

By DICK HANSON

• This year we enter a new phase in aerobatic flying. Up till now, our AMA contest rules have been set up to provide a stepping stone to FAI competition. As I recall, this has been so for at least 10 years and certainly more, but I did not participate actively before 1973, so I don't know exactly how the tie in between AMA and FAI came about.

It doesn't really matter how it came about . . . the important thing is that at the present time, you cannot enter FAI competition as a USA team member unless you do so with the sanction and blessings of AMA. Here's the part that puzzles me; you can enter FAI class flying as a beginner to model flying, and, should you through skill and, unbelievable luck win every FAI Turnaround contest in the country, you would also have to, as I understand it, "gain your spurs" through flying the AMA/FAI (old rules) schedules. Is this so?

My point is that the straight line through novice to master to potential USA team member has become snarled. Do we have two methods now of "getting there?"

I really sensed a lot of fear last year on the part of beginners to aerobatic flying. Fear that the Turnaround Pattern was hopelessly beyond their ability and potential. This is understandable, given the time and money we have each spent trying to get a handle on the current type of winning model and its flying characteristics. The voting on a separate "Turnaround" event confirmed my suspicions.

It now comes to the question," How do we make chicken soup from chicken ----." Better stated: we have a knotty situation. Lets see if we can resolve it.

As a possible method, I suggest we all give the new pattern a chance by flying it at every contest, this will give more people a chance ot see that it isn't impossible to judge or fly.

Should you be skeptical about the equipment necessary to fly the "Turnaround," may I suggest the following combinations which will work and will neet the noise criteria.

SUGGESTED TURNAROUND PATTERN EQUIPMENT

1. New O.S. Wankle engine, plus four to five pound, 500 square inch model.
2. Four-cycle .90, plus 750 square inch model, seven to eight pounds.
3. Four-cycle 1.2, plus 750 to 900 square inches, seven to nine pounds.
4. Standard .60 engines, muffled tuned exhaust, 12 x 8 prop and seven to eight pounds on approximately 700 to 850 square inches.

Propellers have been developed which will make any of these combinations work very well. Just look around.

The suggestions have been listed in the order of their noise levels: quietest through loudest.

Retractable landing gear is not required, but can be an asset to style.

The radio required really doesn't need a lot of special features. Any solid five-channel rig will do the job.

Note that the equipment required is not ultra-expensive, in fact, it is generally less expensive than most full-blown current designs.

I hope that I have whetted interest on the "Turnaround," and in keeping with the subject, I offer the following training program for any who care. It's basically a series of exercises to help gain familiarity with rudder flying.

EXERCISE NO.1

The object here is to learn to fly the model in flat skids . . . left or right. This is useful in holding the model "on line" in windy situations.

Please believe me when I say that these skills cannot be learned properly without repetitive practice. Each practice session must be done with a positive attitude (That's *you*, not the model), and observed and reviewed for error. *Do not practice mistakes!* This is the worst possible situation as you imprint the mistakes just as surely as you imprint the correctly flown maneuvers.

The model required for these exercises is a four-function (engine, rudder, ailerons, and elevator) design which has been trimmed for level, hands-off flying. You should be comfortable with the model and like to fly it. A positive attitude is mandatory!

OK. If you are ready, let's start.

Establish reference points at your practice site to denote frame parameters. Using the standard, old split-S technique, practice flying back and forth with the straight flight section exactly on the same altitude and heading. Speed should only be moderate, say, 50 to 100 mph.

Next, using rudder inputs, slide the model towards you and away from you on each path. Correct as necessary with aileron and elevator to make the model stay *level*. Practice this until you can make the model slide either way without any detectable aileron or elevator inputs.

EXERCISE NO.2

This is a continuation of the first exercise, but now we will attempt to hover, then turn the model at each end of the flying "frame."

Establish a throttle setting which will permit the model to climb to only about 200 to 300 feet when pulled vertically.

Make your level flyby, then pull the model into a smooth, fairly rapid, vertical attitude at the extreme end of the frame. Using only the flight functions, *not the throttle*, attempt to hold the model in a vertical hover for as long as possible. You will find that it attempts to flop unexpectedly, but that's normal. Your job is to learn to recognize subtle variations from the vertical climb and correct them.

When you have finally achieved the ability to *hover* for aproximately one second, try adding rudder unputs to kick the model over, left or right, upwind or downwind, against or with the wind. This is not an easy exercise, but it can save you from "falling to pieces" in an awkward wind situation. Remember, do not chop the throttle to limit the vertical climb while practicing. The use of prop blast to control the rudder and elevator is very important. Once you have mastered the hover and rudder turn, you can experiment with the throttle by finding the best time to chop power *after* the turn commences.

EXERCISE NO. 3

This is an exercise intended to teach you to recognize very low speed flight characteristics. Start from a level flight attitude, quite low altitude (approximately 25 ft), and moderate power setting. When the model is directly in front of you, pull vertically and hold the model on line until it almost stops. Then, apply down elevator and assume level flight at full power.

You may snap roll the model on your early attempts here as the model has lost much speed and the attempt to regain level flight (up elevator, full power, plus rudder correction) can produce a classic snap situation or simply a bad heading change.

Repeat the maneuver until you can confidently push the model from the vertical climb to the level flight attitude without any droop or heading shift.

When you have become thoroughly familiar with the above exercises, you should be able to do flat skidding figure eight turns, side slips on landings, tail slides, and most importantly, correct any heading changes *without apparently doing so!*

Till next month, grab your old trusty plane and get a few meaningful practice sessions in. •

PLUG SPARKS

By JOHN POND

1. This is the only way to shag a model in the desert! Bill and Pam Cohen, 1/2A Tex. *PB-2.*

• In this issue we are going to feature the free flight models that are the most popular, plus a few that you only see once in a blue moon. The last big free flight meet of the year in California was staged by the SCAMPS (Southern California Antique Model Plane Society) at Taft on the same day the SAM 49 club was holding their bash (a write-up on this was in the previous column). Matter of fact, there were three contests going on at the same time.

Starting off with Photo No. 1, featuring Bill Cohen and his wife, Pam, shows the latest way to retrieve models over those dusty rut plagued trails (or what passes for a trail), a converted dune buggy complete with a good set of roll bars.

As can be noted, Bill has finally gotten out of his wheelchair into a real motorized version! With this dune buggy, Bill can go practically anyplace the motorcycles can, plus he has an easy way of carrying the model back. This columnist has seen numerous three-wheel "bikes," but wonders if this will start a new trend for model retrieval.

About the neatest traveling box (outside of the one the British boys brought to Lakehurst three years ago) is the one shown in Photo No. 2 with Tom Alden, Vancouver, BC, Canada, uncrating some of the models. The box has been so successful, Tom ended up the Sweepstakes Winner of the SCAMP Annual . . . not a mean feat!

Inspection of the box reveals at least three gassies and two rubber models. There are probably more, but this columnist has to admire the ingenuity that went into the box and the models selected for fit.

2. Tom Alden travelled from Vancouver, BC, with this neatly packed model box.

Among the lesser-known lights of the SCAMPS Sam Chapter 13 is Clarence Myerscough shown in Photo No. 3. Clarence is posed with his classic combination of Super Cyclone and *Playboy Senior*. This is one of the toughest combinations to beat in Class C. The model took some time to trim out, but the effort was well worth the trouble as Clarence is now starting to pile up the "wins".

Bob Larsh, the SAM vice-president for the Midwest area, has been responsible for getting a lot of gassies approved for SAM competition that were designed and built during the 1941-42 era, but that were either published too late or forgotten during the influx of wartime privations. One of the models he has been successful in having approved as an Old Timer is the Claude McCullough design called *Brigand*.

This *Zipper*-ish looking model as seen in Photo No. 4 was recreated by Lee Freeman, one of the long-time members of the SCIFS (Southern California Ignition Flyers), SAM Chapter 3. We haven't had any reports on how the model performs, but knowing McCullough designs, this one should disappear rather quickly. *(I guess he means "into the blue." wcn)*

As can be seen in the background, about a mile away are the hills that models can quickly get lost in at Taft. Most easterners will remember the fields fondly, but also with some distaste

3. Clarence Myerscough has a really good flier in the Super Cyke powered *Playboy Sr.* Sweatshirt reads, "I've been to Michigan."

4. Latest of the SAM approved designs is Claude McCullough's *Brigand*. Lee Freeman has built a honey. Photo by Mikkelson.

5. SCIF Newsletter Editor Ken Sykora (*sans* campaign hat) holds up his Tlush *Mite* with Arden 09. Photo by Mik Mikkelson.

6. She not only looks good, but flies equally well too! Sandy Chapin launches her 1936 Jeffries Moffett design. Mikkelson photo.

7. Ed Tschernoscha (rhymes with Kenosha) poses with his good flying *Zipper*. Same model was flown at the 1983 VAMPS meet.

because of the lack of accommodations. What the heck do you expect? Taft is way out in the middle of nowhere . . . oil fields and desert.

While we are talking about the SCIF Sam Chapter, we couldn't let Photo No. 5 go by without showing newsletter editor, Ken Sykora, with a lesser-known Old Timer, a *Mite* as designed by Frank Tlush. Powered by an Arden 09, this design should really go.

If you are having trouble recognizing Ken Sykora, it is because the well-known campaign hat is missing . . . maybe Freeman swiped it. (See Photo 4.)

Photo No. 6 is the living proof that Sandy Chapin not only builds them, but winds her own rubber models and flies them. The wind was up pretty much in force at this time, so photographer "Mik" Mikkelson notes that everyone was watching Sandy do her stuff (or should that be *ogling?*). On her right is Brad Levine who has been patiently coaching her for the last several years. Things are now getting to the point where her models are starting to fly like she looks . . . *good!* Ah, the SCIFS are a lucky gang of fellows!

Back to the SCAMPS again, we give you Photo No. 7 of Ed Tchernoscha with a standard *Zipper*. Don't let the name throw you, it simply rhymes with Kenosha. Ed has been around a long time, but his name still floors a lot of people. Of interest, in the background, is an example of the standard free flight retrieving deviced for Taft: a motorcycle, or "motorbike" depending on the horsepower.

For those interested in contacting Ed Tchernoscha, he can be found at 7800 Big Rock Drive, Riverside, CA 92509. He always welcomes company!

At the dinner, Friday night before the contest, this columnist had the pleasure of talking to Fred Caballero of the VAMPS club from Las Vegas, Nevada. (Doesn't take much to figure out the acronym, VAMPS: Vegas Antique Model Plane Society). At that time, he mentioned that he had brought a *Rambler* for the Antique Event.

Photo No. 8 is a good view of this controversial model that appeared in the 1939 issues of *Flying Aces*. As of this date, the columnist, who also doubles as the SAM historian, has not received any documentation which would indicate that this model is truly an Antique. The columnist has had several conversations with Frank Ehling about the subject, but the only information that has been gleaned is that Gil Sherman used Frank Ehling's *Contest Winner* as a design basis for his model. Hopefully, someone out there will endeavor to get some affidavits or something to verify the model as an Antique!

(It appeared in Sept. '83 FA, and to quote, "The Rambler was completed during the early part of September, 1938, and was taken to the Second Annual Quaker City Gas Model Airplane Association contest at Northeast Airport, Philadephia." The text goes on to say that it took first place with a 22 minute plus flight on a 19 second motor run. wcn)

We couldn't wrap up the photos on the SCAMP Annual unless we had a pic of the contest director. Photo No. 9 fills

8. Fred Caballero, VAMPS member, came from Las Vegas to fly his *Rambler*. Beautiful model.

9. Contest Director Al Heinrich took time to adjust his Nostalgia model, a Torpedo 35 powered *Ramrod 600*.

10. "Thar's gold in them thar hills." Jim Bohash holds nugget to prove it.

11. Gordon Codding has been converting his modified *Hepcats* to electric power. He has installed a couple of Estes Skymax motors.

the bill admirably as Al Heinrich is seen with his Nostalgia model, a Torpedo powered *Ramrod 600*. According to Al, this model doesn't need to take a back seat to any of the modern stuff as it does perform well!

Al made some comments that despite the weather, which was threatening, a fair number of contestants attended. However, Saturday had periods of light rain and mist all day. Sunday started off beautifully with blue skies, but by ten o'clock the wind had come up, and it pretty well stopped all flying. One exception to this was the stick rubber event which had three contestants trying for third place.

Ed Wallenhorst was in third place with two flights when Sandy Chapin decided to finish off her two remaining flights. At the same time, Hal Cover decided to brave the wind. Sandy then moved into third place leaving Ed to again drag out his model and put in his last flight. Meanwhile, Hal Cover had put in two flights. With a chance of winning, he launched with about a dozen watches clicking (sic!) but landed about 28 seconds short of Ed's score.

As pointed out before, Tom Alden has started making the trips to the SCAMP and SCIF Annuals. This time he did so well that he won the Sweepstakes Award. The O&R Perpetual Trophy was taken by Larry Clark while the interesting Eight Ounce Wakefield Perpetual was won by Al Richardson. Here's what the results looked like:

1/2A Texaco (9)

1. Sal Taibi *(Powerhouse/TD 020)*	32:59
2. Jim Adams *(Mike/R.R.1)*	29:17
3. Bob Dittmer *(Miss Philly VI)*	28:42

Thirty Second Antique (10)

1. Tom Alden *(Flying Midget/OR 19)*	11:27
2. Bob Dittmer *(Powerhouse/Anderson)*	10:22
3. Larry Clark *(Miss Delaware/OR 60)*	8:42

Class C Pylon (8)

1. Clarence Myerscough *(Playboy/Cyke)*	12:41
2. Bert Fawcett *(Zipper/OS 29)*	9:47
3. Al Richardson *(Sailplane/Cyke)*	9:26

Commercial Rubber (3)

1. John Camp *(Albatross)*	6:14
2. Carl Hatrak *(Megow Jr.)*	2:47
3. Abe Gallas *(Flying Aces Comm)*	2:45

Cabin Rubber (6)

1. Ed Wallenhurst *(Light)*	10:58
2. Mik Mikkelson *(Burd Korda)*	9:17
3. Tom Alden *(36 Canadian)*	7:16

Class A-B Cabin (5)

1. Dick Lyons *(Miss Tiny/OR 19)*	7:21
2. John Camp *(Cabruler)*	7:00
3. Terry O'Meara *(Commando/OS 15)*	6:14

Class C Cabin (6)

1. Bob Dittmer *(Powerhouse/Anderson)*	8:55
2. Lee Norcross *(Bombshell/Cyke)*	5:09
3. Cliff Silva *(Playboy Cabin/Cyke)*	4:43

Hand Launched Glider (3)

1. Allen Heinrich *(Huguelet)*	2:56
2. Bob Oslan *(Hervat)*	2:36
3. Dan Heinrich *(Huguelet)*	1:25

Scale Gas (3)

1. Cliff Silva (Corben *Ace)*	21:09
2. Jim Adams (Fokker D-8/Frog 2.49)	9:58
3. Carl Taylor (Aeronca/Cox 02)	5:44

Eight-Ounce Wakefield (3)

1. Al Richards *(Korda)*	6:47
2. Ed Wallenhorst *(Korda)*	4:32
3. Mik Mikkelson *(Burd Korda)*	14

020 Replica (9)

1. Tom Alden *(Buzzard)*	8:14
2. Clarence Myerscough *(Strato Streak)*	8:13
3. Dick Lyons *(Alert)*	8:09

Class AB Pylon (3)

1. Fred Caballero *(Alert/OS 25)*	13:07
2. Bob Oslan *(Ranger/OS 25)*	11:01
3. Cliff Silva *(Ranger)*	10:46

Stick Rubber (5)

1. Tom Alden (?)	12:26
2. Steve Beebe (Lamb *Climber)*	10:59
3. Ed Wallenhorst *(40 Record)*	6:49

The best upcoming free flight contest for 1984 is the VAMPS Annual to be held February 25-26th at the Eldorado Dry Lake near Henderson (35 miles east of Las Vegas). This is always a terrific meet as the wind (at times) is practically non-existent. We hope to be there to cover the fun. *(See Bill Stroman's coverage of the 1983 VAMPS Annual elsewhere in this issue. wrf)*

ENGINE OF THE MONTH

There is no question that when it comes to motor designs and the manufacture thereof, William E. "Bill" Atwood was the most prolific of all. At the time of the inception of this engine, Atwood had no less than five aircraft engines on the market with a whole flock of car and boat racing engines on the back burner.

Quite a bit of confusion arose over the various Atwood engines being produced back then. The first "Hi-Speed" engine (later known as the Bullet) was advertised with an address of 800 E. Gage St., Los Angeles. The Atwood Phantom was also advertised at this address. When the Hi-Speed "Torpedo" came out, the mailing address was given as 6408 McKinley Avenue, Los Angeles.

A quick look at the old Los Angeles maps show these building(s) to be the one and same with entrances fronting each street. Just another case of one hand washing the other! Regardless, Atwood's engines commanded immediate respect. These rotary valve engines were low cost, light, and ran well. This writer considers the Torpedo the foremost Class B engine produced by Atwood. Even today's famous Torpedo can trace its ancestry to this good running

13. Harold Johnson of Minneapolis, Minnesota, is about to launch an Ohlsson .60 powered *Buzzard Bombshell*. Red and black scheme.

14. Joe Prus of New Jersey says this K&B .40 powered *M-G* flies like a dream! Transparent red and opaque white color scheme.

12. OUCH! The PARCS gang holds up the remains of Dave Reynolds (left) Spitfire powered Sal Taibi *Powerhouse*.

engine.

Of course, by making the engine light (they were made of Dow metal) the magnesium cases broke rather easily in a crash. One of the big faults was the way the engine mounting lugs, when torn loose, would reveal an open crankcase. Too bad we didn't have epoxy glues then! Even the cyanacrolates would help tremendously!

Coming out in the July 1939 issue of *Model Airplane News*, Torpedo enjoyed an immediate success. The enclosed timer was a real boon as it did keep dirt and grease out. However, on the negative side, timer springs would break easier under continual use. According to the manufacturer, the timer had been checked to 20,000 rpm.

In an effort to keep weight down, Atwood employed Dow metal (which is claimed to be 2/3 the weight of aluminum) in all die cast parts. The gas tank was made of transparent bakelite advertised as both a heat and alcohol resisting material. The crankshaft was "hogged" out of one piece of steel with a hollow crankpin, all operating on a bronze main bearing.

A steel piston was lapped to a cast iron cylinder. To round out the materials used, the connecting rod was die cast Dow metal while the wrist pin was machined from brass.

Figures differ on the displacement as the opening advertisements give the Torpedo as a .27 cu. in. engine. However, with a bore of .75 in. and a stroke of .343 in., this figures to be .304 cu. in. Later, with slight changes in the bore (.725 in.), figures were announced giving a displacement of .2989. That's about as close as you can come to .30 and still be a Class B engine!

Other figures on the Torpedo give the base weight as 4.5 ounces, and the power output as 1/5 hp (original specifications gave 1/7 hp using a 13-7 propeller ranging as high as 800 rpm).

One of the interesting items in the running of the engine is the recommended mixture of 2.5 parts gas to one part of oil. At this time, many modelers were using ratios of four and five to one; hence, this mixture seems to be a throwback to the early three to one combinations. This also helps close up the piston clearance as Bill Atwood had machined his engines for quick break-in and immediate use. This feature was later used by Brodbeck in the postwar Torpedo engines making the engine extremely popular to free flighters.

Wrapping the subject up, the engine was originally priced at $16.50 with coil and condenser. When the "merger" of Hi-Speed and Phantom took place, the Phantom Torpedo was priced at $10.95 . . . a real buy!

THIRTY YEARS AGO, I WAS . . .

When Bill Forrey (**Model Builder's** assistant editor) was in York, England, attending the World Championships for F3B Soaring, he met the team manager, Hans Aaser, of the Norwegian team.

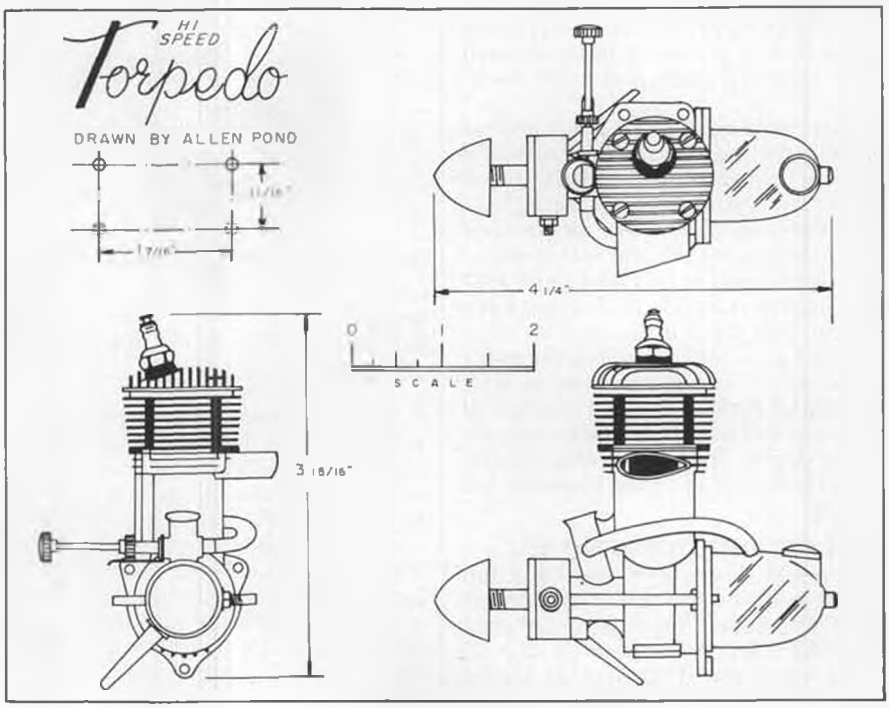
At that time, Hans offered to put Forrey on the list to receive *Model Information* and would translate anything of interest to him. Forrey had just forwarded a letter from Hans to this writer, stating, "This letter is a must . . . Old Timers save a life." Now how about that? Let's hear what Hans Peter Aaser of Bekkegrenda 10, N-1343 Eiksmarka, Norway, has to say (with some editing):

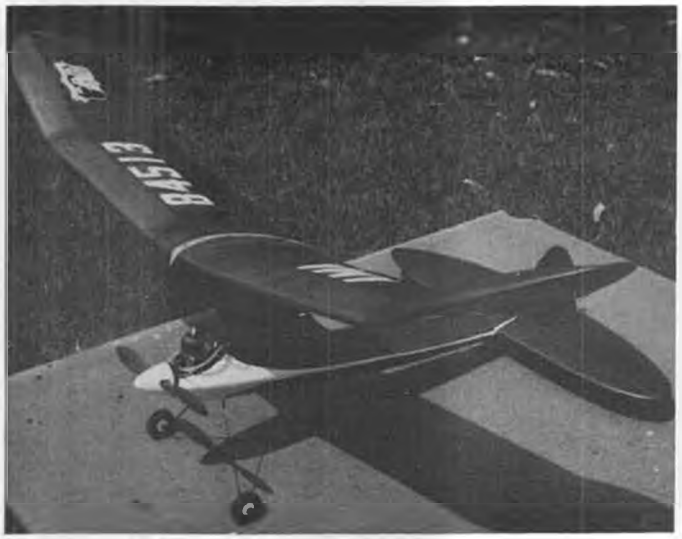
I am celebrating a rather special anniversary this week. On the 28th of November 1943, which was a Sunday, I was out flying with my friends on a frozen lake. The winters were very cold and long in the early forties. We were free flighters at that time as I flew my Henry Struck KGS or one of my own designs powered by a Bunch Mighty Midget. Our German occupation force was very strict but, strangely enough, they allowed us to build and fly model airplanes.

After a nice long flight, I chased the model on my bike across the lake. On the way back, the ice broke under me. There had been two frost periods creating two layers of ice, both rather thin with water between them. I broke through the first layer and stood on the second which slowly gave way creating a slow motion type of fall into the icy water. During this period of time, I had the admirable presence of mind to give the model a good heave. First things first!

The bike went down and never has been found to this date. I somehow got out of my heavy overcoat. Remembering the old Boy Scout advice, I immediately got out my pocket knife. After a few efforts, I was able to get back up on the ice. The model was still in perfect shape!

Two days later, I took a day off from my law studies in order to return the clothes a friendly farmer had lent me. Of course, mother had to dry and press





15. This snappy looking *Swoose* was built by Maurey Fine. Orange and white color scheme, and O&R .29 front rotary valve motor.

Ed Soltis of Yonkers, New York, sends in this vintage photo of himself (left) with an Elf powered *Honey*, and Bernie Gross with original design. Site is Hicksville, New York.

16. Angus Crosbie created this pink and white *Playboy Senior* which came out surprisingly attractive.

discovered by Bob Larsh, SAM Midwest veep, and approved by the SAM board of directors. Plans are in the process of being drawn now.

Jim, who is quite self-effacing, has had another hobby supplant model airplanes, as can be seen in Photo No. 10. Jim has been prospecting for gold for over twenty years. Jim has been able to get enough gold for a modest return, but still feels (like every prospector) there is a bigger vein to be found yet.

Bohash owns (at 65 years young) a piece of property in the Gailbrath Township located near Bruce Station Ontario, Canada. The property, located south-

Continued on page 85

them!

On this same day, the German Gestapo hit the University of Oslo where I should have been studying. The raid was the result of the Gestapo's growing irritation with the students as they suspected (as it turned out, correctly) participation in the underground resistance movement. Two weeks later, 700 students were transported in prison ships to German concentration camps and many hardships.

What could have been a very serious accident for me (retrieving the model over ice) turned out to be a lucky break for me. Thirty days later, as soon as I was able to arrange it, I fled to Sweden and stayed there until the war was over.

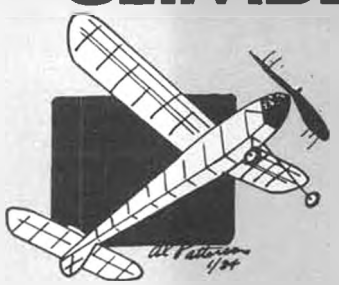
The KGS? Yes, it survived until 1957 when my five year old son received it as a present. That did it in!

I could go on with reminiscences for several more letters, but write to say I like **Model Builder** *for its coverage of old timers and free flight. Right now, it is several degrees below freezing outside with a thin cover of snow. Nice time for building.*

WHAT ARE THEY DOING NOW?

Many old timers will remember Jim Bohash and his eliminations winner of the 1939 Wakefield Team. A good shot of his model is seen in a photo on page 29 of the November 1939 issue of *Model Airplane News*. This design has been re-

HI-CLIMBER



OLD TIMER Model of the Month

Designed by: Earl Stahl
Drawn by: Al Patterson
Text by: Bill Northrop

• Earl Stahl is best remembered by O.T. modelers as the designer of a great series of rubber powered scale models that appeared in the magazines (mostly *Model Airplane News*) during the last few years before the U.S. entered World War II. The Rearwin *Speedster* and Fairchild 24 were the most popular, and even today are almost sure to show up at any contest offering a rubber event.

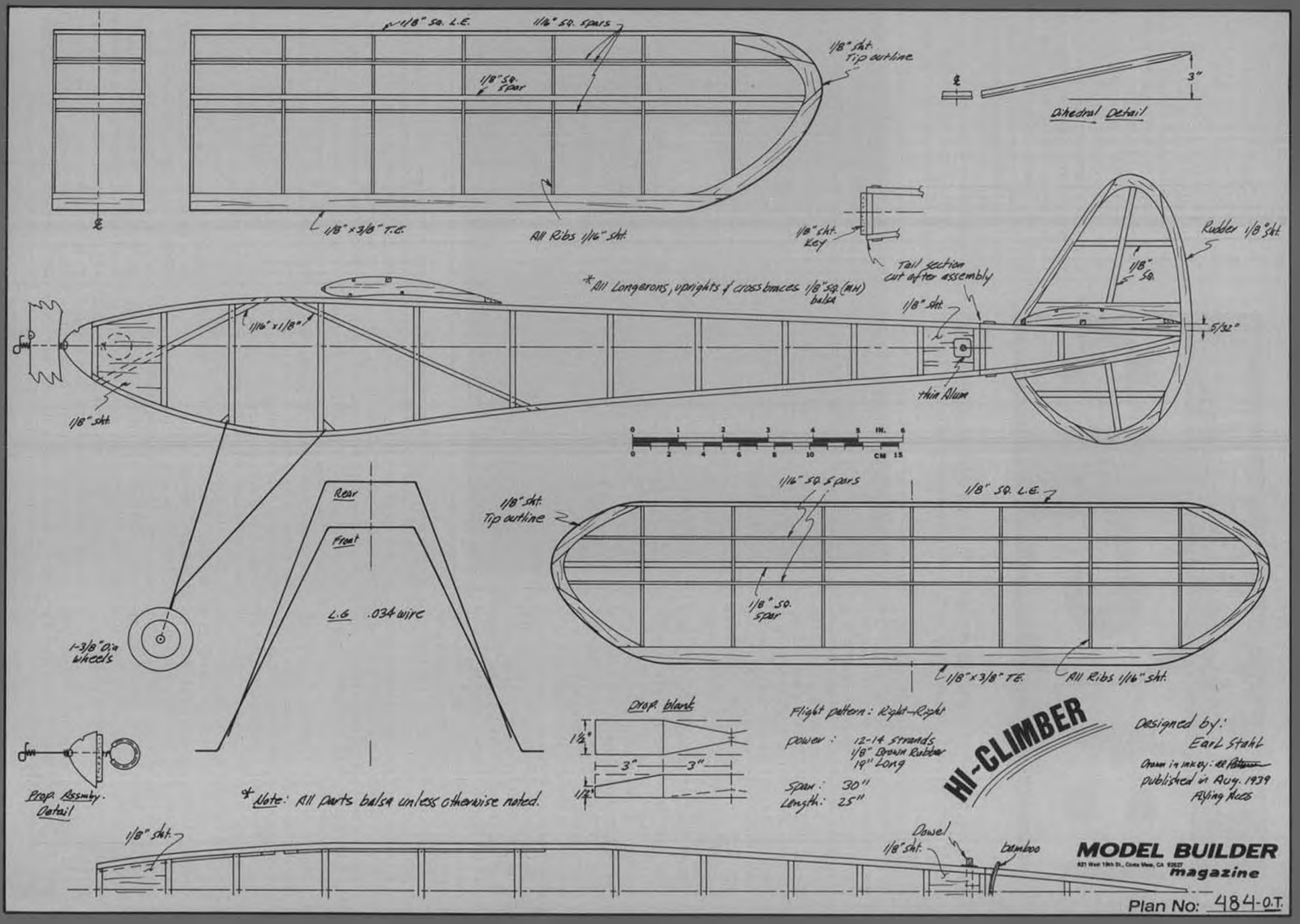
However (without digging into the old model mag flies to verify it), I believe the *Hi-Climber*, and its low-wing counterpart, the *Hurricane* (**MB** Plan No. 1277-O.T.) were published in *Flying Aces* magazine before the scale jobs appeared. Anyway, the *Hi-Climber* appeared in the August 1939 issue of *F.A.*, and the *Hurricane* in the July 1949 issue.

As the plans indicate, this 30-inch span model is quite basic, and easy to build. We'd only suggest two modifications . . . build the fuselage in one piece and rig a simple D.T. for the stab. We're not sure how the O.T. rules apply, but Earl does suggest in the article that a one-bladed prop could be used.

The balance point is not specified on the plans, but Earl suggests that the wing be slid back and forth for glide adjustment. He also suggests 12 to 14 strands of rubber (shouldn't need that much of the modern stuff) and right turn under power and in the glide.

In typical *Flying Aces* lingo, the subheading says, "Yessir, she's a push-over to build and a humdinger for turning in long endurance flights. So don't lose any time in constructing YOUR copy of this thermal-loving balsa-baby!"

Well "Twenty-three skidoo to you too!" •


1/8" sq. L.E.
1/16" sq. spars
1/8" sq. spar
1/8" sht. Tip outline
1/8" x 3/8" T.E.
All Ribs 1/16" sht.
3"
Dihedral Detail
1/8" sht. Key
Tail section cut after assembly
Rudder 1/8" sht.
1/8" sq.
5/32"
* All Longerons, uprights & crossbraces 1/8" sq. (MH) balsa
1/16" x 1/8"
1/8" sht.
Thin Alum
0 1 2 3 4 5 IN. 6
0 2 4 6 8 10 CM 15
Rear
Front
L.G. .034 wire
1-3/8" O.D. wheels
1/8" sht. Tip outline
1/16" sq. spars
1/8" sq. L.E.
1/8" sq. spar
1/8" x 3/8" T.E.
All Ribs 1/16" sht.
Prop. Assmby. Detail
Prop. blank
1½"
3"
3"
1/2"
* Note: All parts balsa unless otherwise noted.
Flight pattern: Right-Right
power: 12-14 strands 1/8" Brown Rubber 19" Long
Span: 30"
Length: 25"
HI-CLIMBER
Designed by: Earl Stahl
Drawn in ink by: Bill Patterson
published in Aug. 1939 Flying Aces
1/8" sht.
Dowel
1/8" sht.
bamboo
MODEL BUILDER
821 West 19th St., Costa Mesa, CA 92627
magazine
Plan No: 484-O.T.

E & L Manufacturing BIG E

By AL ALMAN . . . "BIG Birds" Al reviews the E&L Manufacturing *BIG 'E'* model and comes away with a BIG bearded grin on his face!

• You know how it is when thumbing through most of the latest mags; The construction articles seem to feature "ho-hum" look-a-likes of everything seen at the field. Makes you wonder why editors ever considered publishing these "originals," 'cause a close inspection reveals nothing new, different, or exciting. Then the felony is compounded when those same innocuous birds end up on the cover . . . though usually with a comely, buxom lass to make the pic worthwhile.

Well, folks, I had somewhat the same (yawn) feeling about E&L's ad; their *BIG "E"* held little appeal for me and I couldn't pinpoint what turned me off. Was the gal too good looking? Was the color scheme unappealing? Perhaps the left wing was too far out of proportion to the rest of the airplane (bad use of a good wide-angle lens) . . . or the piano wire landing gear just didn't look right, especially with its rather narrow track. Then again, maybe it was the stupid looking upright engine hanging out in the breeze that offended me, and not the stark, empty cockpit that kept staring me in the face. I think that " all the above," is probably the best answer.

So, what was it that changed my mind? At first I wouldn't be caught dead with such a dumb-looking bird; then, I end up building one and doing this review. What happened?

The truth is I wasn't coerced, threatened, bribed or sweet-talked into this project . . . and it wasn't the devil that made me do it, either. It was the engine! I just couldn't resist the chance to see what this new Zenoah Quartz 2.3 was like . . . although I gotta admit to a certain curiosity about: (1) the stuff used for doublers and covering the foam wings and turtledeck; and (2) Ernie Pritchard's claim that this creation of his flies great after being ready for final sanding in no more than 20 hours.

THE KIT

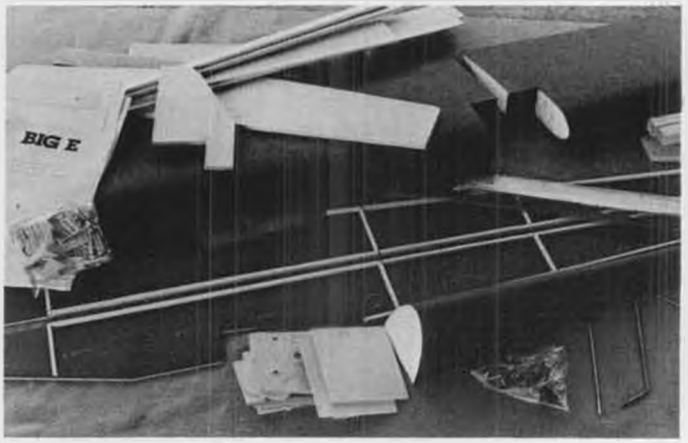
E&L must have done some fast packing and shipping, because in a few days the UPS gal lugged both boxes up my front steps. I went for the engine first, and played with it for a while before remembering to check out the *BIG "E"* . . . and what a surprise that was. Although big, the kit box wasn't all that heavy . . . and for good reason; Pritchard touts only a fifteen pound (dry) weight and, because this kit is partially prefabricated, there's not much in the way of excess wood knocking around inside. In fact, with the foam wings and turtledeck precovered, and the doublers and longerons already installed on the fuselage sides, that big box looked and felt like parts were missing. After all, doesn't a BIG Bird need and use lots of parts . . .

Not this one, guys. The parts count is way down because of the prefabrication; a lot of the time consuming work is done for you. The obvious conclusion is that Ernie must be a kindred spirit to the untold millions of us who hate to build wings because not only are these well cut foam panels neatly covered, but they also have the spar joiner slot ready for occupancy and a stout trailing edge installed. I was expecting both wing panels to be straight and true, and they were (Mr. Pritchard swears I got off-the-shelf parts); however, I was not expecting those foam core roots to fit the way they did. The dihedral angle was exactly what's called for in the instructions, and the two mating surfaces did just that . . . they mated! I didn't have to do any "touching up" at all!

I have to tell you something about these instructions and plans; you see, the instructions are . . . but the plans aren't. In other words, these are not really plans. What you find when opening the box are four 18 x 36 sheets full of clear, easy-to-read drawings and sketches that do a good job of faking it as plans. And why not? The amount of prefabrication eliminates the need for any "real" plans, and as everything on these four sheets dovetails so well with the nine pages of instructions, virtually all pertinent information and data is at the builder's fingertips.

Like most manufacturers, E&L obviously tries to market a good product at a fair price, and revises or updates as frequently as possible. But because of the size of the kit run, the different processes involved, size of the company, etc., it usually isn't feasible to plug in these changes immediately. So, when I received one of the first kits set up for the Zenoah and found a few little problems . . . like having one helluva time getting my engine in or out (even when accompanied by the proper amount of teeth gnashing and grumping) . . . I called Ernie about the trouble I was having, and assumed good will on his part after I hung up. Was I surprised when a scant five weeks later the changes I'd recommended had been included in a *BIG "E"* just received by another Rocs member.

Seems that Pritchard takes his kit



Here's how the *BIG 'E'* looks fresh out of the box. Not too many parts for sure! Notice those precovered wing panels and how there just isn't any front part of the wing root. The fuselage comes partially assembled as you see here.

Close-up shot of the wing's leading edge at the center. The piece of aluminum angle screwed on to the spar joiner secures that part of the wing in place when the 1/4-inch bolts are installed in the rear. The fuselage is sandwiched between the forward part of the ribs (open section in picture) thus keying in the wing.

making very seriously. Anytime feedback indicates a possible problem area that can't be eliminated by rewording the instructions, he hustles on back to his workshop, takes a kit off the shelf . . . and builds it. So, sometimes the "plans," the instructions and the kit must be changed. It's nice to know that a manufacturer cares that much . . . .

GLUING PARTS TOGETHER

The only real work involves putting the fuselage together . . . and because the doublers and longerons are already glued in place and the foam turtledeck is covered, there aren't too many parts to mess with. The wings are cut and precovered; all you have to is glue them together, add the tips, and install the ailerons and servos. The tail section is 3/8-inch stock and only requires as much sanding as you feel is necessary.

The stuff used for doublers and foam covering is, I'm told, the backing found on formica. Don't know what its composition is, but it's very dark in color, about as thick as 1/64 ply . . . and much stronger. It also has a smooth surface, and according to E&L, is as light as ply. I know there's been a varied amount of materials used for covering foam wings, but I don't recall this backing ever being used before.

Because of the time saving prefabrication, and relatively few parts that fit so well, the *BIG "E"* is a joy to build. Pritchard's claim that she goes together fast is no idle boast; I'm a confirmed slow builder, and it only took me 18-1/2 hours to get her looking like an airplane. And for those of us who have the patience to take inventory, there is a parts list included . . . along with what's needed to complete the hardware items . . . such as tires, tail wheel assembly, spinner and, of course, the engine. (The *BIG "E"* can be ordered with the firewall drilled for Evra, Quadra, or the Zenoah . . . although any engine around two cubes can be used.) The hardware package does contain Lord Mounts (more on these later), Sullivan's solid wire control rods, Du-Bro 4-40 ball socket sets, Du-Bro heavy duty hinges, heavy wire for wrapping the landing gear, heavy duty horns, and just about everythng else needed for this aircraft.

Although construction (what there is of it) generally falls into the "standard" category, there are two desgin options used by E&L that bear mentioning: wing and engine mounting.

The wing installation is unlike any I've ever seen, in that the full center section root is not used, and in fact, as you can see from the photo, a good third of the section ain't . . . and the aluminum bracket that locks the wing in place on F-3 is screwed to *the only* spar joiner. Of course, there are 1/4-inch nylon bolts and maple bearing blocks used to secure the trailing edge to the fuse. My real concern was whether the wing was going to stay in one piece, what with a third of is center section missing, and no glass cloth or tape wrapped around its middle. However, I was assured by Ernie Pritchard that it was a "no sweat" situation, and that his own *BIG "E"* had in excess of 600 flights with nary a wing problem (although Mr. P. did admit to bending his bird a number of times due to severe dumb-thumbs). At this point I started talking to myself, quite convincingly, that as Pritchard had been "straight arrow" with me up to then, I just had to give him the benefit of any doubt. I rationlized that the wings had to be staying put, or else he wouldn't be able to sell any kits . . . and besides, he promised to replace everything if I crashed due to wing failure.

I also questioned installing the engine using Lord Mounts . . . and it's not because shock mounting is bad . . . far from it; our car engines and full-scale aircraft engines are shock mounted, so obviously there's nothing wrong with this approach. But . . . you don't just

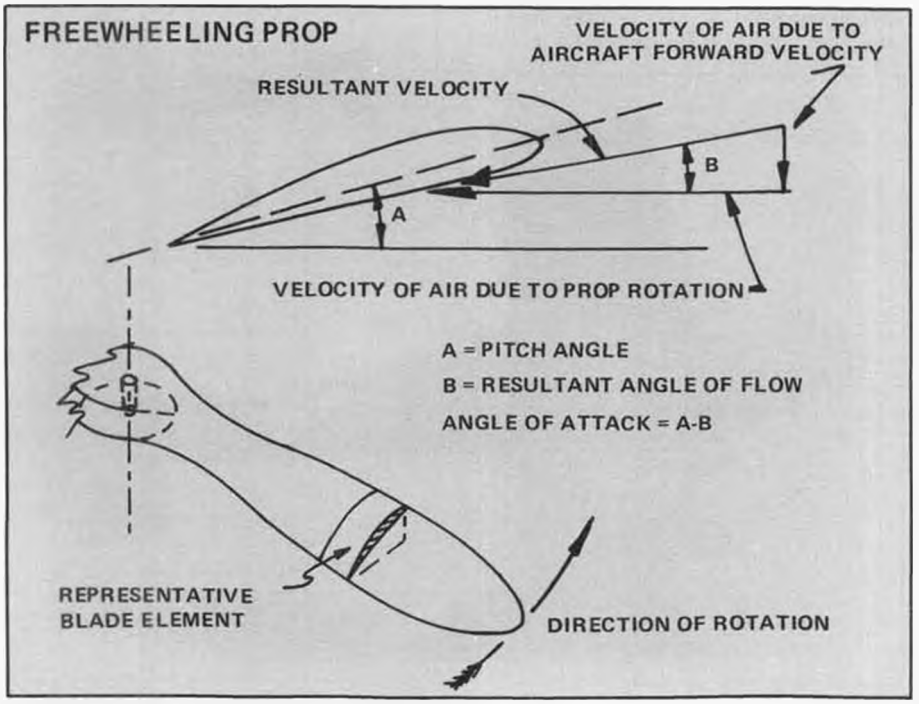
Continued on page 70

Editor's note: This is the third **P&F&CT** *in an ongoing series which began with the August '83 and January '84 issues of* **Model Builder.**

To Freewheel, or Not to Freewheel, That is the Question

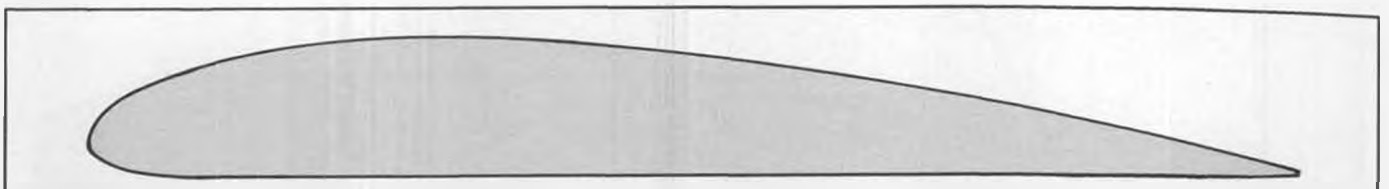
• These Santa Ana winds on the Oxnard Plain even keep the gulls grounded! Today, a good friend of mine visited from down the coast and brought his electric powered Old Timer to fly at our local site, Wood Field. He sure picked a rotten day, although he did put it up six times before the wind stopped, flying 95% of each flight dead into the wind without turning! I won't steal any of his thunder by giving details, for I believe he is going to write about it in **Model Builder**. It was so windy that one time he made a turn when low overhead, and as he turned back into the wind, the hum of the freewheeling prop picked up to the same level of sound as if he had turned the power on! The wind was 10 to 15 knots (as measured by Joe Kiracofe) so his ground speed was close to 30 knots prior to the instant he turned back into the wind, making the prop *really* pick up speed as he gave her a little down.

Thinking of the freewheeling prop on the electric motor reminds me of the thirties and my first rubber jobs. They didn't glide well (in fact, they hardly flew), especially when the rubber had unwound and the still-turning propeller wound the rubber backwards. When I finally got a freewheeling propeller working with a device which prevented the rubber giving up *all* of its turns (a rubber tensioner), the performance greatly increased. Of course, the advent of the folding prop was the answer to the prop drag problem. You know, it is rather convenient that we get freewheeling as a built-in feature with the electric motor, and have less drag than with a "stopped" prop. It is rather strange, though, that the drag is less for a revolving prop than for one that is not turning, for the blade area hasn't changed, nor has the glide velocity. As the drag on an object is one half the product of air density times the total area of the two blades times the square of the velocity times a fudge factor which takes into consideration the propeller shape (drag coefficient), what could possibly change? Air density . . .? That doesn't seem likely . . . unless the turning propeller shoves the air out of its way in such a manner that it sort of "makes a hole" having a density less than that of the on-coming air. I think I shall depart the inner sanctum and deploy to the hangar for consultation with Silli, I mean Sylvestor, on the reason why the freewheeling prop has less drag than a "stopped prop".



To my surprise, only Chickums was on the premises, and he was reading a magazine! Adding chagrin to my astonishment, he was studying the picture of Miss Costa Mesa on the cover of the January **Model Builder**! I am sure he wasn't concentrating on the lovely model of the . . . uh . . . the airplane also presented. Chickums has become somewhat of a problem. I even caught him looking at the inside cover of Merv Buckmaster's Australian magazine, *Airborne*. The inside front cover was a lovely blonde, a champagne glass, a complete R/C system, and *nothing* else except a blue satin coverlet! REALLY, Merv! I shouldn't air my personnel problems this way, but I think I will ask Li'l De-Icer to give Chickums a sister-to-brother talk. On second thought, that may not be such a good idea. At any rate, deciding to let things ride, I asked Chickums where Sylvestor was, and he informed me that the individual in question was out on the runway testing some airspeed indicators he had designed. Now, Sylvestor Silverfish is a "P&F&CT" dedicated man!

As Silli wasn't available, and hoping to take Chickums away from his magazine, I tossed the freewheeling problem to



STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	2.92	5.4	6.3	7.75	8.8	9.62	10.9	11.46	11.5	11.73	11.15	10.25	8.82	7.15	5.18	3.1	1.95	0.65
LOWER	2.92	1.21	0.75	0.25	0.08	0	0	0	0	0	0	0	0	0	0	0.09	0.2	0.35

him. Knowing it is un-nerving to me, he picked his teeth as he listened. I think "picking teeth" is gross, but if one has no teeth (as chickens do not), I think it is even more gross. As I finished, he tossed the toothpick away and looked thoughtfully for a few moments.

"Jefe," he started (which I understand is Spanish for *chief* . . . pronounced heffy . . . or did that toothless critter say hefty . . . hmm!), "You were correct in your statement that the drag on the stopped propeller was equal to the air density (divided by two), times the blade area, times the square of the velocity, times the coefficient of drag . . . **but**, could we please write it, $D = (d/2)\ AV^2\ C_D$? You see . . . this equation, which I will hereafter refer to as Equation 1, is so much easier to write and say. However, Jefe, I regret to inform you that *you were all wet* in your other statements. Listen carefully, and you will see why.

"Let's give Equation 1 some numbers. For *this* 'P&F&CT', let's not be concerned by defining the proper units to use, only those required. Let's say we have a prop of one-foot diameter with a total blade area of .0625 ft^2, and let's allow d/2 to equal .00119 and C_D to equal one. Using these values in the equation gives us the drag of a stopped prop as .000074 times the square of the velocity. If we pick a glide velocity of 10 ft/sec (fps) the drag of the stopped prop will be .007 pounds."

At this point Chickums paused, sucked on his teeth a bit (how can he *do* it?) and continued. "Now, consider what happens when the propeller turns at N rpm." He stopped talking and made a few sketches very quickly. "Here we have a propeller with a representative blade element. As the diameter is one foot, let this blade element be at the blade's midpoint, or 1/4-foot from the shaft line. As this element makes one revolution, it will travel a distance of 1.57 feet ($2\pi R$, which in this case equals 2 x 3.14 x .25). Now, lets say we pull enough energy from the passing slipstream to turn the propeller at, say, 1200 rpm. We have a low-friction bearing and the propeller has accelerated to the point where the frictional torque times revolutions (and some fudge factors) is equal to the energy we have extracted from the slipstream. Now, we know that 1200 rpm is equal to 20 rps (revolutions per second) because there are 60 seconds in a minute. The velocity of the element is determined by multiplying the 20 rps by the distance of one revolution, 1.57 feet, yielding 31.4 fps." Pointing at the sketch of the blade section he indicated the airplane's velocity, the velocity of propeller rotation, and the resultant velocity as he continued. "You can see that the airplane velocity is at right angles to the velocity of rotation, so the resultant velocity is the square root of the sums of 10^2 and 31.4^2, or 33 fps.

"There is a relationship between the sides and angles of a right triangle, which we have here," he continued. "The resultant angle of flow, B, is the angle whose tangent is the ratio of airplane velocity to velocity of rotation (10/31.4 = .318), and that angle is 17.7 degrees.

Let's say the prop has a pitch of seven inches (.583 feet). For the blade element to travel a forward distance equal to its pitch, it will move, in one rev, a distance of 1.57 feet. We again have a right triangle where the pitch angle A is the angle whose tangent is .583/1.57 = .371, or 20.4 degees. The angle of attack, the angle that the resultant velocity makes with the airfoil, is the difference between the angles B and A, or 20.4 - 17.7 = 2.7

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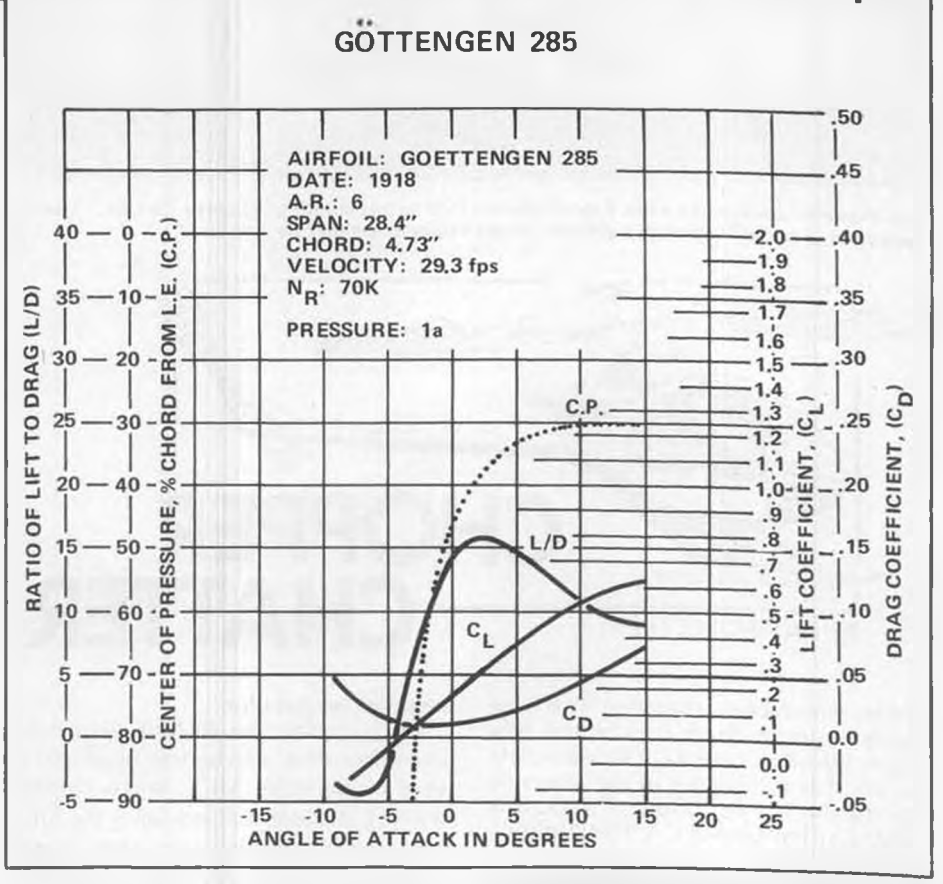
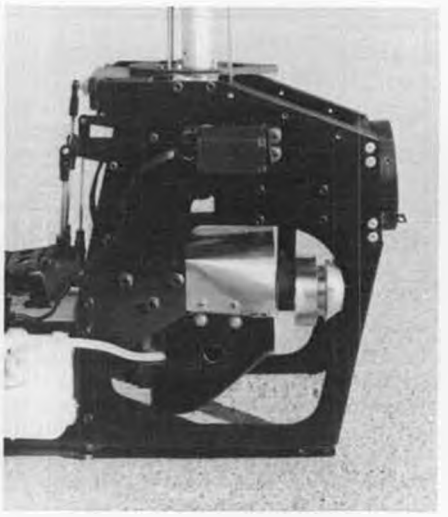


As mentioned in the text, your "P&F&CT" columnist has been corresponding with Bob Todd, a real WW-I fighter ace who is still very much alive and well.

Ray Hostetler reviews the Kobe Kiko Robinson R22 in this month's "Chopper Chatter." The helicopter is available through California Model Imports (see text for address).



Inverted engine installation. Aluminum shroud (top) is stock, black one on bottom is a modified Hughes 300 unit. See text.

CHOPPER CHATTER

By RAY HOSTETLER

• This month begins another "two issue review": an in-depth look at the new Kobe-Kiko Robinson R-22. Released late in '83, it is distributed in the States by California Model Imports, P.O. Box 1695, Garden Grove, CA 92642; phone (714) 991-1720.

The R-22 is a special machine for several reasons, both as a model and full size. It was in the fall of 1980 that I received my full-size helicopter pilot training in N101WR, the number one production R-22 reproduced here as my model. I have 1500 hours in R-22's and they are great helicopters. Small and nimble, they require a gentle touch and respond on impulse.

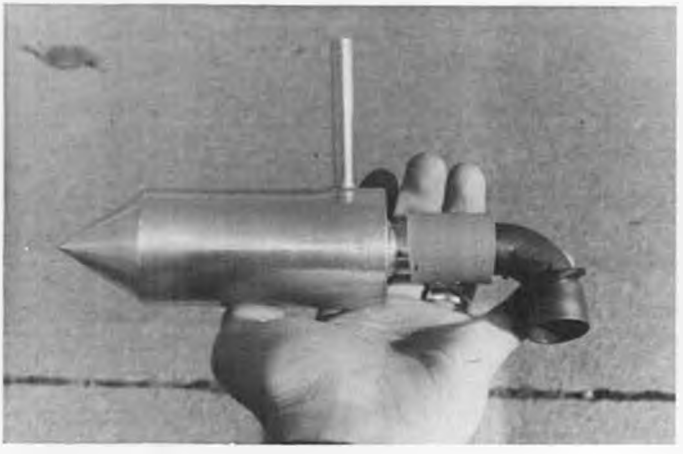
As a model, the R-22 is extremely scale, featuring a flybarless head and a very nicely done MCS (micro control system), fashioned exactly after the full-scale ship's control system. Now, some of you may have winced at the "flybarless head", as these have been tried earlier in model history with less than full success. The only other production flybarless helicopter (as this is being written) is Hubert Bitner's *Horizon*.

Therefore, I want to tell you straight off that the R-22 will undoubtedly become the most popular flybarless ship ever, because Kobe-Kiko has really done their homework on this one, and presented us with a high quality model in engineering and construction. Let's take a closer look at it.

PACKAGING

The R-22 comes in a box measuring 33 x 14.5 x 8. Everything is neatly tucked away, and major components are secured with green wire ties. Kobe has gone to a full kit on the R-22, and it is not preassembled as were (are) Kobe's earlier Hughes 300s.

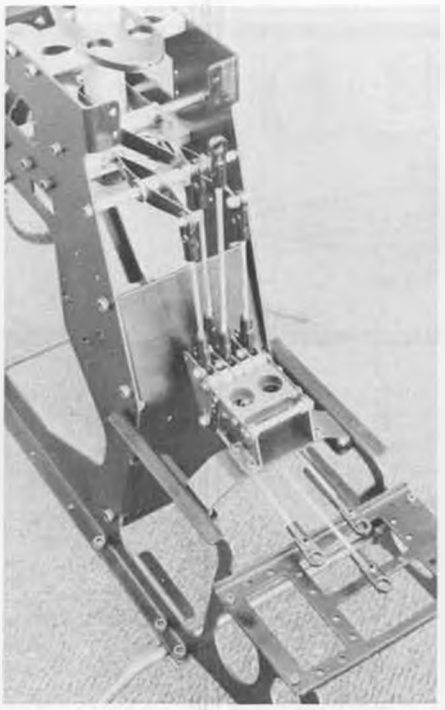
Taking up a major portion of the box is the ABS fuselage and supporting plastic pieces, which I'll cover next month. On the outside of the box, you'll find stamped in one corner the version of the engine mount supplied. In this sense, you order a kit knowing in advance which engine you'll use. Options include the O.S. .50 FSR—H and .61 FSR—H, and Enya .49X and .60X. Other engines *will* fit, either in the same holes, or by modifying the mounting lugs slightly. The extreme option is to have a new set of mounting blocks machined for you, which wouldn't be all that difficult. Consult CMI directly, for they will have the most input as to the various engines which can be fitted with minor mods.



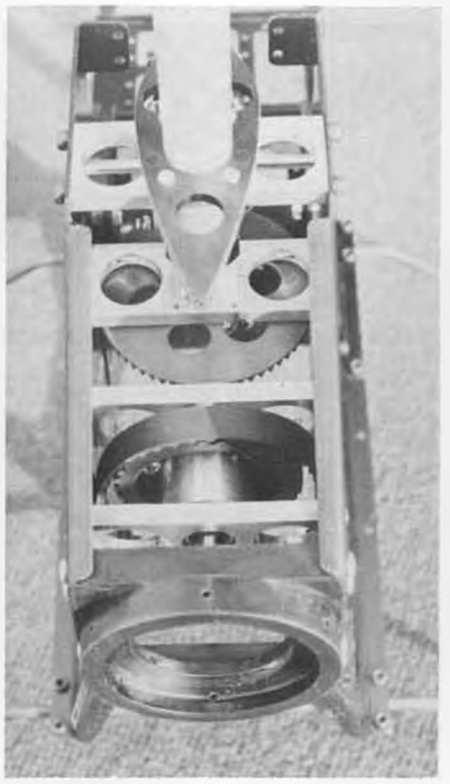
Don Chapman's new V-Tech muffler is distributed by Dave Brown Products. Note compact size with standard "tuned pipe" method of mounting to engine.

V-Tech muffler in place on the R22 . . . a perfect fit. Muffler yields a definite power gain. Can't beat that!

Main shaft pipe and swashplate detail . . . to be covered with aluminum fairing.



MCS close-up. See text for details on how this device operates.



Top view of drive system looking down through main frames. Note plastic adapter for tail boom, free-wheeling unit with belt, main gear, aluminum supports for main shaft.

POWERPLANT AND CLUTCH:

After running the new O.S. Max .50 FSR-H on the bench for six full tanks to break it in, I pulled it off and added the cooling fan directly to the prop drive washer, followed by the centrifugal clutch and starting cone. Alignment is not critical here, as there is no "cone start" system in the conventional way. Rather, the cone points to the rear of the ship and rotates with the crankshaft as usual. Then the centrifuagal clutch engages a bell housing which drives the belt up to the freewheeling unit.

The cooling fan must be balanced on a good balancer before installation. High Point has always been my favorite. I also use it for main and tail rotors. The hole in my fan was slightly off center, and required a definite adjustment.

The centrifugal clutch is a one piece "Schluter style", with half moon shoes on either side of the center portion. The surrounding bell housing has roller bearings for support. Both clutch and bell housing work well and have been trouble free.

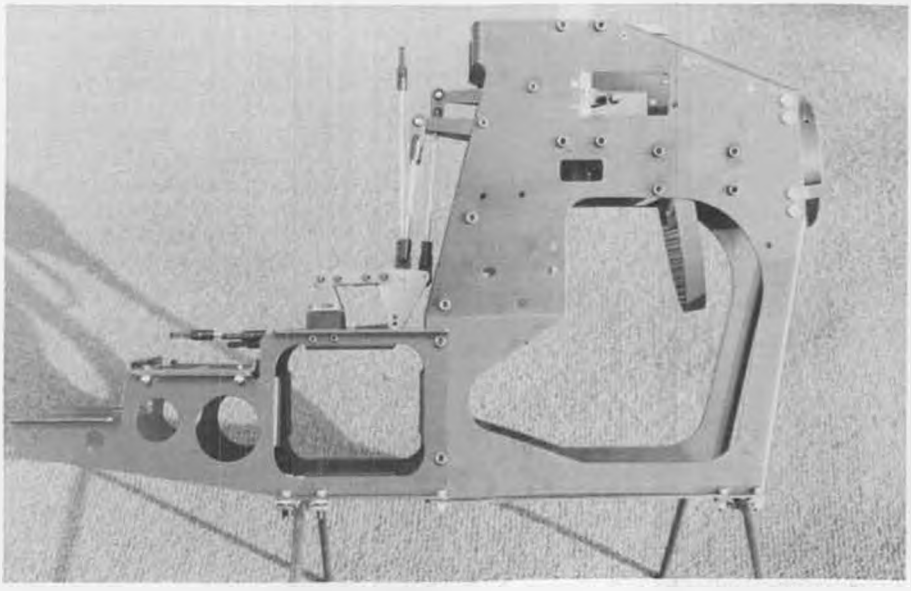
The engine mounts fully inverted, which will not present a problem to you as long as you use a small black office clip to shut the fuel line off as it comes to the carb. If you don't do this, the engine may flood during handling, and could give you a bent wrist pin if you try to start it in a flooded condition. I've made it a habit to clip the feed line immediately after I shut down. I leave it there during refueling and remove it just before I hit the starter.

FUEL TANK, ENGINE COOLING:

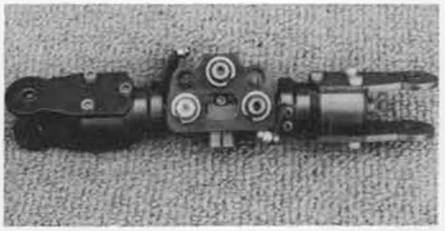
The tank is mounted just ahead of the engine, with the center of the tank approximately 1/2 inch below the carb's spray bar. A standard 10-1/2 oz tank is provided, which will give short flights on a .50 and even shorter flights with a .60. The easy way around this is to get a Sullivan SS-14 tank, which will slip right in where the stock tank goes. The only thing you'll have to do is make a small notch in the frame so that the "bubble" moulded into the top of the tank clears.

The cooling fan that I discussed earlier has eight blades, each deflected to force air back over the engine. As the engine is mounted, there is an aluminum shroud which slips between the side frames and engine mounts. This shroud conforms to the fan and directs air over the crankcase, which goes downward once it hits the

Continued on page 72

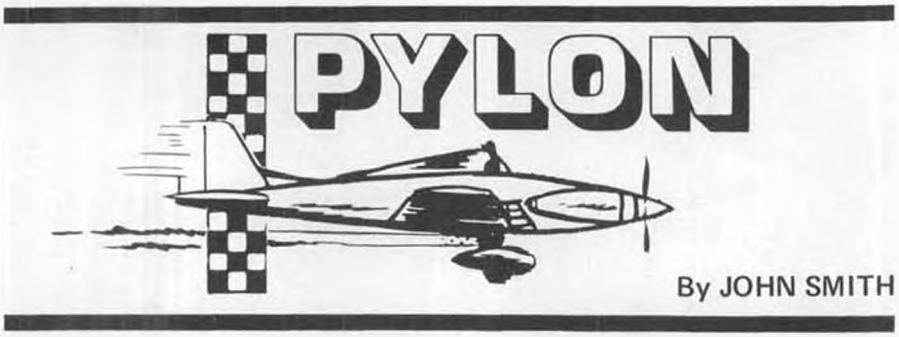


Main frame detail and layout. Simple and strong.



Main rotor head., very nicely done. Features perfect dampening on what will become the most popular flybarless system ever.

Tail rotor gear box. Bellcrank visible on bottom, metal tongues on left side for horizontal stabilizer mounting.



By JOHN SMITH

• This month, as promised, I'll try and show the many and varied ways to apply balsa sheeting to a foam wing. Also, I will cover some of the racing activities of this past 1983 season, I will make another pitch for my favorite event, Formula One-40, and I will recount one of the strangest experiences I have ever had.

First, to the mail bag. I received a nice letter from Claude Tanner of Boise, Idaho. Claude writes of his interest in having an unofficial Q-500 event at the "84 Nats" in Reno. He and his racing buddies, Matt Russel, Pat Johnson, and Bob Huber, would be willing to assist in any way. Claude is responding to a remark I made in my last article in **Model Builder** where in I mentioned that I would like to see Q-500 run as an unofficial event in Reno, and that I would do what I could to see it happen.

"What do you say AMA! This could be the biggest event at any Nationals ever." Racers, send your letters to John Grigg, c/o AMA headquarters, telling him of your interest in having a Q-500 event at the Reno '84 Nats. Let's really bombard John with letters. Also, keep those cards and letters coming with your local Q-500 rules.

Claude goes on to give a rundown on his group's racing rules which are as follows:

Engine: Any stock, front rotor, side exhaust .40. Must idle/kill. Stock R/C carburetor.

Muffler: With or without stock muffler. No tuned pipes. Muffler pressure only, no pumps.

Props: Rev-up 9-6. Balanced and supplied at cost to flyers.

Fuel: 15% Nitro supplied. Fueling anc defueling at weigh-in stand only.

Fuselage: 2-1/2 sq. in. firewall.

Landing Gear: Conventional with 2-1/4-inch wheels minimum.

Weight: 3-1/4 lbs. minimum after each heat.

Let's close the mail bag and go into skinning a foam wing.

The wing used is a typical Q-500 foam core. First, glue the 1/4 sq. in. trailing edge to the foam core as pictured, using your favorite white glue. After this is dry, carefully trim the balsa trailing edge to match the taper of the core. Now comes the most important part. Make a sanding block with 150 grit aluminum oxide sandpaper glued on both sides to a 3/4x3x12-inch block. With the core resting on its cradle as pictured, carefully sand the surface of the foam smooth. *Caution*: avoid digging or balling up the foam. Sand both sides of the core. Vacuum the core and wipe it down with a tack rag to remove all traces of dust (most important).

Next, we will prepare the 1/16 balsa sheets to be joined together to make skins. If you have a table saw, this step will be all the easier. To get straight, square edges, you can use a simple fixture (as pictured) or you can use a straight edge and do it the hard way. When you use an X-Acto knife and straight edge, be careful that you hold the knife exactly 90° to the cutting surface to ensure a square edge.

Caution: Do not remove any more balsa to clean up the edge than necessary.

Lay down a sheet of wax paper on a flat surface the length of the balsa sheets and proceed to glue the edges together with your favorite cyanoacrylate adhesive. *NOTE:* I usually select all the faces of my sheeting, turn them over, and do all of the gluing on the backside of the sheets. This will give you a finished skin with no glue smears on the upper (face) side. Don't forget to mark the back side with a felt tip pin to avoid mix-ups later on.

Sand the backs of the skins with 120-grit garnet paper on a sanding block. Sand the faces with your 150-grit sanding block. *Note:* Your skins should only be sanded on a flat, smooth surface. Clean the backs of skins with a vacuum and wipe down with a tack rag to remove every bit of balsa dust (most important).

There are three ways to attach your skins to a foam core: (1) Epoxy resin, the one to three-hour pot life variety; (2) 3M Adhesive Transfer tape; (3) contact cement, Goldberg Blue Goo, Dave Brown Sorghum, 3M Fast Bond 30, etc.

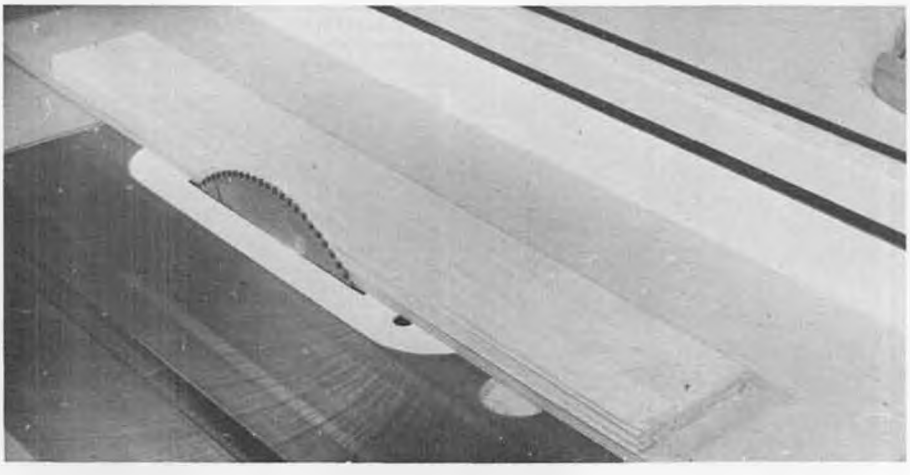
Epoxy gives the most strength and rigidity, but is the most difficult and time consuming. Adhesive transfer tape is the fastest, it has good strength, but it is more flexible than epoxy. Contact cement is about as stiff as tape, but it takes more time to apply than tape (but less time then epoxy). All three methods give good results for any Q-500 or sport model foam wing. Take your choice.

To apply skins with epoxy, mix up about 2-1/2 ounces of Hobby Poxy Formula 2 (one-hour epoxy). Squeegee the epoxy onto the backside of your balsa skins with a rubber squeegee that has had small 3/32 notches made in the edge at about 1/8-inch spacing. These squeegees are available at auto body supply stores. This will leave you with small ridges of glue. Apply the balsa skins to the foam core and reinstall the sheeted core in the core beds. Weight the core beds down on a flat surface overnight.

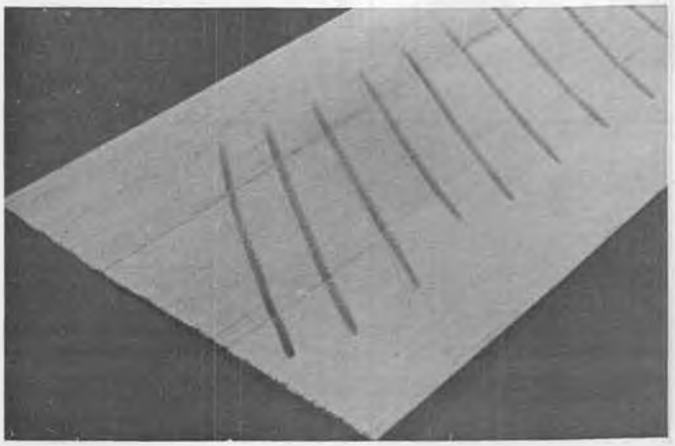
To apply the skins to the core with adhesive transfer tape, apply the tape to the balsa sheet spanwise as shown in photograph. You can leave small gaps between strips of tape of approximately 1/16-inch, but no more. This will not affect the strength. Peel off the backing strips, making sure that the core is in its foam cradle on a flat surface. Position the skin, and press it into place. Finish the assembly by burnishing the skin with a pad formed by folding several sheets of paper towel into one approxiamtely 4 in. x 4 in. pad. Apply pressure by rubbing in a spanwise motion. Finish the other core in the same way.

As there is nothing to dry, this is by far the fastest method. You might call it "instant wings."

The best contact cement I have ever used is Fast Bond 30 by 3M. It is available at most industrial supply houses, or check your Yellow Pages for your nearest 3M dealer. You might be able to talk him out of a free sample (about a quart). To do the job, all you will need is four fluid ounces and a one-inch nylon brush; the cheapest kind.

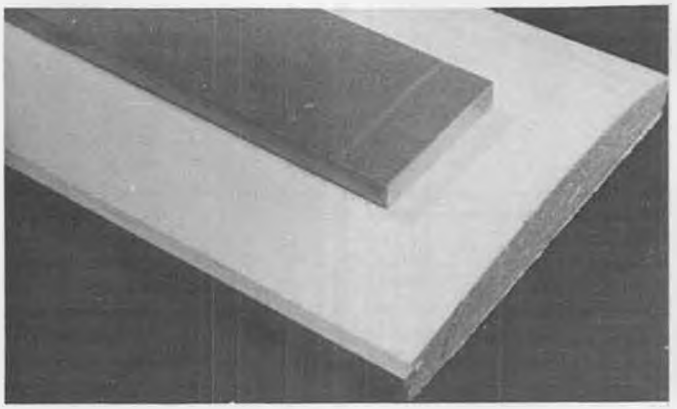


Half-inch scrap construction grade plywood can be used as a simple guide for cutting clean, straight edges on balsa sheeting used in wing skins. Edges glue together without gaps.

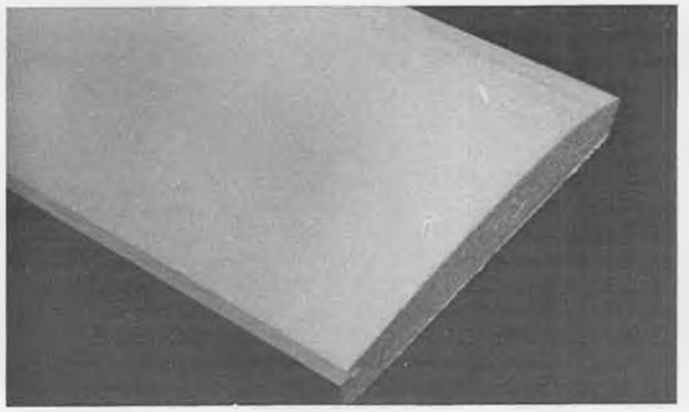


After gluing edges together, sand the outer side of the skin to a smooth surface and mark the inner side of the skins with felt tip marker.

Glue trailing edge balsa piece to the trailing edge of the foam core with white glue. Tape keeps the piece from moving while glue sets.



Prepare the foam core for the skinning operation by sanding spanwise with long block. Use core bed. Vacuum off all dust!!!



There are many ways to adhere wing skins to foam cores. The author details the pros and cons of each method in the text.

Apply a thin, even coat to both the core and the back of the balsa skin. Allow both parts to dry to the touch. Fast Bond 30 changes color to a dark green when it is ready to join. Carefully position the skin over the core. Press in place. Again, the foam core is in its cradle on a flat surface. Burnish the skin with a pad of paper towels.

That's just about all there is to it. You will have to choose the method best suited to your needs.

The Q-500 class is still alive and well here in New England. The racing this past season was hectic and physically tiring . . . just too many races to go to. Unfortunately, 1/2A died a slow and painful death. It was brought on by the inability of most of us to get and keep those little demons running. Also there were no new modelers coming into this event. So, it died.

The jury is still out on Formula One-40. This is an event which I dreamed up, and which you first read about in **Model Builder.** This event was conceived to fill the gap between Q-500 and Formula 1. It allows clubs to run races with great looking airplanes that don't make too much noise, and don't cost you a month's pay. It also gives the added benefit of greater safety because the speeds are not nearly as high as Formula 1.

No Q-500 anywhere can match a Formula One-40 model for the beauty of line and ease of flying. There are many fine kits around and they do not take long to build. If you want more information, please write to me. Also, send any results of Formula One-40 races your club has run.

If the time allows, and **Model Builder's** editor permits, I will present a set of plans for an all balsa Formula One-40. Try Formula One-40 . . . it's a real kick.

Time and space have run out for me to relate to you the wildest racing experience I (or anyone else) have ever heard of. Tune in next month!

Don't forget to send Q-500 rules and reports and keep those letters coming. Next time I'll report on a few great products for you racers.

John G. Smith, 27 Fulton St., Brockton, MA 02401. •

"Uh . . . I think we got a little problem down here in the foam wing department."

R/C AUTO NEWS

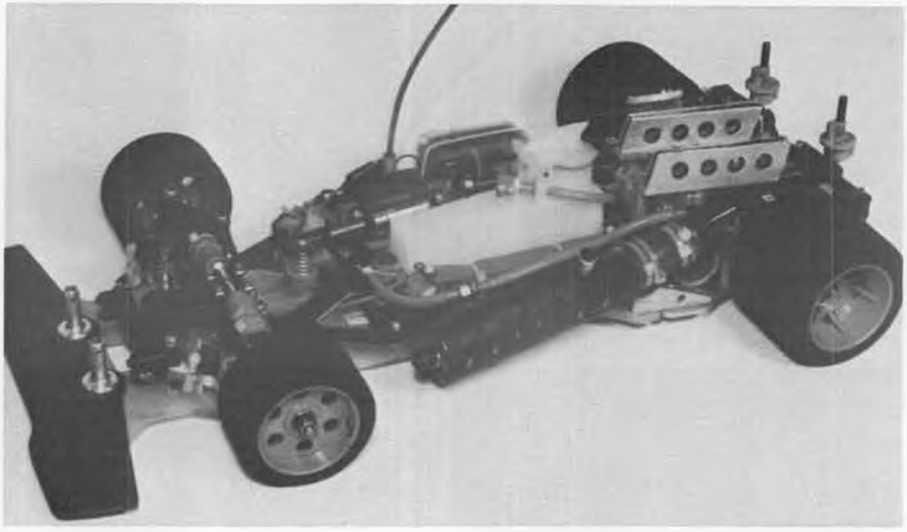
By DAN RUTHERFORD
PHOTOS BY AUTHOR

• When Delta's 1/8-scale suspension race car, known simply as the *Eagle*, was released a couple years ago, I was primed and ready to try a suspension car. Everybody was talking about them (some in open concern for the affect that more expensive and roadworthy 1/8 cars would have on the hobby . . . it seems silly now, but I was one of the concerned). They offered much more stuff to fiddle with, and, well, they just looked super trick.

However, prior to building an *Eagle*, I had already assembled an early PB suspension car, imported at the time by MRP. The car had looked great in the box, but as it went together, my enthusiasm waned. This and that didn't fit right, some of the parts were obviously too lightly built, and it was just plain hard to work on. With the car assembled to the point of needing a motor and radio, I backed off, never completing it. Shortly thereafter, the arrangement between MRP and PB went away. As far as I know, a PB car has yet to turn a wheel in anger in our area.

It all added up to me not being completely convinced about suspension cars. I had (and still have) great faith in what the guys at Delta can do when they set their collective minds to a project, but the *Eagle* would be their first attempt, and previous "first shots" by others had not been impressive. With a race-ready and extremely well-proven Delta *Super J* pan car hanging on the wall, I was ready to give the *Eagle* an honest try . . . but the *SJ* was to stay intact . . . just in case, don't ya know.

The building and initial racing of the Dirty Racing Team's *Eagle* has already been covered in a previous issue. At this time, it is enough to say that even racers experienced with Delta products appreciate how easily the car goes together. Anybody building an *Eagle* in his first experience with a Delta car is amazed.



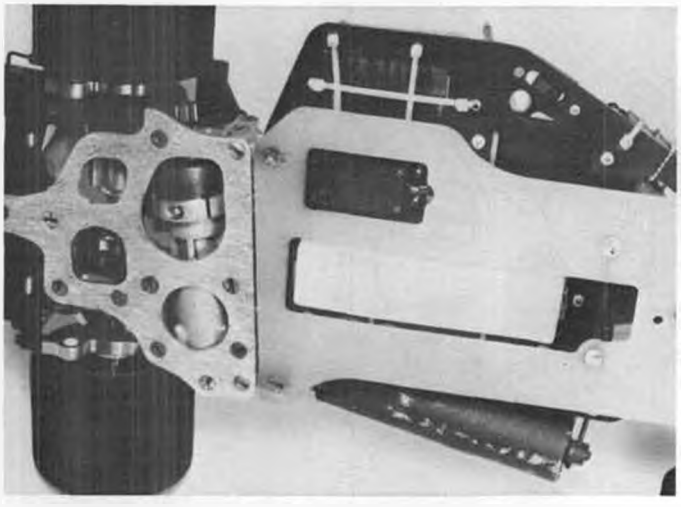
As it sits, this Delta *Eagle* has two years of racing on it, yet except for its not being shiny-new, it is in perfect condition and ready for a lot more racing.

As I write this, racing buddy Dave Clark has now completed his new *Eagle* to the point of needing only the motor and radio system. While he may not have been amazed . . . that possibly being too strong a description . . . he is very pleased with how it all went together, having been reduced to only one "fiddle" to deal with, that of filing some extra clearance into a bracket that captures the inboard ends of the front shocks. Dave is fairly critical in his assessment of race car stuff, both in full-scale and in model size. When the only problem in assembling such a complicated piece as the *Eagle* is a spot of hand filing on a plastic part, there virtually are no problems.

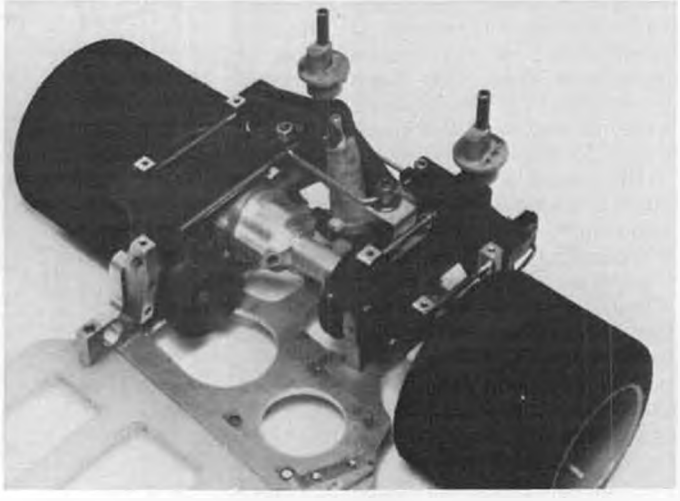
Still, the real beauty of the *Eagle*, when working on it in the shop and thrashing it between heats at the track, is how neatly and logically thought out the entire car is. While it truly doesn't appear to be so, judging from the pictures that accompany this article, most of the stuff that a racer needs easy access to is in fact readily accessible. In some cases, things are admittedly a little tight. In removing the front shocks, it is necessary to flip one up a little in order to get to the upper set screw on the other. Adjusting the idle mix involves threading a nut driver between the rear shocks. Changing the limiting on the diff appears to be impossible, while actually there is *just enough* clearance to do so. In fact, I have successfully done this with the engine still running.

In the whole car, there is onle one fastener which is buried under other components, and that is the one attaching the left rear corner of the radio tray to a splice plate between the pan and motor pod. The exhaust header hangs directly over this screw, so pulling the motor is required before the radio tray can be removed.

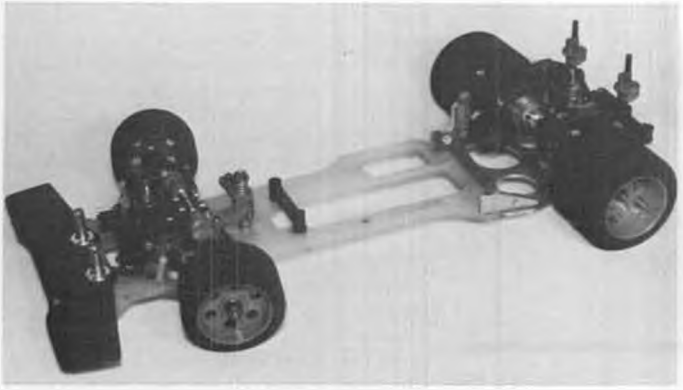
Normally, pulling an engine would be



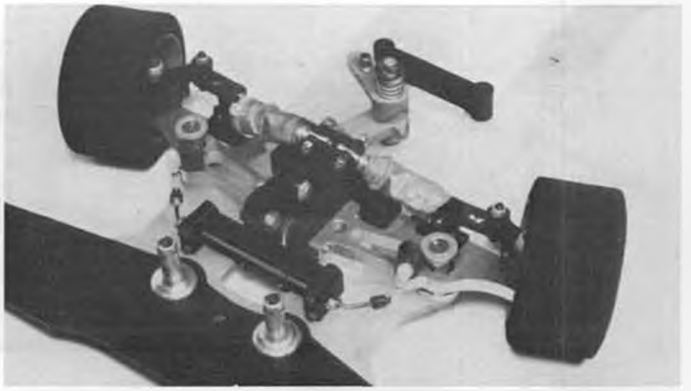
Delta likes their race cars to have low center of gravity. Notice that the pan is cut out to allow throttle servo and tank to be installed nearly flush with lower surface of pan.



Rear view of the Delta *Eagle* shows the differential, the double disc brake, and the almost vertically mounted rear shocks. Shocks are protected by dust covers.



Complete *Eagle* chasis, less radio tray and motor. Current chasis pans are black fiberglass instead of natural color shown.

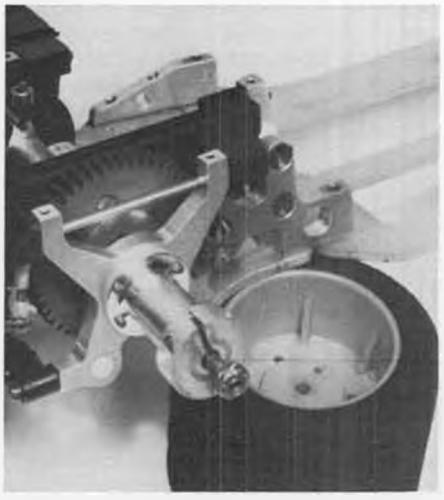


Eagle front end. Suspension swing arms mount low, dust seals conceal coil-over shocks. Inboard attach points for swing arms offer adj. caster.

an inconvenience; in the case of the *Eagle* it ends up being a push, as the motor is so easy to pull out it isn't worth complaining about. Actually, it is pretty easy to get the motor out of most RC cars; where the Eagle is much better is in the reinstallation of the noise-maker. There are no adjustments to make, and there is none of the usual setting of gear mesh and so on. Tightening down the four flat-head "Super" screws common to the motor pod and the mount blocks nicely (and automatically) pulls it all into proper alignment.

While still on the subject of access to components, the double disc brake and the differential are pretty much buried in the bowels of the car. Fortunately, these two units are incredibly reliable, normally not even needing casual inspection during the season (let alone let's-get-greasy maintenance). However, both should be thoroughly checked out during the off season with the diff getting new thrust washers and a fresh shot of grease, the brake at the least deserving new pads.

Racing the *Eagle* has been nothing short of terrific, even if there were some early problems. During practice for the first race on the car, I tagged a protruding section of track wall with the right rear wheel. The impact deformed the plastic carrier enough to let the "dog bone" driveshaft drop out of the outboard axle. Although it turned out to be of little consequence this was a failure. To fix it, we loosened one screw, flipped the carrier up, and reinstalled the shaft. We only lost a few minutes of practice. However, that same hit, in deforming the hanger, semipermanently put a real bend in it, resulting in what appeared to be quite a lot of toe-out on the right rear wheel.



Recently released all-aluminum carriers end previous problem of bent plastic carriers. Nice machine work is evident.

Later that same day, I also banged the left rear on another wall, nicely equalizing the toe-out between the rear wheels. It looked terrible, but on the track the car still had a super set of handles! Now remember that this was almost two years ago. A bunch of toe-out on a current *Eagle*, set up a lot "tighter" would probably be quite noticeable . . . back then it wasn't. However, there was still a durability problem which was soon lessened considerably with the release of stronger parts.

Just recently Delta released machined, all aluminum rear hangers that will totally eliminate any durability problems, as well as allowing an even tighter setup on the car.

Related to the recurrent problem of bent rear hangers was one instance of breaking out the side of a shaft in the differential. When a hanger would get whacked really hard, even if the dog bone didn't drop out and fall free, it would try to rip its way out of the pocket in which it rode. With my car, this resulted in trashing a shaft coming from the differential and at least one of the axles running in a carrier. About the time I discovered this, Delta had already made new parts which were not just of a stronger material, but relieved for more clearance also.

In the first year of racing the *Eagle*, there were only two other problems with the car, both of which were freakish happenings. However, in both cases I was effectively knocked out of a heat race and as this is supposed to be a "to-the-wall" type of article, I'll tell you about them.

About the fifth lap into a heat, I came storming around a sweeper leading onto a 200-foot straight. We're talking about the *fast* section of the track! Exiting the sweeper, a small pebble or something (evidently) was thrown up by the right front wheel, hitting the radio switch and knocking it to the "off" position. It wasn't until the car got to the end of the straight that it hit the wall, at which point it was flat booking! Nothing broke on the car, but I was careful to grind the switch knob down flush with the radio tray later on.

A few races later, I managed to let the car drift too close to one particularly nasty piece of barricade, ending up with the right front wheel hanging over the lip. Following my usual policy which states, "If in doubt, punch it," I left the throttle squeezed shut, and at an overlap in the sheet metal, the steering link to the wheel was popped off just as nicely as could be. It was an easy fix; I actually lost less than a lap snapping it back on with my fingers. Later on, washers were installed under the heads of the cap screws, effectively trapping the clevises, but making toe-in adjustments a little more time-consuming.

In two years of active racing, the only problems we've encountered, of any kind, you have just read about. I spent all of that time lugging my faithful *Super J* along, and never once had to use it. In several instances I lent it out to racers involved in 1/12 racing who wanted a chance to try a 1/8 car.

This past year the car has been absolutely faultless, running a ten-race series of club races, an Enduro, and a bunch of practice sessions without once giving chassis-related problems. So reliable was the car in '83 that I was able to compete very effectively with several racers in our club who have over the years displayed greater driving talent, winning the season-long battle for points and "atta-boys" with the rather high total of 474 out of a possible 480. This included two firsts and six seconds in the best-eight-out-of-ten races scheme of things. Not only that, the two races that couldn't be counted represented another second and a fourth, all 10 races being A main results, incidentally.

Such a statement might be interpreted as my ego coming to the fore; the point, however, is that the *Eagle* not only handles extremely well, it is also fantastically reliable. So much so that when our Enduro race came up in the last half of the season, I only gave the chassis a quick once-over, spending most of the preparation time doing a

Continued on page 75

Control Line

By MIKE HAZEL

PHOTOS BY THE AUTHOR

• This column will be slightly shorter this month, as I am in the hectic process of moving my residence. It is also being written at the very last minute, no doubt a vexation to the editor. I am only moving across the street, yet it is the most difficult move to date, due to the years' accumulation of *junque*. At any rate, it will be worth it, as my workshop will be upgraded. That is the important thing, isn't it? Check the end of the column for the new address. Remember you can also write in care of **Model Builder**.

I have received quite a few notes and newsletters from out there in control line readerland. Let's cover some of this news. First we hear from Bob Heywood, of Dayton, Ohio, who reprorts on C/L Speed activity from his area.

There was lots of Speed action at the 1983 Cold Cash Speed Bash on September 10 and 11 in Dayton. It was the 16th running of this annual event. As a result of this contest and the high caliber of flying shown, several club members converted to Speed flying. The Buzzin' Buzzards have always had a reputation for speed and racing, and this new growth will continue this heritage. Our flying field has two 180-foot diameter asphalt pads, plus plenty of grass area. We're part of a city park which also has an RC area, archery, and a community garden project. (Sounds like my kind of park! mwh)

Back to the Speed contest . . . . We're seeing a steady growth in the number of entries. I feel this is a result of upbeat press and activity. Besides, where else can a hot rod addict go 200 mph for such a relatively small cost? Highlights of the year's meet were Nick Sher's 208 mph Class B record, and the top three places in Class D all topping 200 mph. Don Benesch's Silver Bullet D *hitting 210 added to the thrill.*

As for some thoughts on speed promotion: the fundamental premise is so basic, focus on it and add some color. Promote a sort of thrill which can be seen, felt, and heard, not just dreamt about. A renewed emphasis should be placed on doing well at local meets, as opposed to thinking only about the national record. I believe also that the time is ripe to establish a novice and expert skill level breakdown to encourage beginners. In general the various events could be grouped under realistic nominal speeds, for example, B, D, and Jet Novice would work with a 180 mph limit. The NASS needs to get involved in such a program.

I also received a copy of the "Buzzard Droppings", newsletter of the Buzzin' Buzzards club. Les Byrd is the editor, who also reports that there is a lot of activity going on in the Dayton area. He had a couple of safety tips in his last issue, which bear passing on.

"I like thin cyanoacrylate glues, but they sometimes come out too fast and flood the joint. As a result, they don't adhere well. So, I've adopted a common practice of inserting a short length of Teflon tubing into the end of the nozzle to allow pinpoint application and accurate metering of the glue dispensed. Fine, but these little lengths of tubing sometimes get clogged and must be replaced. Beware . . . they're sometimes stuck in the nozzle, and if you're not carefull, when you pull them out with your pliers, the wet, clogged ends will sometimes flip a drop of cyanoacrylate adhesive into the corner of your left eye. You may experience instant pain, followed by a scratched cornea, a Saturday afternoon visit to the doctor, a $20 office visit bill, and an afternoon with a hideous patch taped over your eye to prevent blinking.

"Next, after refueling my new high performance .40 on the engine test stand, I choked the venturi, applied the battery clip, and with my gloved hand attempted to start the motor. Well, it didn't start in two flips as it had been, so I decided it was dry. I disconnected th battery, choked the venturi once more, and as is generally my habit. I flipped the prop two or three times to distribute the prime in the crankcase before reconnecting the battery clip. Well folks, it started on the first flip . . . *without the battery being connected*! Now keep in mind that the motor was warm, and the glow plug had just been lit about three or four seconds earlier. Apparently, everything was ready but me. I wasn't hurt, but I was very surprised."

Two very interesting occurances, indeed. I would add that when working with CA glue dispensers, always point the unit away from yourself (and others) when opening, unclogging, or testing.

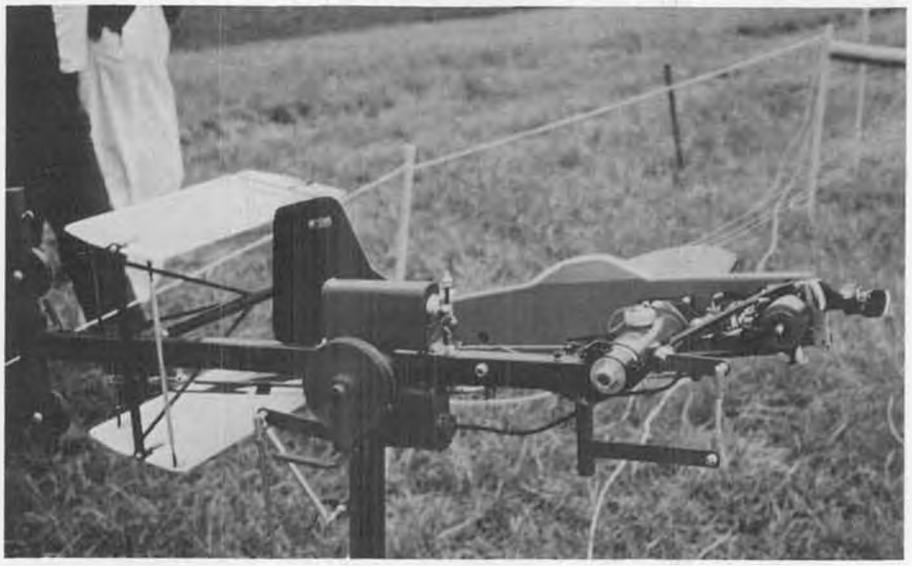
The engine firing up without benefit of 1-1/2 volts is unusual, but not a totally rare occurance. This brings to mind the classic situation of an unwary modeler casually flipping the prop on a diesel engine and receiving a surprise! Also, a hot .049 engine can be stopped and restarted without battery connection if done quickly. The lesson here is to always be ready for action when turning the prop.

All of this brings to mind something funny I saw a number of years ago. One of the locals had a Rat racer with a K&B Torp .40 that had a habit of starting without turning the prop. Evidently, with the piston in just the right position, the right fuel/air mixture in the chamber, etc., all it took was to light the glow plug to make the darned thing take off. I saw this happen a couple of times myself. What a way to psyche out your competition! If someone were to do this today, no doubt the bystanders would be looking for the onboard engine starter. Anyway, to this day, I always grab the prop or stay clear of it when connecting the glow plug after a prime has been applied.

Another fine newsletter that shows up regularly is the "Skywriter," from the Seattle Skyraiders, which is edited by Dave Mullens. The Skyraiders is a large club, and it's still growing. The membership participates in virtually all competition events, besides lots of sport flying. A strange one accurred at their annual meet last fall, which was held in a parking lot at one of the Boeing Company facilities. A large helicopter came over the field at low altitude to pick up a piece of euipment that was between the flying circles. Unlucky Pete Bergstrom was flying his Stunt plane,and when the copter passed overhead, the rotor blast

Joe Armstead built this trio of C/L racers. The smallest one is a Mouse Racer, and it is flanked by a couple of Slow Rat Racers. Note mufflers required in WAM competition. Klampmann pic.

Frank Garzon launches Nick Sher's record holding Formula 40 at Dayton, Ohio, speed bash. Very fast acceleration! Photo by Bob Heywood.



This fantastic piece of machinery is in reality a flight simulator! Oba St. Clair, of Eugene, Oregon, designed and built it. Photo by R.F. Stevenson.

blew his plane down!

Dave Copeman is the newsletter editor for the Circlemasters Flying Club of Milwaukee, Wisconsin. Judging from the contents of the newsletter, there is a lot of scale interest in the club. Included in the last issue was a piece regarding club participation which looks familiar. It has probably been repeated, but I will repeat it again:

"Are you an active member, the kind that would be missed? Or are you smug and content, that your name is on the list?

"Do you attend the meetings, and mingle with the flock? Or do you stay home, and criticize and knock?

"Do you take an active part, to help, and work along? Or are you satisfied to be the guy who just belongs?

"Do you work on committees, to see there is no trick? Or leave the work to just a few, then complain about a clique?

"So come to meetings often, and help with hand and heart. Don't be just another member, instead, take an active part!

"Think it over, brother! You know right from wrong! Are you an active member, or do you just belong?"

The newsletter of the Orbiting Eagles of Omaha is edited by George Lieb. Club member Bob Furr included the following tips and hints in a recent issue:

"If you ever build a scale model, you may find that the full-size aircraft had a tinted canopy. Plastic canopies, as used on our models, can be dyed to match almost any color using Rit brand dye. It can be found in most grocery stores in a variety of colors. Follow the package directions to mix the dye and submerse the canopy for a few minutes and then check the color. It takes quite a bit of time for the color to darken, so be patient. A neat trick is to dye only the inside of the canopy. This avoids streaking and color changes from fuel and cleaning.

"Most of us have had problems with carbide cutting disks breaking while using them. A simple fix to toughen a new disk is to use a few drops of one of the superglues on it. Use the older, thinner type, not thicker, gap filling type of CA glue. After a couple of minutes, the disk is ready to use. Remember to do this on wax paper or a plastic sandwich bag so you don't glue the disk to the workbench."

This Fox .35 powered *Barnstormer* built by Bob Emmet was seen at Portland Old Timers event. M. Hazel photo.

And from a land down under, (does that make us up over?) I received a package of newsletters and sample competition rules from Joe Snaith. Joe is the editor for the publication of the Ku-Ring-Gai model flying club in Sydney, Australia. The club's 50 members fly mostly CL, with some free flight thrown in for variety. The club flies in an area set up for models in a national park, located discreetly away from residential areas.

Here are a few interesting points about the CL Aussie rules. The Goodyear racing event is styled closely after FAI Team Racing, except there is no tank specification, so I assume that this is a glow engine event. There is also a .15-size engine Rat Race event, which features a lack of restrictions on model design. The scoring is based upon laps completed in 10 or 20 minute segments, which correspond to individual heat and final length races. The Open Combat event is similar to the FAI Combat event, except for the use of .40-size engines. These and other events are governed by the Model Aeronautical Association of Australia. There are also several local unofficial type events which include: Fun Class Combat, Reed Speed, Crate Race, and Silhouette Scale.

★ ★ ★

Sometime back I made some comments regarding the engine noise problem that seems to be an evil necessity with most of us. Tom Dixon wrote in to share some thoughts on noise suppression, and modeling in general. Tom feels that all engines over the 1/2A size should have some effective muffling system, four-cycles excluded, as they are already quiet. He writes:

What really hurt CL in this area several years ago, was the guys flying Goodyears on Rossi .15s with megaphone pipes. Doesn't take much of that to annoy the neighbors! With flying sites quickly lost, control line visibility declined, and thus interest went away. At least the borderline interest; the hard core guys are still going; but nobody buys and flies Ringmasters *anymore. Kids buy and fly rockets, or play Dungeons and Dragons, and these are the ones who do come into the hobby shops.*

I feel that when all the magazines and hobby shop owners feature airplanes

Continued on page 63

R/C POWER BOATS

By JERRY DUNLAP

SOME THOUGHTS ON BEING ORGANIZED

Although organized model boating activities aren't everyone's idea of a good time, many of us are committed to the promotion and enhancement of this aspect of model boating. Recently, I have been involved in working with a city park agency in procuring a new running location for some of our model boating events.

As many of you know, the process of obtaining permission from an agency to use public facilities for model boating can be both time consuming and frustrating. It sometimes seems like you can get shuffled between secretaries like poker cards. However, my recent experience in obtaining access to a lake again affirmed my belief in the need for organized activity.

When negotiating with an agency for use of their facilities, you must sell your organization. The agency may want to know information like what type of people are you representing, how many members there are in your organization, how old are the members, and what other agencies have you worked with in past years. As it is the agency's responsibility to oversee the safe operation of public property, it should come as no surprise that they ask questions about potential users.

One question that is most certainly going to be asked is, "What amount of insurance coverage can your group provide?" It is at this point that affiliation with either of this country's national model boating organizations is invaluable. The organizations are the International Model Power Boat Association or the North American Model Power Boat Association. Both organizations provide excellent insurance programs to protect property owners in the event of either personal or property damage caused by model boat operation form of personal and property liability insurance, the agency controlling the use of the property is not going to allow model boating on their site.

Photos this month of the NAMBA "B.C. '83" meet. Here we see two Division II Sport 40s heading down the front chute.

Affiliation with one of the national organizations is another way of increasing the credibility of your model group. An activity that is of national scope is impressive to those making decisions about facility usage. While the local club in my area was going through the process of receiving permission for a running site, the local newspaper featured our club's endeavors. The reporter was very interested in the national aspects of model boating. Our local club's affiliation with a national organization and our insurance coverages were given attention in the article which appeared in the paper.

There are those who feel some of us tend to organize the fun out of everything. At times, it may appear that organizations do seem to get in the way. However, anyone who is capable of accepting the fact that we exist in a society that is highly regulated, licensed, taxed, governed, and monitored, is also capable of seeing the need for some type of formal sutructure for a leisure activity.

The cost of joining either IMPBA or NAMBA is minimal when one considers the potential benefits. The cost is less than what we are paying for a gallon of 50% nitro fuel. As the two national model boating oranizations tend to have certain areas where each is predominate, some readers may not be certain which would be the best orgaization for them to join. If no one in your local area can help, I would be willing to recommend one of the organizations based on your locality. My address can be found at the end of this article.

THE LIMITATIONS OF OUTBOARD POWERED BOATS

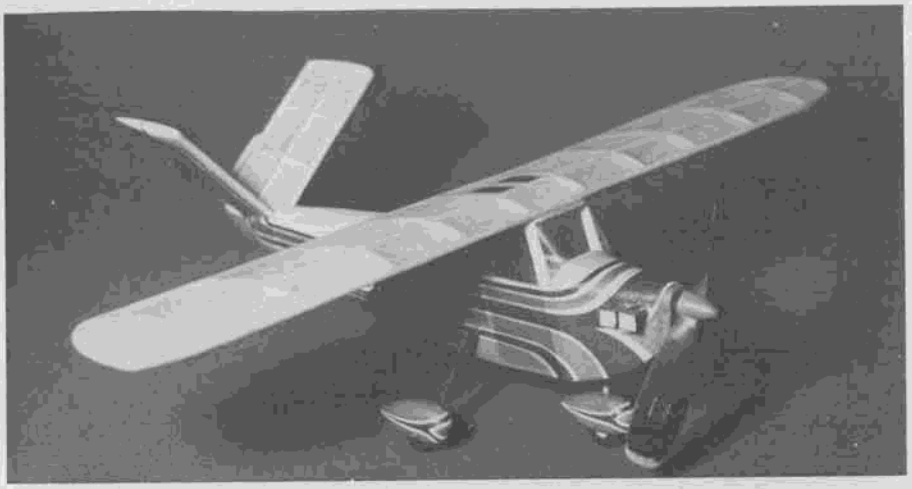
A question that has been asked in letters and over the phone is one dealing with using outboard powered boats to compete against inboard powered boats. As much as I love the outboards, I recognize there are limits to their use in certain racing classes.

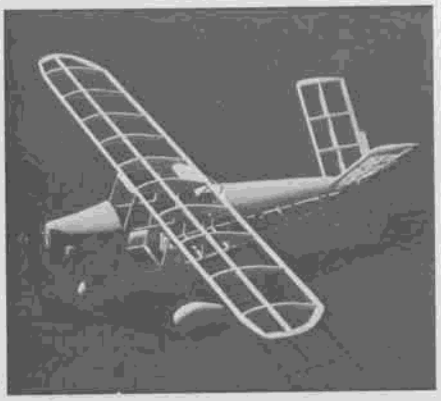
It certainly is possible to use outboard powered boats to race in the traditional inboard classes. The most successful outboard poered boats would be the 3.5 outboard outriggers that are very poplar in the Southern California area. This particular class is very fast. However, the fellows racing these boats are making some very radical modifications to their outboard motors to get them to perform

Continued on page 93

Stuart Russel (left), NAMBA president, poses with Tom Perzentka, Octura Models, "Mom" Coad, executive secretary of NAMBA, and Don Coad, recorder and technical committee member.

NAMBA Hall of Fame member, George Campbell (left) confers with Ed Fisher, winner of four national championships at "B.C. '83".





LEFT AND ABOVE: Walt Mooney's *Honey Bee* with and without clothes. The only thing not true to scale on this bird is the prop.

HONEY BEE

By WALT MOONEY . . . Peanut purists will perk up when they peruse the plans for this perfectly scale Peanut *Honey Bee*, a certificated homebuilt designed by the author!

• This Peanut Scale model is a little surprising in view of the fact that it will fly quite stably with no deviations from exact scale outlines including dihedral, (none) except that it is equipped with a larger than scale flying propeller. It is also a little surprising in view of the fact that I have very good documentation on the real airplane.

The real *Honey Bee* was built in 1952 and was certificated on December 17, 1953. A small group of people, including Ken Coward, Bill Chana, Carole Mooney, Dean Morehead, and myself did the entire design and construction of the prototype. Because the "homebuilt airplane" movement had not started at the beginning of the *Honey Bee* project, the CAA insisted that it could not be flown continuously on an experimental basis. We were therefore forced to obtain an approved type certificate for the airplane. After passing all the required tests we were awarded the certificate on the 50th anniversary of the Wright Brother's first flight in a powered, heavier than air machine.

The real airplane was flown by more than 200 pilots during its flying lifetime and for about 2000 hours. I flew it for the first time when I had only 11 hours of power time in my log book and eventually put about 1000 hours on the airplane myself before I retired it to the Experimental Aircraft Association museum in Hales Corners, Wisconsin. The *Honey Bee* was awarded the most outstanding new design award at the 1955 EAA Fly-In in Milwaukee.

Three-quarter rear view shows V-tail details, and black "windows" in top of wing.

So, it really is surprising that it has taken this long for me to design and build a Peanut Scale model of the *Honey Bee*.

An accurate three-view of this aircraft has been provided for those who would demand documentation. It depicts the aircraft as it was painted in the summer of 1966. The wheelpant trim was tape, and has mostly come off the wheelpants, so the museum does not have the *Honey Bee* currently on display with this color scheme.

The airplane has had several color schemes over the years. Color demarcation lines were in about the same locations relative to top and bottom coloration. The original color scheme was mostly silver on the bottom, white on top, with a red horizontal separation line where the top black line is shown, but running from the engine cylinders to the end of the tail cone. The numbers were black on the top of the right wing and the bottom of the left wing. Two-inch black numbers were on the fuselage just ahead of the tail above the red stripe. A *Honey Bee* signature about like that on the model plane title was on the turtledeck aft of the cockpit about eight inches tall. It was red with black shadowing.

The second color scheme painted all the silver areas orange, the red stripe black, and put vertical black numbers where the slanted white numbers are now on the fuselage sides. The wing numbers were painted out. The *Honey Bee* logo was repainted with orange lettering shadowed in black. The landing gear legs were orange.

The *Honey Bee* did not acquire wheel pants until just before it acquired its final color scheme. They gave the airplane a speed increase (at the same power setting) of seven miles per hour.

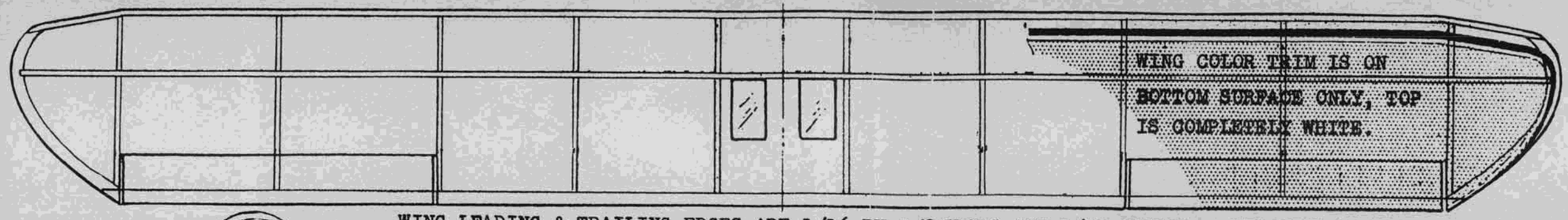
Maximum speed of the *Honey Bee* was 13 mph at sea level. Its best rate of climb was 960 feet per minute. Its range was about 700 miles. Its absolute ceiling as extrapolated from a sawtooth climb test was 23,000 feet. It was actually flown to a little over 19,000 feet and on many cross country flights I cruised it at 13,500 feet.

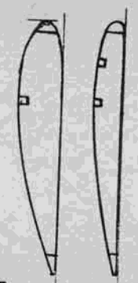
It was lovely flying aircraft . . . so why wasn't a Peanut built earlier? Well, it has a high aspect ratio wing and that results in a fairly small Peanut. It must be kept quite light. I've tried to design most of these little Peanuts with wood sizes of 1/16th square or larger so the beginners would find them easier to handle. To fly adequately, this model needs to be built with thinner wood parts. The sticks on the plans are 1/20th square instead of 1/16th. Even thinner wood sections would result in a still lighter model.

The airfoil section used on the full-sized aircraft was the NACA 4418. At full-size Reynolds numbers, this is a very good airfoil. However, at the Reynolds numbers obtained by Peanut Scale models, it is rather poor, especially if it is built smoothly. A thinner, multispar wing rib is suggested if efficient model flying is your aim.

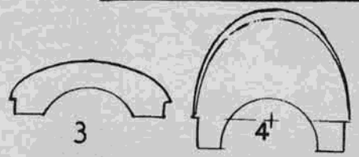
There is nothing about the structure of this model that requires comment if you have been following **Model Builder's** Peanut articles. If this is to be your first attempt, I suggest that you get

Continued on page 63

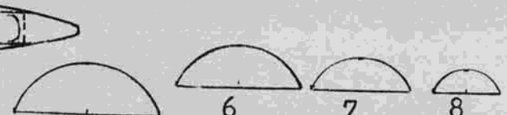




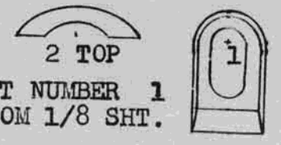
WING LEADING & TRAILING EDGES ARE 1/16 BY 1/8 SPARS ARE 1/20 SQUARE CUT RIBS & TIPS FROM 1/20 SHEET
SCALE RIB & A THINNER ONE THAT WILL WORK BETTER ARE SHOWN
TAKE YOUR CHOICE



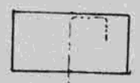
COWL SIDES AND BOTTOM ARE
1/20TH SHEET BALSA



BODY FORMERS ARE ALL CUT
FROM 1/20 SHEET except 1



CUT NUMBER 1
FROM 1/8 SHT.

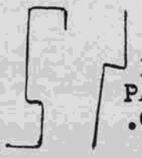


2 BOTTOM

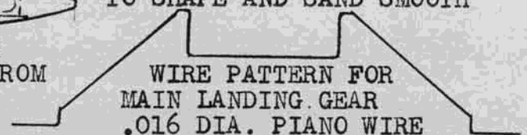
USE THE SMALLEST SIZE
WILLIAMS BROS. CYLINDERS
OR EQUIVALENT AS BASIS
FOR DUMMY 65HP ENGINE

TOP VIEW

WHEEL PANTS ARE MADE OUT OF THREE
PIECES. CENTER IS 1/4 THICK AND
THE SIDES ARE 1/20TH. CARVE
TO SHAPE AND SAND SMOOTH

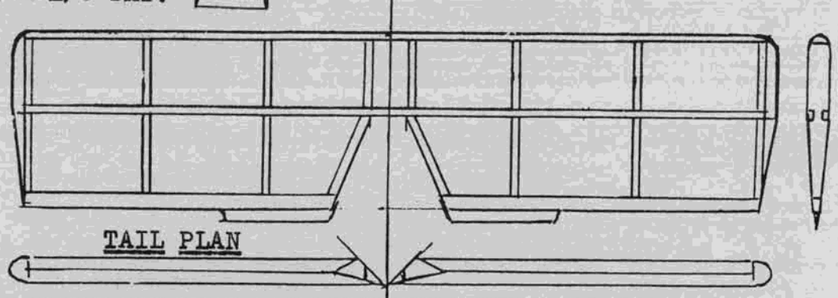


NOSE GEAR WIRE
PATTERN, BEND FROM
.016 DIA. WIRE



WIRE PATTERN FOR
MAIN LANDING GEAR
.016 DIA. PIANO WIRE

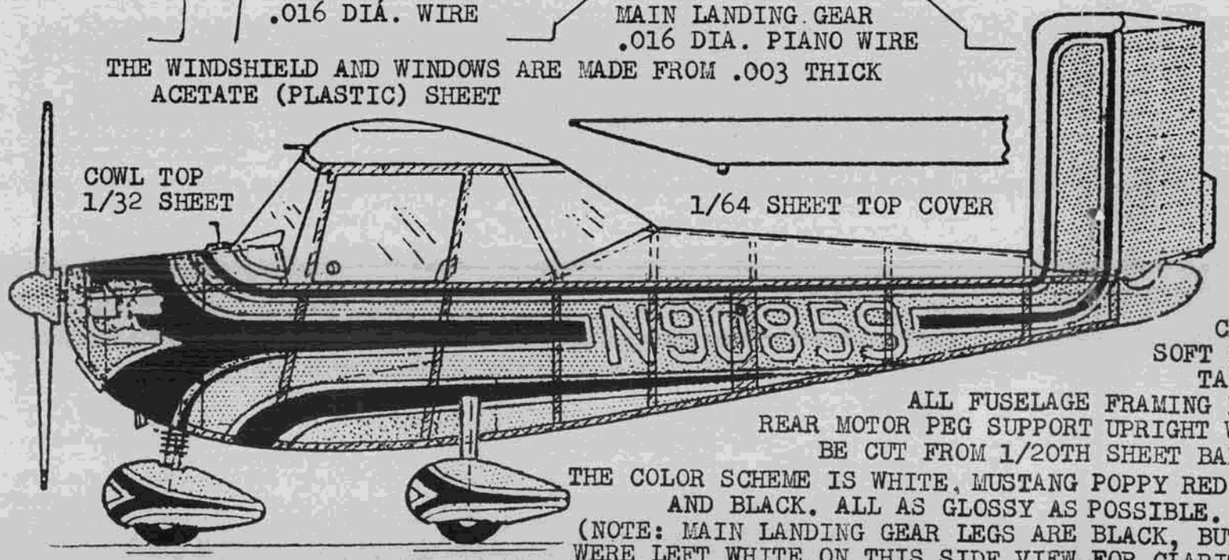
THE WINDSHIELD AND WINDOWS ARE MADE FROM .003 THICK
ACETATE (PLASTIC) SHEET



TAIL PLAN

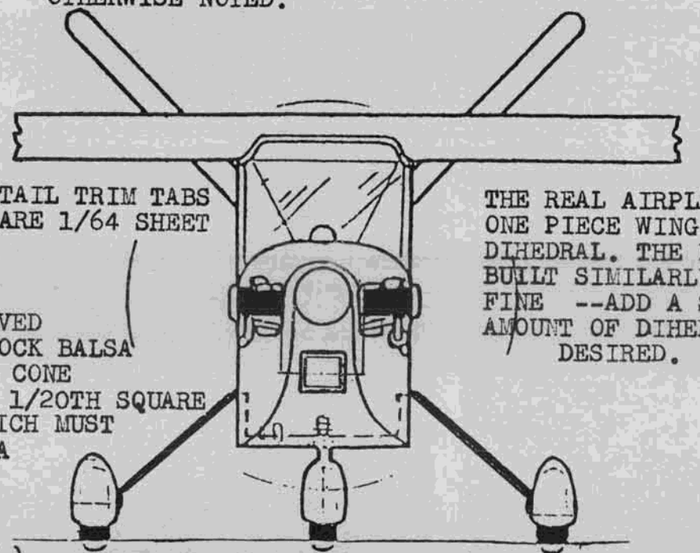
BUILD THE TAIL FLAT DIRECTLY OVER THE PLAN
THEN CUT AT THE CENTER AND CEMENT BACK TOGETHER
AT A 90 DEGREE ANGLE TO ONE ANOTHER

ALL STRUCTURAL PARTS OF THIS MODEL ARE BALSA UNLESS
OTHERWISE NOTED.



COWL TOP
1/32 SHEET

1/64 SHEET TOP COVER



TAIL TRIM TABS
ARE 1/64 SHEET

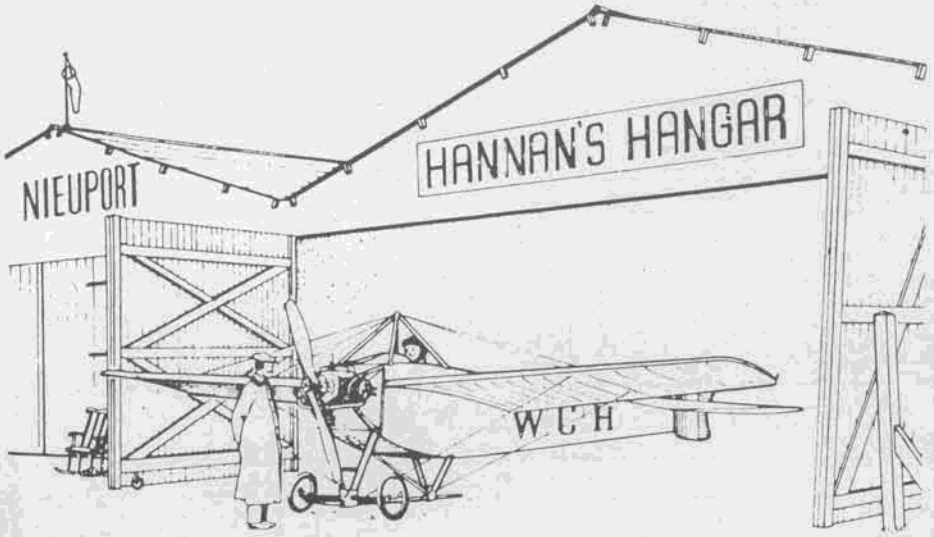
THE REAL AIRPLANE HAD A
ONE PIECE WING WITH NO
DIHEDRAL. THE MODEL IS
BUILT SIMILARLY AND FLYS
FINE --ADD A SMALL
AMOUNT OF DIHEDRAL IF
DESIRED.

CARVED
SOFT BLOCK BALSA
TAIL CONE

ALL FUSELAGE FRAMING IS 1/20TH SQUARE
REAR MOTOR PEG SUPPORT UPRIGHT WHICH MUST
BE CUT FROM 1/20TH SHEET BALSA

THE COLOR SCHEME IS WHITE, MUSTANG POPPY RED,
AND BLACK. ALL AS GLOSSY AS POSSIBLE.
(NOTE: MAIN LANDING GEAR LEGS ARE BLACK, BUT
WERE LEFT WHITE ON THIS SIDE VIEW FOR CLARITY.)

"Honey Bee." Walt Mooney 10-22-83



"Knowledge is of no value unless shared with others."

Mike McKeever with his record setting *Shock Wave* hand launched glider. Designed by Jim Lueken, the model did 12 maxes at the world famous Taft free flight site.

• This month's lead-in line is from the magazine *Traction & Models*, published by Vane Jones, and brought to our attention by Ken Hamilton.

ANYONE FOR TANDEM-WINGERS?

Sears McCorrison, of Massachusetts, sent in a report describing recent research about dragonfly wings. According to the Colorado College scientists studying the insects, the turbulated tandem wings are much more efficient in relation to their size than those of full-scale aircraft.

We notice that some of the newer canard designs are almost of tandem wing proportions. Perhaps Samuel Pierpont Langley with his *Aerodromes* was right after all?

MORE MODEL STAMPS

Marian Krzyzan who had previously favored us with a Polish postage stamp featuring an R/C model aircraft, has now sent another one depicting three streamlined model racing cars. Perhaps other countries' post offices could be persuaded to commemorate the model building hobby/sport?

USA SCALE TEAM PATCHES

Now available are colorful cloth patches, being sold in a fund-raising effort for the U.S. flying scale model team. As the 1984 World Championships are being conducted in France, the patch theme is most appropriate: a silver *Spirit of St. Louis* is shown flying in front of the Eiffel Tower against a circular blue background. Help support your team and brighten up your jacket in the process, by sending $3 to Bob Underwood, 4109 Concord Oaks Dr., St. Louis, MO 63128. Order a *Spirit* from St. Louis, and tell 'em **Model Builder** told you!

ANOTHER OVERSEAS CONTEST

For those of us who may not be able to participate in person, there is another way to take part in international events: F.L. Van Hauwaert, Club de Petite Aviation, 1 Grand Place b 52, 4110 Flemalle, Belgium, again solicits entries for the "Flamalle '84" indoor proxy Peanut contest.

Last year, some of the models arrived late or damaged, so Van Hauwaert suggests the following remedies:

1. Only one or two models per box.
2. Boxes should be *sturdy*. Cardboard reinforced with plywood is one good choice. Styrofoam containers have not proven adequate, as they are easily punctured or crushed.
3. The model(s) should be *securely* attached inside the box to prevent disloging during shipment.
4. Documentation and instructions should be secured in such a manner that they cannot inflict damage to the model(s).
5. If return postage is enclosed, it should not exceed ten dollars. It might be better to send such funds in a separate envelope.
6. For the 1984 flemalle contest, models should be sent near the end of May to insure timely arrival.

Note: The little (eight-inch wing span) Pistachio Nut models are gaining in popularity, and are even easier and cheaper to mail than Peanuts. Walt Mooney recently constructed one in about fours hours!

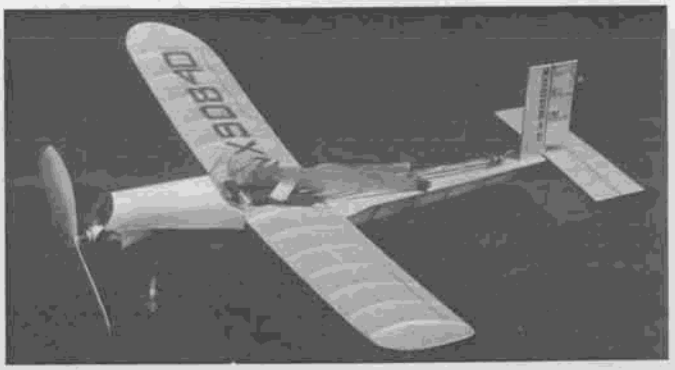
ANY PORT IN A STORM

According to Dave Linstrum, Doc Martin and his merry Miami men are now indoor flying in a Florida fertilizer warehouse!

BY STRIKING CONTRAST

The Nebraska Free Flighters have the luxury of several indoor flying sites, including a gymnasium, an armory, and the Beatrice Town Hall. Among the events they fly are: Easy B, Hand Launch Glider, Bostonian West, Rubber Scale, and Peanut, according to Tom Winter.

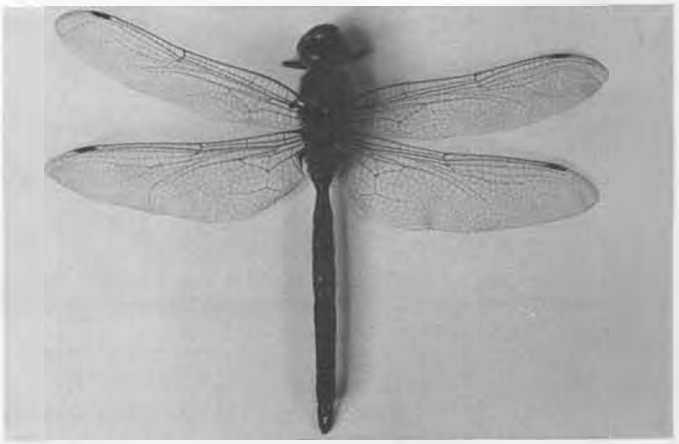
Walt Mooney's Siemens-Schukert E-1 Pistachio Nut, eight-inch span model took a mere four hours to build; placed second in a Santa Monica, California, contest. Photo by Fudo Takagi.



Dick Johnson, of Texas, constructed this delightful Peanut *Wee Bee* from information supplied by Bill Chana and Walt Mooney who built the big(?) one. Photo by Bill Caldwell.

Jere Robinson's Peanut Scale DH-66 *Hurcules* seen during a San Diego Scale Staffel contest.

Walter Erbach, record-setting ornithopter member, gives this advice to solving model problems: "The best solution is the simplest thing you can think of." Amen to than.



Mother Nature's highly efficient dragonfly features thin, flat, tandem wings, nearly as transparent as microfilm.

POINTS OF VIEW

Fred Henderson, Model Editor of England's *Air International*, opines: "I have always believed that any model, if it is to justify its description as a 'model', should have an original which it reproduces; otherwise it is not a model but an original creation!"

Jean Marc Geiser, of France, sees the issue thus: "Scale models? I think they are not interesting, because they are only copies of machines which have already been built, tested and flown. The real interest is in models which represent research; the future planes or helicopters which will one day be reality. Scale models are the past; non-scale models are the future."

PROP THOUGHTS

From a pre-World War 1 publication: "Don't think you can make up in pitch what you lack in length. You may get a big breeze behind, but you can't fly with a fan."

"Don't imagine for a moment that any propeller will make up for lack of power in the motor. A properly designed propeller will absorb the full horsepower, but can do no more."

"Don't judge the efficiency of your propeller by its thrust on the ground. You can't tell the speed of a race horse when he is tied to a post."

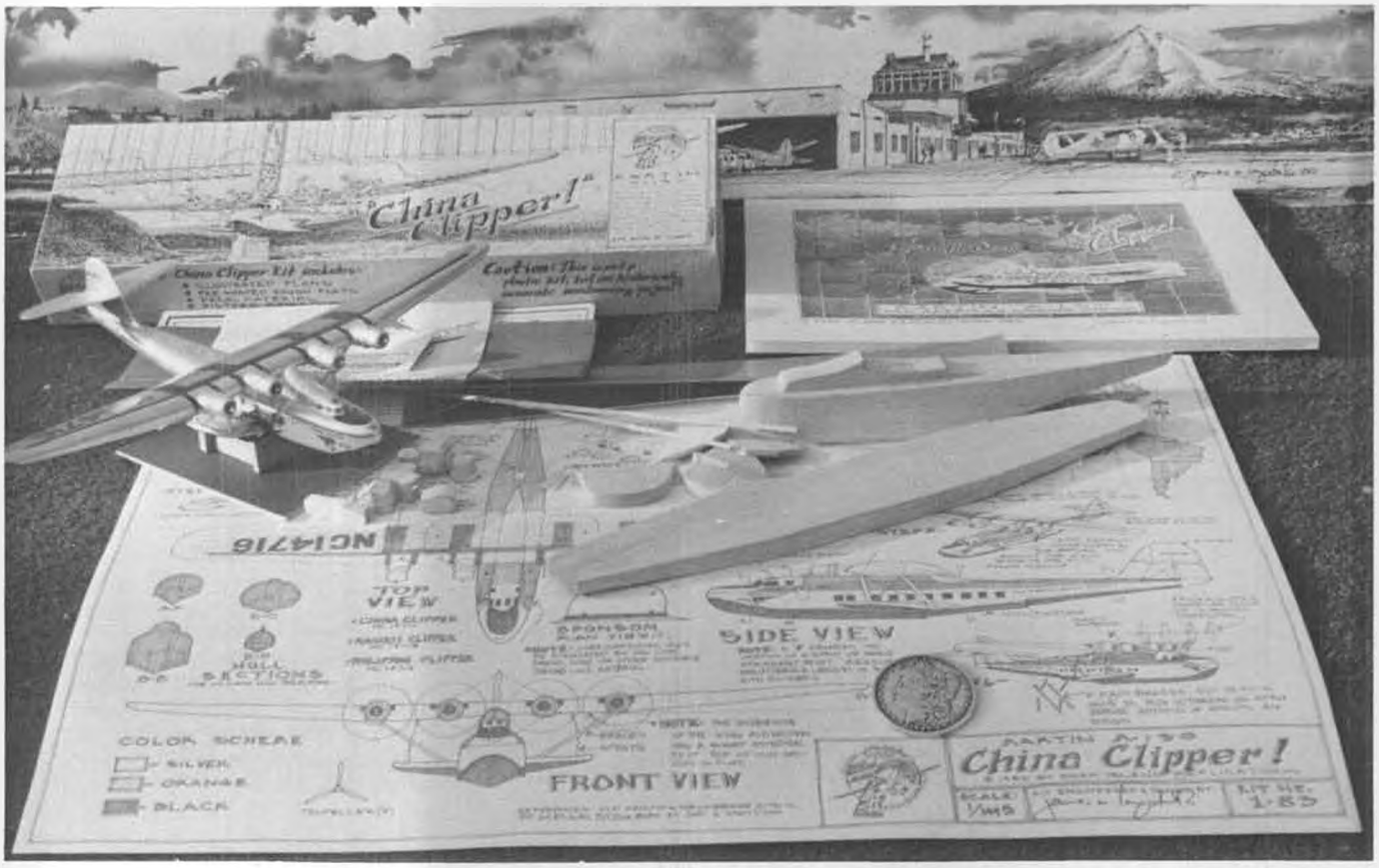
"Don't think that because a man is a good carpenter that he can make a good propeller. There is still something in the 'know how.'"

And Larry Kruse sent us a definition of *propeller*, from *Aviation Space Magazine:* "Fan that keeps the pilot cool. Turn it off and watch him sweat."

IT NEVER FAILS

Tired of crowded model flying fields,

Continued on page 68



New "old fashioned" wooden solid model kit for the Martin *China Clipper*, as described in the article.

Free Flight

By BOB STALICK

It's April already! As you read this, depending on where you live, the weather will be getting nicer, and your competitive juices will be beginning to flow. It's time to test fly those winter time building creations. For me, it's December as I write this, and I'm still *building* my winter time creations. My building schedule is two F1C (FAI Power) models, a D Gas model, and Bostonian. So far, I've completed one of the F1C ships . . . does that sound familiar? Our outdoor season is less than six weeks away, so time's a wastin'.

I hope this column provides some food for thought as you look forward to this summer's season.

MYSTERY MODEL FOR APRIL

Earlier this month, I had the opportunity to be in Indianapolis and visit with Bob Larsh. Bob is one of the stalwarts of the famous Central Indiana Aeromodellers (CIA). Bob is also one of the promoters of the Nostalgia event. While there, he gave me the plans (full-size) to this month's Mystery Model.

This 1955 design has many of the features that would be found on today's power ships. It has a low pylon, moderatly sized stab, and a slender, "pencil bomber" style fuselage. The ship should be a natural for Nostalgia with a good plain bearing .15 to .19 engine. Anyhow, if you can guess the name of the ship, and if you can be the first in line with your response at the **Model Builder** offices, you will win a one year subscription to my favorite magazine.

DARNED GOOD AIRFOIL: 9% RAMROD.

Last month, I presented the *Ramrod* airfoil for your consideration. The 9% Ramrod featured this month is the same section thinned down by one percent. This is a popular section here in Oregon, and it is used on small AMA gas models . . . 1/2A and A sizes extensively. It has many of the same characteristics as the full-sized section, but it seems to be faster in the climb. Glide does not suffer. This section is paricularly effective if turbulated. Turbulators are positioned approximately at the 7.5%, 15%, and 22% positions. Normally, the turbulators are 3/32 sq. spruce or balsa strips. I have also used this section on F1C models with some success, although I think it's just a bit too thick for sheeted wings.

I recommend the 9% Ramrod very highly. I think you'll like it as well.

Retired school principal, Bob Fizer, showed at Sacramento with this Tom Hutchinson *Maverick* 1/2A gassie. Nice flier, according to photog Bob Kampmann.

John Drobshoff of San Francisco presents his 1936 *Junior Birdman* at a recent NCFFC meet in Sacramento. John says the tissue is still intact from its original building days . . . a long time ago! Bob Kampmann photo.

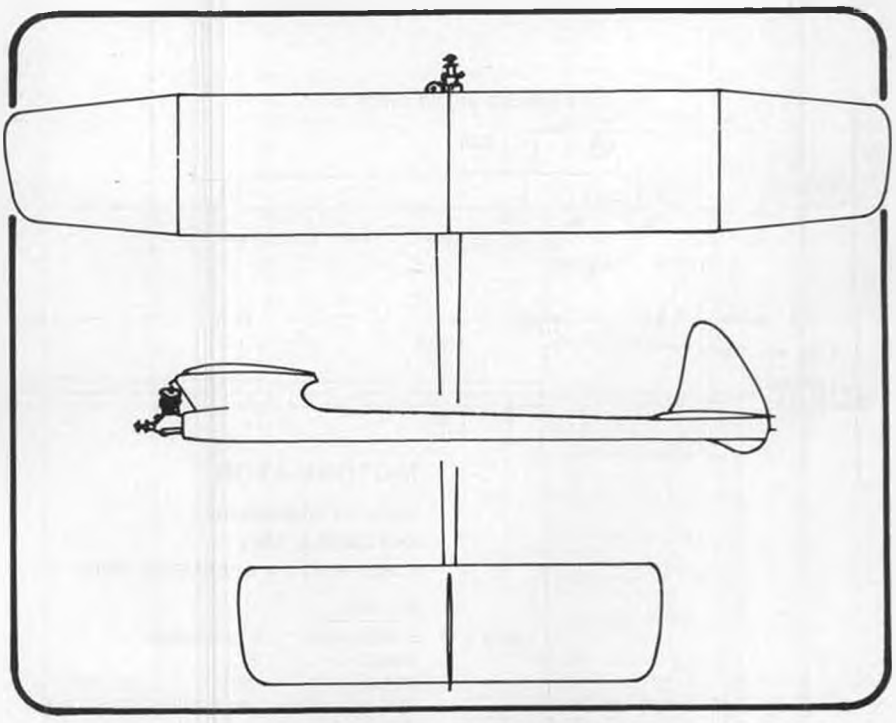
APRIL THREE VIEW: ROBERT DUNHAM'S MOTORVATOR A-B POWER MODEL

Robert's A-B ship has compiled quite a string of wins over the past several years. It is a further development of his FAI Power model and sports a sheeted wing and stab. It is VITed with a Seelig timer. Wood selection for the wing and tail is very important to hold the weight to a reasonable figure. It seems to perform equally well with either the K&B 3.25 or the 3.5 using an 8-4 Rev-Up prop with 50% nitro fuel. As a matter of fact, it has never failed to max out, and has done well in the five and four-second run flyoff flights. (Information from Bob Dunham via the CIA "Informer.")

NEW RUBBER FROM CHAMPION PRODUCTS

A new source of rubber is now available for the avid competitor in the rubber events. George Schroeder has been able to find a manufacturer willing to produce rubber according to his specs. The new product is now available and known as Champion Rubber. It's similar to FAI rubber. It's available in 1/8, 3/16 and 1/4-inch widths at $11.95 per box for only a short time, then the price will increase. One big difference with Champion is that you'll be able to return any bad stuff that you get for a refund or a credit. Champion products is a **Model Builder** advertiser. Give their new stuff a try.

Another shot of John Drobshoff, this time with a *Pacific Ace* built from John Pond plans. Model features a pop-up stab which is activated with a Tomy timer. Photo by Kampmann.



APRIL MYSTERY MODEL

AN AIRFOIL CORRECTION

I the January issue of **Model Builder,** I stated that the DGA for January, the RSG 31, was the thickest in the series. I recently received a letter from James Johnson pointing out the error of my statement with the information that the RSG 32, 34, and 36 also exist . . . although he sent no coordinates.

Sorry for the misinformation, and thanks to James for the correction.

CIAM PROPOSED CHANGES

Recent proposals of note to be dealt with at the CIAM meeting may have an effect on you if you are a member of the FAI program. Most are cosmetic or minimal refinements, such as allowing four models in FAI events for all outdoor classes except Coupe, or outlawing all kinds of electronic thermal detecting equipment.

However, one of the proposals really caught my eye. It would replace the minimum surface loading on F1C models, which has been 20 grams per square decimeter with a surface area limit of 30 to 38 square decimeters. This translates into roughly 465 sq. inches minimum and 589 sq. inches maximum. The intent is to allow development of models that use engines smaller than the current 2.5 cc mills without unduly penalizing them with either smallish surfaces or excess weight. I, for one, hope that it passes, even though I have more than one model that exceeds the maximum area. I think such a move would be healthy for this event and should serve to increase participation in an event that has become highly specialized.

DOPE DON'TS FROM THE CIA "INFORMER"

Don't dope when temperature is over 85° F.

Don't dope when the relative humidity is over 70%.

Don't exceed retarder use over 25% volume.

Don't use more than 10 drops of castor oil for every four ounces of dope.

Don't forget any of the above.

BUILDING TIPS: THE FIREWALL

Recently, the "Satellite" collected the thoughts of a number of gas model fliers as to how they keep the firewalls stuck on their models when using super-honking engines. Some good tips were presented, including these:

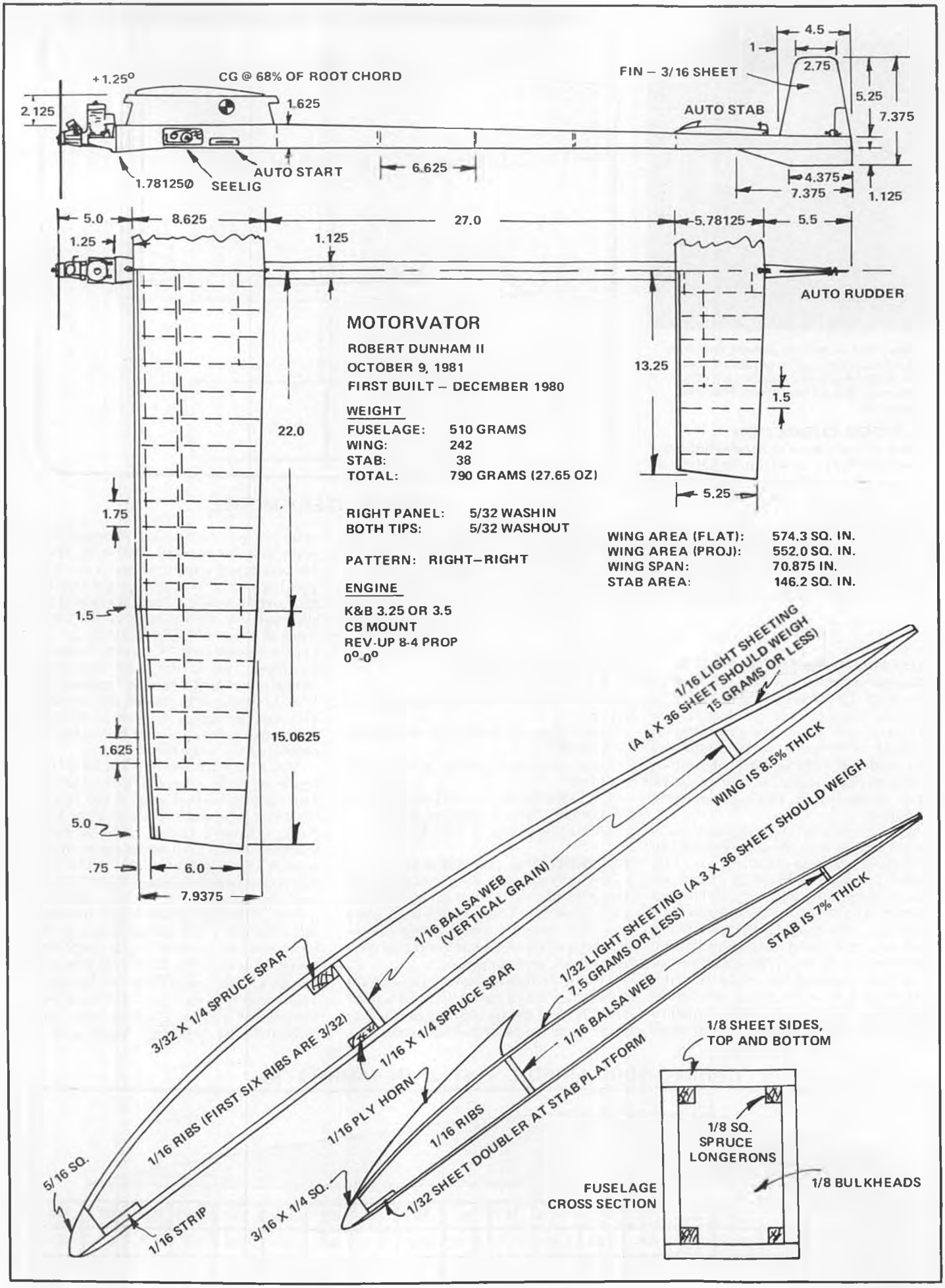
Lyman Armstrong says, "Early in the 1950s there was a fellow whose Torp .29s and 32s were always running better than mine. Finally, I asked him what his secret was. He was laminating plywood firewalls to a thickness of a full inch. Then, he wrapped the nose with aircraft pinking tape and applied eight coats of glue over the tape." The thickness of the plywood was used to soak up the vibrations of those old K&B beaters.

Lyman continues, "On a profile type of fuselage, I extend the nose accurately over the building board so I can use the board edge as a brace for the firewall. Pins can generally be driven though your engine mount screw holes, but be careful of the alignment.

"On a built-up fuselage, I build off the top view. Have a piece of three-inch by four-inch balsa that goes down first at the front where there is a straight line. Next, I have a bunch of balsa sheet triangles which I pin down again on the outside of the right side of the plans. A fuselage side is then pinned to the block and the triangles on the inside. The formers are then glued to the fuselage side. The other side is then glued to the formers while it is held in place with the triangles. Incidentally, these triangles and the block are pinned to the building board with two-inch pins. The tank and the firewall can be glued in now. The three-inch by four-inch block and a

DARNED GOOD AIRFOIL — ST. JEAN RAMROD - 9%

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	1	2.15	3.6	4.6	5.92	6.85	7.7	8.53	8.99	9.1	8.9	8	7.38	6.1	4.3	2.7	0.7
LOWER	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0


+1.25°
CG @ 68% OF ROOT CHORD
2.125
1.625
1.78125Ø
SEELIG
AUTO START
6.625
FIN – 3/16 SHEET
4.5
1
2.75
5.25
7.375
AUTO STAB
4.375
7.375
1.125
5.0
8.625
27.0
5.78125
5.5
1.25
1.125
AUTO RUDDER
MOTORVATOR
ROBERT DUNHAM II
OCTOBER 9, 1981
FIRST BUILT – DECEMBER 1980
WEIGHT
FUSELAGE: 510 GRAMS
WING: 242
STAB: 38
TOTAL: 790 GRAMS (27.65 OZ)
RIGHT PANEL: 5/32 WASHIN
BOTH TIPS: 5/32 WASHOUT
PATTERN: RIGHT–RIGHT
ENGINE
K&B 3.25 OR 3.5
CB MOUNT
REV-UP 8-4 PROP
0°-0°
WING AREA (FLAT): 574.3 SQ. IN.
WING AREA (PROJ): 552.0 SQ. IN.
WING SPAN: 70.875 IN.
STAB AREA: 146.2 SQ. IN.
13.25
1.5
5.25
22.0
1.75
1.5
1.625
15.0625
5.0
.75
6.0
7.9375
1/16 LIGHT SHEETING (A 4 X 36 SHEET SHOULD WEIGH 15 GRAMS OR LESS)
WING IS 8.5% THICK
1/16 BALSA WEB (VERTICAL GRAIN)
3/32 X 1/4 SPRUCE SPAR
1/16 RIBS (FIRST SIX RIBS ARE 3/32)
1/16 X 1/4 SPRUCE SPAR
1/16 PLY HORN
1/16 RIBS
3/16 X 1/4 SQ.
1/32 SHEET DOUBLER AT STAB PLATFORM
5/16 SQ.
1/16 STRIP
1/32 LIGHT SHEETING (A 3 X 36 SHEET SHOULD WEIGH 7.5 GRAMS OR LESS)
STAB IS 7% THICK
1/16 BALSA WEB
1/8 SHEET SIDES, TOP AND BOTTOM
1/8 SQ. SPRUCE LONGERONS
1/8 BULKHEADS
FUSELAGE CROSS SECTION

Pose pretty! John Lenderman at the Misery Meet at Harts Lake Prairie, Washington. The model he holds is *Lenderman's Coupe*, once the AMA record holder in this event with over 14 consecutive max flights. Photo by Bob Stalick.

Pose pretty No. 2 . . . Gene Jensen, also at Harts Lake Prairie, Washington, was also a competitor in the Misery Meet. He holds his coupe appropriately called *Jensen's Coupe*. And if you haven't guessed it by now, the photo is also by Bob Stalick!

right angle triangle will hold the firewall. Epoxy in place. Watch that you don't glue anything to the jig. If you have positioned everything for clearance, you can sheet across the top of the fuselage sides before releasing the assembled fuselage from the board and jigs. This method sure beats paying $100 for a building jig."

Jack Balaam says, "Here's the method I've used for the past dozen years without a failure. I've been building *Satellites* during this period with a profile fuselage and balsa cheeks. The firewall is usually three pieces of plywood with the landing gear sandwiched in the middle.

"I roughly carve the cheeks and make the timer hole, and then I glue them to the fuselage sides. The front end is then sanded flat. The firewall is then coated with five-minute epoxy and pressed against the front of the fuselage. When the epoxy dries, I sand the cheeks and the firewall smooth. Without blowing away the balsa dust, I use Hot Stuff around the fuselage and firewall joint. Then I take Goldberg's Nylon Tape, soak it well in Ambroid, and wrap it around the firewall and back on the fuselage cheeks. I go back about 1-1/2 times the firewall diameter on each side as well as top and bottom. Six more coats of Ambroid are then rubbed in, allowing time for each coat to dry before applying the next. I then cover with tissue, nitrate dope, and two coats of Super Poxy.

"With the landing gear sticking out of the middle of the firewall, the hole for the gear sometimes enlarges due to DT landings, Periodically, I put a little five-minute epoxy around the hole to prevent fuel soakage.

"Like I said before, I've never had a firewall failure with this method. Once I had a K&B .29RR throw a prop blade while I was holding the model. The Tatone metal mount broke, but the firewall did not give way. Another time, a Tigre .23 threw a blade at the end of a nine-second run. My *Satellite 600* literally exploded in the air. The pylon cracked, the wing broke in half, the stab in half, the rudder in half, the engine lugs were broken, but the firewall did not come off.

"I think the key to my success is the Goldberg Nylon Tape, and I recommend it to anybody."

To add to the above suggestions, I thought that I would share my methods as well. The secret of good firewall mounting is how well it is tied into the main components of the model. All of my gas models of late have the firewall glued not only to the fuselage itself but also to the pylon. I usually use a firewall made up of a front of 1/16-inch magnesium sheet that covers the entire front of the fuselage. This magnesium is epoxied to one or two thicknesses of plywood that fit inside the fuselage sides. Plywood thickness will vary. I use 1/8 on 1/2A models, and two thicknesses of 3/16 on FAI models. Class C and D models use two thicknesses of 1/4.

Before mounting the firewall into the fuselage, I drill and install all of the blind mounting nuts, and in the case of FAI Power models, I also install the fuel tank with the fuel and pressure tubes epoxied through the firewall. Next, I prepare the fuselage sides. All of my gas models have some plywood sheet epoxied to the front inside of the fuselage sides. I use a two-inch long piece of 1/64 ply on my 1/2A models and 1/32 on everything else. On the larger models, the plywood extends back to include the first former.

As all of the models I build have box-like fuselages, I build with a flat fuselage underside so that the entire thing can be built while pinned to the building board. After the fuselage sides are glued to the fuselage bottom, I install the firewall assembly. I use only Thixotropic Epoxy. The fuselage/firewall joint is liberally coated and held together with masking tape, rubber bands, and/or Kraft clamps. I use some of the Thixotropic excess to form fillets at the inside joints. After curing, I install the pylon, using Thixotropic again. A part of the pylon always is fastened to the firewall. The fuselage top is installed last, again using epoxy around the firewall area.

One final note, I never use a landing gear sandwiched within the firewall. In my experience, this only serves to pry the firewall apart. I always use a system as described last year by Bill Giffen in this column, or I use a combination engine/landing gear mount. In some cases, such as FAI Power, I cut and file a 3/16 or 1/4-inch thick piece of aluminum mounted behind the pan in which to mount the gear.

I hope these tips will help you as you contemplate your end of the winter projects . . . those you have yet to begin.

HUMOR FROM THE CIA "INFORMER"

"To err is human . . . but to blame it on the timer is even more human.

"At the contest . . . while standing in line for a timer . . . patience is something I admire in the fellow in line behind me, but can't stand in the one ahead of me.

". . . Why is it that the guy who won three first places also manages to buy the winning raffle ticket ???"

Until next time, thermals to all, and to all a good flight. •

Free Flight Scale

By FERNANDO RAMOS

Jim McMahan built this odd-ball F/F scale *Marshonet*. It flies extremely well and is very stable. It amazed all who saw it.

• I want to start this month off by wishing you all a Happy and Prosperous New Year! By the time you get this issue it will be early March, and you will probably have had enough time to reflect on 1983. When I say reflect, I'm not referring to world crises or some of the major personal problems we all have from time to time. I'm talking about important items like, did you build all of the models you wanted to for the past contest season? Or did you finally overcome a particular building technique that has been bothering you? If any of you are like me, '83 went by, and the numerous projects are still at bay.

This coming year has additional meaning to me. This year includes one of the greatest spectacles in F/F scale modeling found nowhere else in the world, The Fourth Flying Aces Contest! This most exciting contest is held every other year. The first one was held at Willow Grove Naval Air Station in Pennsylvania, the second one at Wright-Patterson Air Force Base in Dayton, Ohio, and then it was moved back to Willow Grove for the third one. This year it will be held in mid-July at the Ford Testing Grounds outside of Detroit, Michigan. Ralph Kuenz has been instrumental in getting this flying site, and preparing the myriad of details.

It is early enough for those of you who wish to attend this "learning experience" to get your plans made and tuned up. If any of you have kin living in Michigan, this could be an excellent time to drop in on them.

As mentioned in a previous column, when I attended the big quarter-scale meet outside of Las Vegas, the one area that I felt needed attention was the landing gear and wheels. So often we are content on slapping a pair of wheels at the end of a wire, and be done with it. What I would like to do is to shoot pictures of wheels and landing gears of some real airplanes. Mostly antique and classic types with a few modern ones thrown in. These would appear from time to time in this column. This way, you can see how to detail this particular section with minimal effort. Naturally, WW-II types have more complexity, but they are still not beyond the limit of most modelers. At any rate, I'll give it a go, and see what you think.

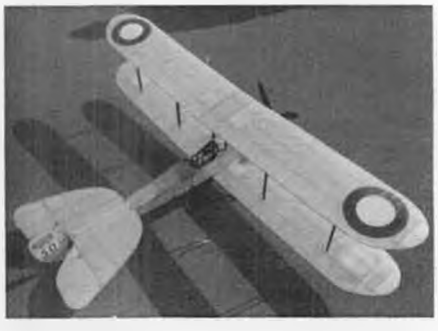
For starters, I want to show you "Mac" McJunkin's way of constructing a wheel.

This type of wheel was used by Mac on his Jumbo model of a McDonnell *Doodlebug*. The overall model was excellent with outstanding engine details, but those wheels added greatly to the appearance of the model. You might ask yourself, what can you do to a wheel and tire to enhance it that much? The tire was covered with rubber for one, and not the rubbery stuff you can brush on. For another, the wheels had brake drums, a minor constructional hassle, yet one that added immeasurably to the reality of the model. The outer hubs, or covers, also looked real.

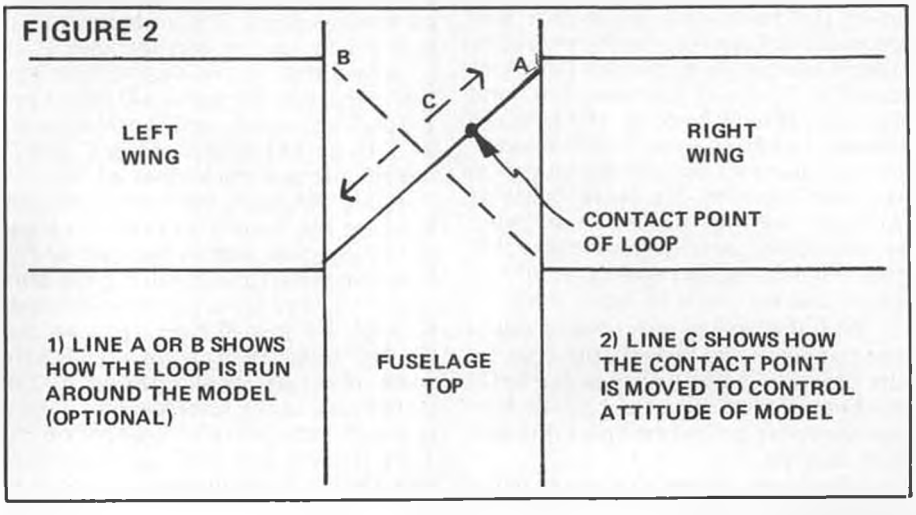
The illustration clearly shows the step-by-step method of wheel construction. All I want to do is to clarify a couple of points.

Making the wheel and tire are pretty clear-cut, but the rubber on the tire is something else. During Halloween, Mac bought up all the black balloons one particular store had. The balloon is filled with air, not anywhere near capacity, then the tire and hub are forced into the filled balloon. The air is gradually let out, encapsulating the unit. A very small hole

Dick Howard's Douglas observation plane is another remarkable flier, beautiful too!



Mark Carman's BE2C is a F/F diesel powered model. Very nice model, flies well.



"Mik" Mikkelson puts the turns into the rubber motor of his Jumbo Scale Peerless Corben *Ace*. Note "insurance" tube.

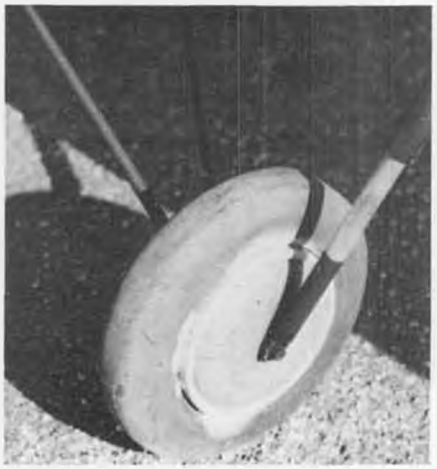
Mac McJunken's *Doodlebug* is a Jumbo Scale model with some really fine detailing. Note radial engine (BELOW) and hand painted logo.

is made in the rubber at the center of the hub. When this is done, the hole gets pretty large. This now allows you to Zap or Hot Stuff the rubber around the hub. This is repeated on the other side of the wheel as well. The excess rubber can now be trimmed away. (See Figure 1.) The rubber tends to bridge across the hub. Not to worry. When the brake drum side and "hub cap" side are zapped into place, that little problem will be eliminated. Pretty clever, wouldn't you say?

One other clever addition to Mac's airplane were the wingwalks. Most people will take fine sandpaper and let it go at that. Not Mac! He took some microballoons and added it to some

Dick Howard's venerable and beautiful P-38 is an excellent flier.

Chris Johnson, son of *MB* columnist Ken Johnson, specializes in scale biplanes. He holds a fantastic F-3F Grumman as proof.



Mac McJunken's balsa wood wheel design as described in text and in drawing to the right.

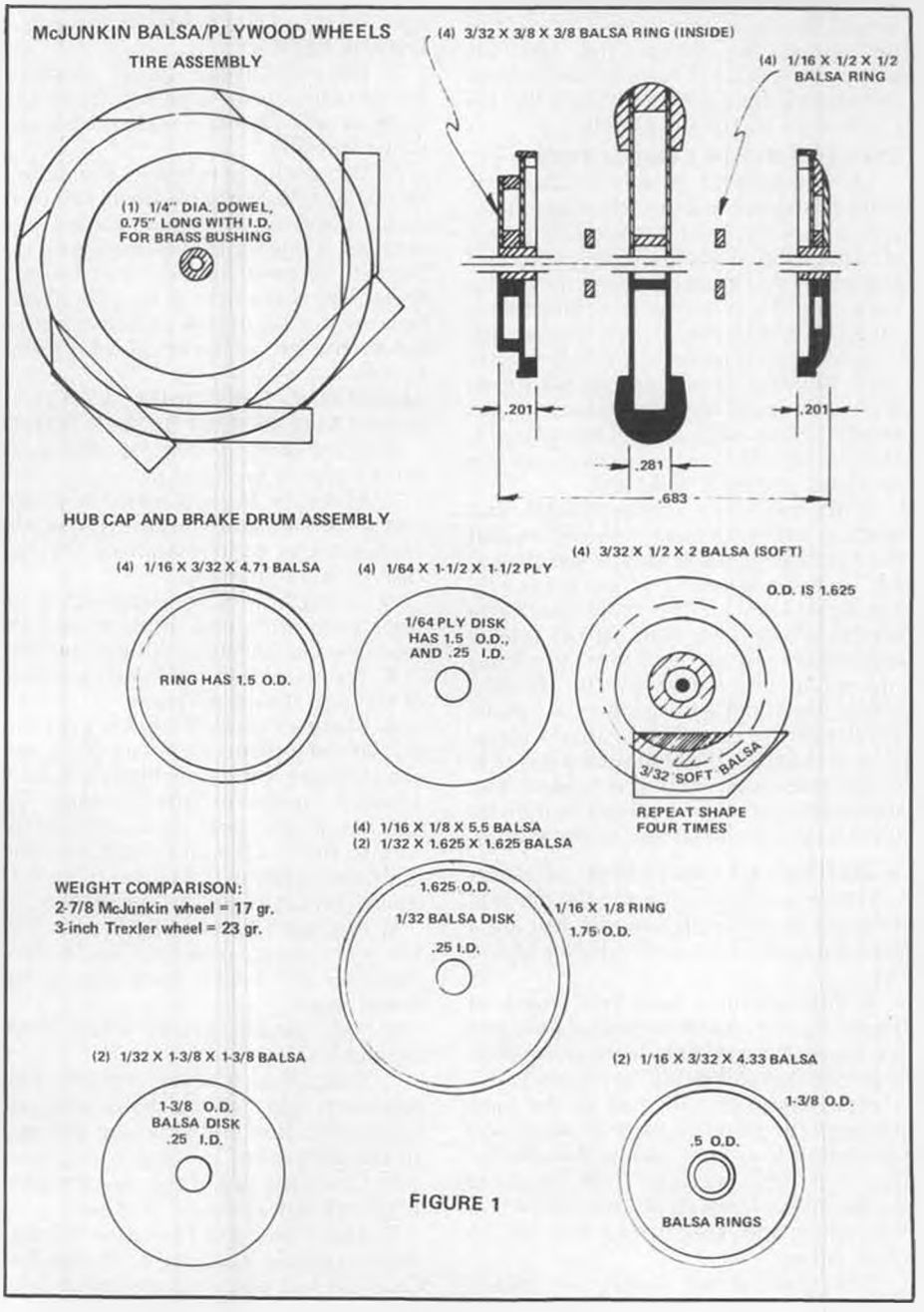


FIGURE 1

Floquil paint. (Looked like grimy black.) He then sprayed this mixture onto some paper. It looked absolutely terrific! I'm telling you, scale modelers are just too much!

Curtis Moss of Orlando, Florida has sent many interesting ideas that he would like to share with us. Curtis is the gentleman who, several issues ago, told us how to trim a F/F scale model to have interesting flight patterns. You'll like his method of balancing wheels.

USES FOR ROSIN CORE SOLDER

1) A length of solder is ideal for fishing rubber motors through fuselages. Just form a hook at one end, attach it to the rubber, and bend the other end slightly so that it can come out the access hole near the motor peg. Solder that is about 1/16 inch in diameter works well.

2) Wrapping solder around the crankshaft housing or tail skid or tail wheel strut is a good way to balance a gas model. Start with an excess amount, then trim off small pieces until the model is perfectly balanced.

3) To balance a rubber model, first wrap an excess amount of solder around the fuselage at the point the weight will be located when it is permanently installed. Trim off the solder until the model is balanced, then cut off at least one inch more, and melt the solder in an old spoon (the spoon will be ruined). While the solder is still molten, use a pair of tweezers to insert the head of a screw or bolt into the solder in such a way that it becomes cast into the solder. The threads of the screw or a nut can then be used to attach the weight to the model.

A METHOD OF DISPLAYING MODELS

(This is an ultra simple and fast method of really showing off a model, but it is a bit hard to describe in words. See Figure 2.)

1) Take about a four-foot length of heavy thread or rayon control line, and tie the ends together to form a loop. Run this loop around model as shown in the sketch, then run one end of the loop through the other to form a suspension point that is as tight and as close to the fuselage top as possible. Then, tie a knot in the string to establish desired ceiling clearance, and hang from a nail, etc., in the ceiling.

This single-point suspension allows the model to be hung at any desired attitude, and the slightest air disturbance causes the model to slowly rotate, giving visitors an all-angles view of the model. Like a nose high, left wing down down attitude of about 20 degrees. As the loop isn't actually tied anywhere, it goes on or off the model in seconds.

ENGINE NOTES

1) An eight-gauge (blue) electrical barrel connector is a perfect fit on Cox 1/2A needle valves. It makes a fast and easy extension.

2) The small squirt bottles that ladies' home permanent solutions come in make good small engine fuelers and primers. A fine tip, screw-on glue tip can be easily screwed onto many varieties of these. An alternative is to drill a small hole in the tip of one of these bottles before the lady of the house whacks the tip off.

MODIFYING THE COMET 54 INCH SPAN TAYLORCRAFT RUBBER POWER

(The following should be clear once the kit plan is on hand.)

1) Make an 18-inch balsa prop, and use a ball bearing washer. Use the equivalent of eight strands of 1/4-inch rubber as a minimum.

2) Strength will be improved if the door parts are glued in place, and the movable ailerons are omitted altogether.

3) Try to obtain lightweight wheels of the size shown on plans.

4) Make a V-shaped landing gear wire of 1/16-inch piano wire, complete with axles. Secure the wire with two pieces of 1/8-inch square on the fuselage. Cut notches in the gear struts and secure wire to the struts with thread and glue. (This wire replaces the pins and 1/8-inch square braces called for on plans.)

5) Replace F8 and F9 parts with solid 1/8-inch sheet, one-inch wide. Drill holes for a 1/4-inch aluminum tubing motor peg.

6) Add small gussets to all joints around door areas.

7) If kit wood is heavy, replace all tail parts with light, 1/8-inch balsa. Make tail brace wires functional by spot gluing at all contact points.

8) Cover the top of the nose area with 1/32-inch balsa instead of paper.

9) Make an extra F1 out of 1/8-inch sheet, and glue it *and* the kit F1 together. Carefully cut out a square about 1-1/2 inches wide around the nose button hole. Glue this square to the back of the nose block. This makes the nose block removable for winding.

10) Use dowels for all windshield bracing.

GAS MODEL

1) Observe steps two, three, four, six, eight, and ten mentioned above.

2) A full-sized F2 must be made to serve as a firewall. Make it from hard 1/8-inch sheet. Use parts F1, F2, and F3 as a guide in making the new F2. If needed, add balsa sheet to the front of F2 to get proper prop clearance. Glue a 1/16-inch plywood square to the front and back of F2 for engine mounting. Use bolts and nuts, if available.

3) An .049 reed-valve engine will work well if the model is light, but an .049/.051 Cox Tee Dee or diesel conversion .049 is better.

OPTIONAL REMOVABLE WING PANELS

1) Extend the rear spar about one inch. Carefully notch out the base ribs on the fuselage to make the rear spar a snug fit. This allows both spars to plug in for wing panel attachment.

2) Add small wire hooks to the top of both wing panel leading and trailing edges. Rubber bands between the hooks hold the panels tight against the base ribs.

3) Add 1/16-inch wire plugs to the strut bottoms. Drill holes in F7 for these wire plugs. Attach wire hooks to the strut bottoms. Run a rubber band between the hooks (under fuselage) to hold the struts in place. •

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

porate an extension. A special radial mount is available as an optional extra part, and a special new silencer is also available, although the exhaust noise level is quite reasonable without silencing.

The FS-61 is an excellent choice for sport and scale modelers who want the smooth power, good fuel economy, and realistic running of a four-stroke engine in the medium-size range.

With the introduction of the 46 VR-DF ABC, O.S. now offers engines specifically designed for ducted fan usage in the 20, 40 and 60 size classes.

This latest ducted fan offering is based on the popular O.S. 46 VR Marine engine. The new ducted fan powerplant shares higher port timings and rear carburetion/rear exhaust configuration with the marine version. Full Schnuerle porting is employed along with an ABC ringless piston/cylinder. Twin ball bearings support the crankshaft and the conrod sports bronze bushings at both ends. The 46 VR-DF comes with an O.S. 4E carburetor, exhaust header stack and extender prop nut as standard equipment, as well as all wrenches necessary for disassembly. Weight of the engine is 14.6 oz.

The O.S. 46 VR-DF is an excellent

choice for jet scale modelers who are seeking maximum performance from the Scozzi, Turbax, or Midwest .40 size ducted fan units.

The O.S. FS-61 and 46 VR-DF are available exclusively from World Engines, 8960 Rossash Rd., Cincinnati, Ohio 45236.

★ ★ ★

Attention indoor model fliers . . . Indoor Model Supply, Box C, Garberville, CA 95440, (707) 923-3500, introduces its latest Peanut Scale offering, the 1921 *Waterman Racer*.

The kit comes complete for $6.95, but for $15.00 you can purchase the *Waterman Racer*, the Bill Hannan book, *Peanut Power*, and the Indoor Model Supply catalog (16 pages, illustrated). Now go to it Peanut lovers.

★ ★ ★

Electric powered flying models need what Joe Utasi has to offer through his Jomar Products company. Of course, we are referring to the SC-2 Speed Controller.

This speed control is designed specifically for the larger, high performance electric motors now being produced. Furnished as shown, the SC-2 speed control can efficiently handle up to 40 volts at 40 amps continuous current. This is equivalent to .9 horsepower! Optional outputs are included that provide BRAKE and BYPASS functions. BYPASS shunts out the control for 100% efficiency. BRAKE can be used to short the motor terminals and stop the prop. The unit measures 1.5 x 2.3 and weighs only 1 ounce.

Next, we have a handy device which could just save your airplane from an early demise. Introducing the S2B2 battery backup unit.

The S2B2 battery backup system represents a breakthrough in backup circuit design. Using the latest in MOSFET transistors, the S2B2 has virtually no voltage loss, and can be used with standard 4-cell packs eliminating the need for an extra cell and special chargers. The unit measures 2 x 2.3 and weighs 1.2 ounces. Primary and backup battery packs can be of different capacity (i.e. 500 ma and 1200 ma) as the packs are charged independently with your standard charging system. When the primary pack falls below 4.4 volts the S2B2 automatically switches over to the backup pack and lights up a red LED to indicate the use of backup power. If desired, the S2B2 can be used with five cell packs by changing one resistor value.

For further information contact Jomar Products, 2028 Knightsbridge Dr., Cincinnati, OH 45244.

★ ★ ★

C.B. Associates, Inc., 21658 Cloud Way, Hayward, CA 94545, (415) 783-4868, has just released news of its latest import from overseas, a fantastically detailed sheet of propeller decals. These beautiful, four-color decals are made in Germany for scale modelers who demand the best.

If you wish to purchase these decals, you may order them directly from C.B. Associates at the above address. Due to the low markup from wholesale, these $7.95 decal sheets will not be discounted.

★ ★ ★

Free flight modelers will be interested in what the next "Over the Counter" company has to offer.

Valley Models Company, 6072 E. Alta Ave., Fresno, CA 93727, is now kitting the popular *Shocer* F/F design in two sizes. The kits feature machine cut and sanded parts, and full-size plans with details on construction and flying.

The *Shocer 600*, an A or B class, high performance F/F model, has the following specifications: wingspan, 70 inches; wing area, 620 square inches; weight, 22 to 26 ounces; motors, .15 to .29 cubic inches.

The *Shocer 250* is a 1/2A and A class contest free flight model. It has the following specifications: wingspan, 47 inches; wing area, 244 square inches; weight, 6 ounces; motors, .049 to .051 cubic inches.

Kits for the *Shocer 400* and *800* will be released in early 1984.

If these models interest you, contact Valley Models for ordering instructions and prices. Dealer inquiries invited.

★ ★ ★

Last, but not least, is the newest modeling book from the English publisher, Argus Books, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS. The title of this book gives you a very good idea of its contents: *Scale Model Aircraft for Radio Control*. The author, David Boddington, has done a fantastic job of covering the immense subject of R/C scale modeling. A glance down the table of contents reads: Choice of Subject, Aerodynamics, Designing Your Scale Model, General Construction, Construction of 1903-1939 Aircraft, Construction of Aircraft from 1939 Onwards, Radio Installation and Linkages, Engine Installations, Ducted Fan Units and Jets, Multi-engined Models, Large Scale Models, Sailplanes, Undercarriage Assemblies and Wheels, Cockpit Details, Covering, Engine Details, External Details, Finishes, Pilots, Preflight Checks and Test Flying, Competitions, and Conclusions.

If you are into scale, you should consider buying this book. Write to Argus for details.

★ ★ ★

When contacting manufacturers featured in "Over the Counter," tell them you saw it in Model Builder! •

Electric . . . . . *Continued from page 21*

Model Builder plans. The very pretty girl holding the plane is Chris Baker, who just turned 21. How time does fly! Bill and I are old flying buddies, and now I'm beginning to realize *that* might mean more than I thought . . . I remember Chris as a little one. Time does fly. (I'm

repeating myself, I must be getting older!) Anyhow, Bill won Electric FF at the 82 Nats, but didn't get to go in 83. (Maybe we'll see each other at the 84 Nats, Bill?) The plane weighs 9.3 ounces, has 200 square inches of area, and flies well with electric power.

Bill says he is really into Old Timers now, and he writes a column for the free flight magazine, the NFFS Digest. If you are interested in free flight, I recommend that you join NFFS and get the benefit of their news magazine. Bill is one of the most knowledgeable free flighters I know, and for that matter, one of the most knowledgeable modelers in general. He taught me all I know about R/C soaring and indoor Peanut Scale, to the point where I almost could pass for not being a hacker!

Take a look at Bill's motor mount method . . . it's very simple. Just a balsa block with a semicircle cut out of it. It looks like he just glued the motor in, that's about as simple as you can get! Thanks, Bill, for the info.

Speaking of the '84 Nats, they will be in Reno this year. This is exciting news for us Westerners. Even more exciting is the possibility that there will be a couple of indoor electric R/C events! I will do my best to be there, *with an entry*. There will probably be two categories, Non-Scale and Scale. I proposed that there be a 32-ounce top limit on weight, and a four-ounce per square foot wing loading maximum. I think that the final rules will be quite close to that.

If you are interested in this event, I recommend that you try it. Use an Astro 035 with a belt drive (3:1 or more reduction), and the smallest radio you can get, with a 100 mah receiver pack, 1/2-ounce servos, and a receiver that weighs less than one ounce. Cannon R/C Systems makes a good outfit. Futaba and Tower now sell airborne systems as small as the Cannon. Use the "enlarge it" philosophy on the model. If you are going for Non-Scale, I recommend an *Easy B* style plane. For scale, pick a Peanut Scale plane that flies well, and enlarge it.

I wrote an article for my scale Sopwith *Tabloid* in *Model Aviation* a year ago, and it has a lot of good advice and experience in it. You will find that the biggest problem in indoor R/C is speed . . . too much of it! Light wing loadings help some, but the most important factor is the prop. A large diameter, slow revving prop is the best speed regulator you can have; it acts like a brake. Don't worry about the plane falling out of the air, at the proposed wing loadings it will practically float like a balloon.

A speed controller, if you can fit it into the weight allowance, would be a great help. I recommend the one by Jomar Products (2028 Knightsbridge Dr., Cincinatti, Ohio 45244), it is only .75 ounces (model SC-1), and will handle everything from an 020 to a 20, from 7.2 to 30 volts, and currents up to 30 amps. The retail is $49. At the time I flew the *Tabloid* indoors at the IMS show, this throttle was not available, so I used a resistor and switch to get half power. This gave an excellent cruise once the plane had climbed to about 15 to 20 feet. I plan to use the throttle (SC-1) now; it should give really precise control.

Now for another hint, one I learned the hard way! I used very light Japanese tissue on the Tabloid (available from Tony and Addie Naccarato's T&A Hobby Lobby, 3512 W. Victory Blvd., Burbank, CA 91505). This is the way to go for a very light, very pretty, and realistic covering (for fabric type planes), but it has two problems. One is that almost any type of dope will shrink the tissue too much, which will warp the light structure you will be using (1/8 square balsa, or smaller). Sig Lite dope solved that problem (also available at T&A Hobby Lobby).

Be careful how you shrink the covering. I used the cheapest Badger spray gun and rubbing alcohol (isopropyl) in a fine mist. Anything else will give uneven shrinking, which looks terrible and causes warping.

Now for the second hint! I live in a nice damp climate (Pacific Northwest), and every time I emerge from the land of mossy lawns and dripping skies, I get a shock when I look at the models I brought along. The plastic coverings go loose in a hot dry climate, which is no big deal. I just tighten them up again. Japanese tissue, on the other hand, gets tighter, and by that, I mean really tighter!

If you live in an area where the humidity is normally 40% or more, do not shrink tissue coverings tightly if you plan to take the model to a place like Reno, where the humidity is well under 10%, or you will watch the covering crunch your model! Leave the covering just a little bit loose, you'll be glad you did!

Well, I'm glad that AMA has decided to have this event, I know it will be fun, and even if you don't have a model, come by and see the fun. These planes are neat to see in the air; it is incredible to see R/C indoors. **Model Builder** magazine, by the way, deserves a lot of credit for setting up this type of event in past years; all the progress in this area has been due to the impetus supplied by **Model Builder's** annual event at the IMS show. Flying indoor at Reno should be a lot easier than at IMS as there will be no booths to fly over, there will be a nice clear room (I hope), and the crowd will be well away from the models. If you do decide to try it, feel free to write me at **Model Builder**, and I will be happy to give you whatever information you need for success. See you there!

Bob Firestone sent photos of his multimotor electrics; he likes them big! His *Royal Gull* is really magnificent. It uses two Astro 05's powered by a single, 1.2 ah, eight-cell pack. It has a wingspan of nine feet, and a flying weight of about five pounds. The *"Gull"* in the name is descriptive of its gull wing configuration, as you can see in the photos. The motor nacelles fit neatly into the anhedral junctions. This looks good to me for a flying boat too; it would be a clean way to keep the props out of the water spray. Bob likes the "pod and boom" fuselage style, and has two Williams Brothers pilots in a tandem cockpit in the pod. This looks like it would make a practical full-scale recreational plane!

Bob is using an Ace R/C radio, I don't know if the receiver is a Silver Seven, I have heard that the Silver Seven is exceptionally good in multimotor setups due to its high resistance to electrical noise (the long motor leads in multimotor designs sometimes cause problems).

The *Gull* flew beautifully, Bob didn't have to run with it on hand launch, it would lift out of his hand after a couple of steps. The climb is slow but steady, and Bob sent some color photos of it well over 600 feet up.

Bob was quite happy with the plane, but then disaster struck! After several flights, a wing junction failed at 300 feet, and the plane ws demolished . . . though the radio and power units survived. Bob sent in the photo of the crash also, and both wing sections appear to have failed at the gull junction.

I had a similar wing failure eight years back which I remember exactly! There is nothing like seeing a plane plummet in to keep a memory fresh! I vowed that I would never have a wing failure again. I haven't . . . and here is how: I bind an aluminum joiner tube to the spar, out to 1/3 the span of the wing, then I use a music wire (steel) dihedral joiner that goes out to 25% to 30% of the span. I use a hefty one on my larger planes (three

pounds or over), 3/8 in. diameter, and about 1/4 in. diameter on my two to three-pound planes. All I use is one, and it doesn't add all that much to the weight of the plane. I do not glue the wing panels together, as I prefer to leave them "plug-in," glider fashion, so that I can take them down to the Astro contest in ordinary luggage. This system is shown in detail on the plans for the *Brigadier* available from **Model Builder**.

Since I went to this method, I have never had a wing failure. I have stressed a wing so much that it bent . . . but that was no big deal, I landed the plane routinely, though the increased dihedral made it pretty touchy on rudder! That's the beauty of a steel wire dihedral brace, it may bend, but it will not break, so the situation never gets beyond saving.

Anyhow, Bob says that is the way he will go on his next gull wing. (There will be more.) His *Super Gull* was on display at the '83 Toledo show, it is bigger yet at 10-1/2 feet, six pounds, with two 05s on speed reducers driving 9-6 props. Bob lives in a mobile home, and this one just about filled it up! Bob also plans a twin 020 powered six-footer, and another *Royal Gull* with speed reducers on the 05s. Neat! Like I said earlier, Bob's designs really look good for full-scale (with, of course, good strong wings!). Thanks, Bob, for the photos.

One last item . . . I received the announcement for the Astro contest too late to get it out before the event. It is probably over as you read this, but I will have a report on the action in an upcoming issue. The Astro contest is a two-day affair starting on Saturday, February 4, at Magnolia High School (corner of Gilbert and Ball Roads, Anaheim, California), and finishing on Sunday, February 5, at Mile Square Park (Fountain Valley, California).

Twelve events are scheduled in the Astro contest including Seven-cell Old Timer, Open Class Old Timer, F3E, Scale, Open, Junior, and Senior Free Flight, R/C Scale, Seven-cell Pylon, Aerobatics, Control Line Scale, and Control Line Seven-cell Speed. Whew! Anybody that entered all of those would have to be a superman!

Till next time, fly with variety, fly electric. •

Peanut . . . . . . *Continued from page 49*

several back issues and read the Peanut articles that describe structure assembly.

The depiction of the color scheme is what needs to be described most. The entire model is first covered with white tissue. This is water shrunk and then given one or two coats of dope to seal the tissue.

All of the color detail was put on using red and black tissue. The tissue is cut out to the proper shape using a very sharp razor blade.

First, get ten or twenty layers of newspaper, or if possible an old phone book. This will be used for your cutting surface. Now, tape down two layers of black tissue. Trace the outlines of the black trim on a piece of vellum and tape this over the the black tissue. Now, using the sharp razor blade, carefully cut all the way around the color outlines making sure that your cut goes clear through both layers of tissue. Cutting into the newspaper a ways will insure this. Next, remove the color cutouts. Position them very carefully on the white tissue covering and dope them in place with thin dope. This is a relatively complex color scheme and careful positioning is very essential. When tracing the color outlines, the areas that go over the top of the engine cowl will have to be estimated, on all other areas the plan is correct enough to be used as it is drawn.

Do the same procedure with the red tissue color pattern. The white numbers can be done in one of two ways. One way is to cut them out of the red tissue trim before it is doped in place. The other way is to ignore them and have continuous red trim in the area of the numbers and then cut them out of opaque white paper and add them over the trim. On the model in the pictures, it was done this way using "stickyback" paper. After sticking them in place, they were given one coat of dope.

Paper color trim cut out this way generally gives much sharper color edges than can be obtained with paint. On the model in the photographs, the black on the wheel pants was applied using tissue. The red was applied using a red felt pen.

The control surface outlines were depicted using a fine black felt pen on the upper surfaces and a thicker one to depict the control surface gap on the lower side.

The two windows on the top of the wing were depicted with black tissue.

Expect the color trim to take about as much time as building the rest of the model. It's tedious, but it is sure worth the effort when you get done.

This model should balance at the wing spar. It will fly on an eight-inch loop of 3/32nd rubber. •

C/L . . . . . . *Continued from page 47*

with engine and muffler as one unit, maybe some CL interest will remain. By the way, when was the last time you saw any model magazines on a newstand, like (for instance) at your local 7-11 store? But the fishing, hot rod, and computer mags are there! Why aren't we? Let's keep CL alive and civilized too.

Thanks for your input, Tom. By the way, Tom is the man behind the specialty firm, Controline Sales, whose specialty is Stunt related items. Among these are specially prepared Fox .35 engines, plans for old time Stunt models, and other items of general interest. Send an SASE for his list. The address is Controline Sales, P.O. Box 27540, Contract Station #7, Atlanta GA 30327.

★ ★ ★

A topic that bears review for the benefit of novice and intermediate modelers is that of engine break-in. As you know, there are few engines that truly have the quality of full power out of the box. Even with said engines, power and reliablility will increase slightly with a small amount of running.

What is accomplished during the break-in process is two fold. Number one, the heating and cooling cycles will stabilize, or heat treat applicable materials in the engine. This normally means the piston, particularly if it is made of iron. This brings up the fact that we have several cylinder configurations. The old traditional configuration is of an iron piston in a steel sleeve. A chromed steel

sleeve with a ringed aluminum piston is another type which generally breaks in the quickest. Then we have the ABC and AAC types, which are aluminum pistons running in chromed brass or aluminum sleeves, respectively.

At this point, I will not pretend to be an expert metallurgist, only saying that for our purposes, engine break-in is operational heat treating, and serves to stabilze material expansion characteristics.

The other important consideration of the break-in is for all the moving parts to go through a controlled wearing process, so as to be most properly mated. It is not feasible to try to build an engine that has this wear "toleranced in". Any engine tuning expert can tell you that the area that matters the most, namely, up in the cylinder, is the most difficult fit to measure.

Heat again becomes an important factor. As an engine comes up to normal operating temperature, parts will expand unevenly, and thusly wear much differently than if they were turned over cold. This is most notable along the top of the piston, where it is initially shiny, and then dulls as the fit is perfected.

Now let's look at the methodology of getting the job done. Remember, the key to your engine's performance and longevity will most likely be a proper break-in period.

For most applications, I suggest using a test stand. It sure beats holding onto the plane. I personally prefer an engine mount constructed of metal. There are a couple on the market. Make sure that whatever you use is sturdy and solid.

Keeping in mind that heat and rpm are the main factors in the process, you need to prepare a special propeller that will help you regulate these considerations. The prop must be sized such that the engine will be allowed to turn moderate to high rpm without having to run at a lean setting, and thus overheat. By allowing the engine to run in the rpm range in which it is intended, and keeping the load and engine temperature controlled, you will ensure a satin smooth wear pattern.

For most sport engines, the easiest thing to do is simply use a prop with two inches less pitch. A .35-size stunt engine would then be happy with something like a 10-4.

Engines intended for high performance applications should have a prop specially prepared. Use a fiberglass prop, or one of hard maple, and label it. It can also be used for comparative purposes between engines. For a .15-size engine, cut an 8-4 prop down to six inches diameter. A .21-size can use the same, but cut down to seven inches. In the .29 to .40 range, a 9-6 prop is good, cut down between seven and eight inches span. A .60-size engine can use an 11-7 cut to about 9-1/2 inches.

When cutting down the prop, leave the tips square and blunt. This is easier to fabricate, and it is safer when running. We don't really need to be concerned about thrust efficiency on the bench, anyway. Of course, take great care in balancing this prop. If you are using a wooden prop, make sure it is fuel proofed, and then rebalanced.

Next comes the question of fuel. The answer is to work up to the nitro percentage that you will be using in the air. If you intend to use a no-nitro fuel for your application, then use that fuel for break-in. Sport and stunt engines can start and finish with five to ten percent nitro fuel. Some racing applications may use up to 70%. A couple of percentage steps should normally be taken here.

Now comes the actual running. Two suggestions are offered here to abide by. Firstly, maintain consistent lengths of engine runs. Two minutes is good. Secondly, let the engine completely cool before you fire it up again. This is important for the heat treating. One other suggestion I would offer is to leave off the muffler, if so equipped, during at least the first stages of break-in. A muffler causes the engine to run hotter.

The initial runs will be with a rich setting. Not blubbery rich mind you, as the low-load prop will allow a very fast four-cycle without overheating. Successive runs are gradually leaned out, until your pride and joy will hold a peaked, or nearly peaked setting.

Remember to think safety at all times when bench running engines. Stay behind the prop when adjusting the engine, make sure all bystanders are out of the way, and don't forget to wear hearing protection.

Show some consideration fo others while making all this racket. Don't set up your test stand in the pits and exhaust everybody. Hmmmm, I remember that when I was a teen-ager, I used to test run my Rat Race Super Tigre .40's in the backyard, surrounded by neighbors. I guess I was lucky to have very tolerant neighbors!

Keep your rpm's steady and high! Mike Hazel, 1073 Windemere Drive NW, Salem, Oregon, 97304. •

Vamps . . . . . . *Continued from page 13*

their black and yellow silk covering and some of the finest tissue lettering one will ever see.

Well, I could go on forever . . . I guess I'm hooked on this end of the hobby. I think too many modelers can get in a rut by just staying in one part of our many-faceted hobby. Perhaps if you try some of the other types, you just might learn something new. And who knows, you just may enjoy it also.

Many thanks to the VAMPS for having such a grand contest, and special thanks to Bob Chambers for running it. See you all next year.

RESULTS

A-B Pylon
1 Frank Szuce ..... *Zipper*
2 Mike Poorman ..... *Playboy Sr.*
3 Jim Robinson ..... *Alert*

A-B Cabin
1 Sal Taibi ..... *Diamond*
2 Jim Robinson ..... *Dodger*
3 Larry Schuarz ..... *Dodger*

C Pylon
1 Don Weitz ..... *Playboy*
2 Bill Holt ..... *Playboy*
3 Frank Szuce ..... *Sailplane*

C Cabin
1 Jim Adams ..... *Playboy Cabin*
2 Frank Szuce ..... *Buzzard*
3 Fred Caballero ..... *Long Cabin*

Old Timer Rubber
1 Sal Taibi ..... *Lanzo Stick*
2 Mike Poorman ..... *Korda*

Scale
1 Bob Haight ..... *RWD 8*
2 Jim Adams ..... *Fokker D8*
3 Bill Stroman ..... *Goedecker Taube*

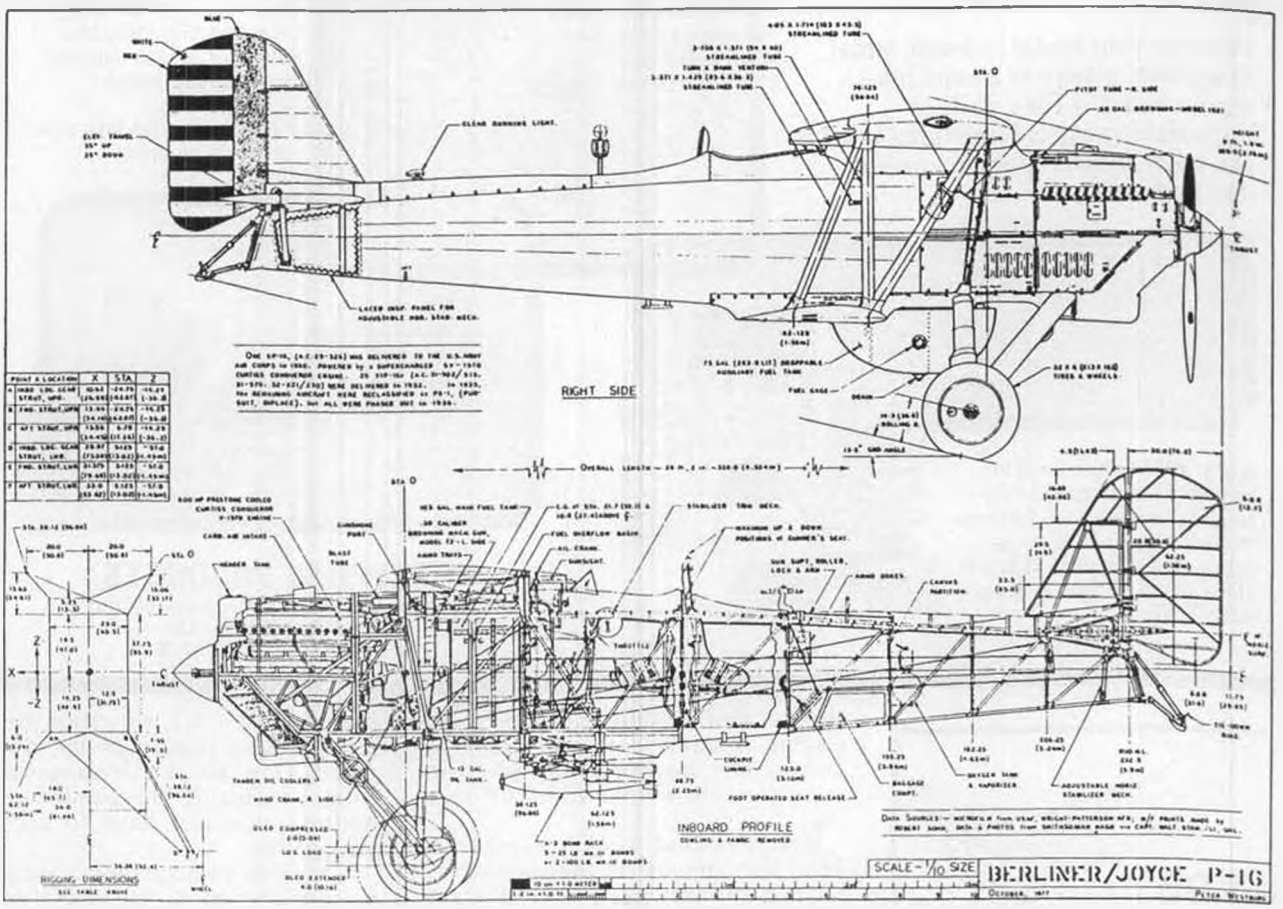
020 Replica
1 Cathy Archer ..... *Strato Streek*
2 Bill Stroman ..... *Valkyrie*
3 Rudy Calvo ..... *Snuffy*

30 Sec. Antique
1 Ed Tschernoscha ..... *Powerhouse*

1/2A Texaco
1 Sal Taibi ..... *Powerhouse*
2 Fred Caballero ..... *Tlush Mite*
3 C. Cristenson ..... *Lacky Zenith*

Texaco
1 Fred Caballero ..... *Long Cabin*
2 Lee Rose ..... *Dallaire*
3 Ed Tschernoscha ..... *Powerhouse* •

Peter Westburg's
SCALE VIEWS



SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.

1/24th scale: ½" = 1 ft.	Shts	$
Douglas O-35/B-7	1	4
Douglas XO-36-XB-7	1	4
1/12th scale: 1" = 1 ft.		
Boeing F4B-4/-3	4	16
Boeing P-12E	3	12
Curtiss A-8 Shrike	3	12
Curtiss Gulfhawk IA	2	8
Curtiss N2C-2 Fledgling	4	16
Curtiss O-1B/A-3 Falcon	3	12
Curtiss P-1B Hawk	3	12
Curtiss XP/YP-23	3	12
Curtiss SBC-4 Helldiver	4	16
Czech Avia B-534	2	8
Davis D-1K	2	8
Douglas O-25C	3	12
Douglas O-31A/O-31B	3	12
Douglas O-38/O-38B	2	8
Douglas O-43A	3	12
Douglas O-31C/Y1O-43	3	12
Douglas O-46A	3	12
Fokker D-17	3	12
General Western Meteor	1	4
Grumman F2F-1	3	12
Grumman F3F-2	3	12
Stearman 4E Mailplane	2	8
Travel Air 2000	2	8
Waco ATO Taperwing	2	8
1/10 scale: 1.2" = 1 ft.	Shts	$
Berliner/Joyce P-16	4	16
Curtiss BFC-2 Goshawk	4	16
Curtiss F9C-2 Sparrowhawk	4	16
Curtiss P-6E Hawk	4	16
Fiat CR-32	3	12
Great Lakes Trainer	4	16
Hawker Fury Mk I	4	16
Hawker High Speed Fury	3	12
Hawker Persian Fury	3	12
Monocoupe 90A	2	8
Swedish Sparmann P-1	2	8

ORDERING INSTRUCTIONS

Price includes 3rd or 4th Class mail. For Airmail or First Class in U.S., add 25% of total order. For Overseas Airmail (includes Canada and Mexico), add 50% of total order. Remit by International Money Order or U.S. funds drawn on a U.S. bank for overseas orders. Master Card or Visa orders add 5%, include card number, expiration date, and signature. Send payment to MODEL BUILDER, P.O. Box 10335, Costa Mesa, CA 92627. Phone (714) 645–8830

CALIFORNIA RESIDENTS ADD 6% SALES TAX

Fuel Lines . . . *Continued from page 22*

tap location can modify the order.

What about the third method, and where does it fit in the relative order? It is positive displacement. An argument could be made that bladders are also positive displacement, however, there's really a subtle difference if you think about it. A positive displacement system uses methods (such as a piston) to directly move or displace the liquid fuel. The Perry pumps are an acceptable example. Pressure-wise, they're about in between untimed and timed crankcase methods. The significant difference is the positive displacement. Add to that the fact that pressure only begins with engine rotation (same for crankcase and muffler methods), and you'll see there's less chance of inadvertant flooding.

Which method should you use? If it's your first attempt at pressurization, I recommend a muffler or untimed crankcase tap. They're inexpensive, easy to use, and they work well. Later, if you want to try another system, give it a go. If you've tried them all, and still want to ask, "What's best: bladder or hard tank?" My answer is whatever works best for you. Some guys swear by (or at) bladders; others do the same about hard tanks or positive displacement. Above all, I strongly recommend using a pressure fuel system.

What a way to close . . . Last night's postdinner fortune cookie advised, "Look towards the future, but not so far you can't see today." •

Wonders . . . . *Continued from page 16*

shapes in order to suit your tastes. Go ahead and experiment with different ideas on wing layout, wing tips, fin outlines, etc. Using the guidelines presented below, you could easily design your own *Wonder* and give it your personal touch.

Some of my ideas include trying sweepback again with two fins on the wingtips, using just one half of the wing with large tips covered with Econokote (like an old C/L), or using the Ace tapered wing instead of the constant chord. How about a biplane, tandem wing, or canard? The possibilities are endless, you just have to use your imagination.

If you do plan to design your own personal *Wonder*, you may find the following guidelines to be of help.

1) Keep the center of gravity 1-1/4 to 1-1/2 inches behind the leading edge at the mean aerodynamic chord of the wing (half-span on a constant chord).

2) Set the wing and stab at zero degrees of incidence.

3) Use about five degrees of downthrust.

4) Keep it light and simple.

I wish you luck with your *Weekend Wonders* (and all of your planes, for that matter). I would love to see any photos or hear any stories, comments, or suggestions. Get the plans from **Model Builder**, set aside a weekend, and have at it!

Bruce A. Tharpe, 2380 Cabrillo Dr., Hayward, CA 94545, (415) 782-9172. •

LIST OF MATERIALS
1 — 1/8 x 2 x 36 Balsa: fuselage sides,formers.
2 — 1/8 x 3 x 36 Balsa: tail surfaces,fuselage sheeting.
1 — 1/8 x 3/4 x 36 Balsa: ailerons.
1 — 1/8 Plywood scrap: firewall
1 — 1/16 Music wire: torque rods, pushrods.
1 — 3/32 Brass tubing: torque rod bushings.
1 — 1/2A Motor mount.
1 — One-ounce fuel tank.

Big Bird ET . . . *Continued from page 25*

the bottom of the fuselage uncovered so that you can install the rudder and elevator pushrods. This has to be done after the tail surfaces are glued in place. You can use plastic for the windows, but I found that a far better method is to use clear Monokote. Suit yourself, but the Monokote is clear, fast, light, and it stays put.

When the tail surfaces are covered, hinge them. I use Rocket City hinge strip, again, suit yourself. When the tail surfaces are hinged, screw the control horns in position. Now remove the Monokote from the bottom of the tail surfaces and the top of the fuselage where they will glue in place. Make certain that the tail surfaces are square to the wing and then bond the empennage in place permanently.

INSTALLING THE EQUIPMENT

Mount the electric motor and prop in position in the nose of the aircraft. Also install the wheels . . . I used Ace 1-3/8-inch wheels. Install the servos in the positions shown on the plan, as well as the pushrods. Attach the pushrods to the fuselage framework along their length, it cuts down on pushrod bow. Install the rest of the equipment so that the *Big Bird* balances where shown on the plan. Shift things as necessary. When you have the proper balance, mount your remaining equipment permanently. Now cover the bottom of the fuselage.

Stand back and take a look. Is everything stuck on good and tight? Are there any loose ends? Check the structure for any warps. Operate the servos. Do the elevator and rudder move in the right direction? Do they have 3/8 inch control deflection each way? Does the motor turn the right direction when switched on? If all is A-OK, then put the radio on charge and trickle the motor battery. And you get some sleep. You look a little tired! *(No Larry, YOU look a little tired! wrf)*

FLYING BIG BIRD

Is this easy! If you're not up to it, get your grandmother to come test fly this thing for you. If you want, you can rise off ground (ROG), or hand launch your *Big Bird*. It's not very particular. Just head *Big Bird* into the prevailing wind and switch her on. You'll soon find out, "Why Big Bird?!"

She's as gentle and relaxing as they come. I once put the prototype into a circle, put the transmitter on the ground, and watched as *Big Bird* entered a thermal and climbed merrily away.

For those of you who prefer an .049 glow motor, I have that version on the drawings. Make sure that you fool-proof the model so that the nose doesn't rot off, and please try not to make too much noise! However, you'll soon find you have a very gentle sport model that's a real kick to thermal.

As for me, what's next with *Big Bird?* Well . . . I found this great 25 horsepower ultralight motor and some 1-1/2

by 1-1/2 spruce. Now, I wonder how I'm gonna hold the wing on? •

BIG BIRD PARTS LIST

Balsa and Spruce

11 3/16 x 3/16 x 36 Balsa
6 3/32 x 3/16 x 36 Balsa
4 3/16 x 1/4 x 36 Balsa
1 1/8 x 1/8 x 30 Spruce
1 1/8 x 1/8 x 24 Spruce
2 1/8 x 1/4 x 30 Spruce
2 1/8 x 1/4 x 24 Spruce
1 1/4 x 3/8 x 30 Balsa
1 1/4 x 3/8 x 24 Balsa
1 1/4 x 1 x 30 Balsa tie stock
1 1/4 x 1 x 24 Balsa tie stock

Cut Parts

1 Main stack of ribs: 18 from 1/16 balsa, two from 1/8 balsa
4 1/8 x 5/8 x 5-1/2 Dihedral braces
12 1/16 Shear webs
1 3/16 x 7 Dowel
1 1/16 x 1-3/4 x 2 Ply motor mount
2 1/8 x 1/2 x 2-1/4 Plywood motor mount supports
2 1/8 x 2-1/8 x 2-3/4 Plywood landing gear mount
1 1/16 x 3/4 x 3 Plywood trailing edge reinforcement
1 3/32 x 1/4 x 9 Spruce landing gear mount spacer

Miscellaneous

2 1 x 1 x 9 Wing tips
1 1/16 x 3 x 12 Center sheet
1 3/16 x 3 x 12 Gussett stock
1 Landing gear of 3/32 wire.

Hannan . . . . . *Continued from page 53*

Lou Proctor decided to fly inthe middle of a large California dry lake bed. So where did his model land? Smack against Lou's card table workbench!

SMILIN' JACK ORIGINALS

How would you like some true collectors's item art for your workshop wall? Zack Mosley, creator of the famous "Smilin' Jack" comic strip, is now marketing actual originals, ranging from as recently as 1973 (when the strip was retired) to as long ago as 1934. Starring in these drawings are Smilin' Jack himself, Dixie Lee, Fat Stuff (and the button-eating chicken), Downwind Jackson, and of course, Zack's voluptuous Lil Deicers. A stamped, self-addressed envelope will bring you full details and prices. In fact, the list itself is quite a treat. Zack Mosley, Box 375, Stuart, Florida 33495.

HANDY HINT DEPARTMENT

Herb Kelley, Yucca Valley, California, uses foam egg carton material for some of his model components, and he has been able to form the plastic into gentle contours. The foam is lightly clamped between positive and negative wooden forms and placed in a 200 degree oven for about 15 minutes. When removed, and while still heated, the clamps are tightened and the plastic is allowed to cool to its final shape.

FAREWELL JIMMY

James Haizlip has passed away at age 87. Although his expeience covered many phases of aviation, he gained much of his fame during the Golden Age of Air Racing. For example, while piloting Wedell-Williams Number 92 during 1932, he won the Bendix race and placed third in the Thompson Trophy race.

Our condolences to his wife Mary, also a well-known pilot and aviation enthusiast. Both Haizlips had helped with research for the Williams Brothers Wedell-Williams racer model kits.

PLEASE DON'T EAT THE PEANUTS

Speaking of Peanuts, we abstracted the following from Ron Firth's *Model Aeroplane Gazette*, where it was attributed to Dick Gibbs of Australia: "For me, a lot of the charm of flying Peanuts is in achieving just one or two seconds longer in the air, and it doesn't matter whether your model has a normal duration of 10 seconds or 30 seconds. To get a better flight requires the same amount of brain beating, so that you come up with the correct trim changes and power or prop adjustments in each case. The satisfaction of turning 20 seconds when you expect to do 18 seconds is immense.

"To be able to enjoy a few hours of actual flying in the midweek evenings is good for the soul. And once you have reached the ultimate performance of any model, there comes a strong urge to build another, better one. At 13 inches maximum span, this is also good for the soul because you can tackle a model of just about any flying machine that ever was without breaking the bank, and the chances are that with a little work you will coax a reasonable flight out of it in the still air of a gym or hall.

"Any Peanut Scale flier will be happy to extol their virtues far more than I've done here, but the easiest way to be convinced is to build one yourself and learn firsthand the special magic of these little birds."

SORRY GIRLS!

Evidently a woman was *not* the first to solo a balloon in the United States, as had been announced in a Smithsonian Institution lecture and reported in this column some time ago. According to Ike Kerschner, of Kunkletown. Pennsylvania a new Smithsonian Press book, *The Eagle Aloft: The History of the Balloon in America*, assigns that honors to a 13 year-old boy, who went aloft on June 24, 1784.

PLANS AND SCALE DRAWINGS

Charles L. Neely, 2703 E. Goshen Ave., Visalia, CA 93291, now offers a series of scale drawings and model plans. Currently listed are 3/4-inch-to-the-foot-scale P-51B and C *Mustang* drawings which are claimed to be the most accurate available; Neta Snook's Canadian JN-4 (in which Amelia Earhart learned to fly), also 3/4-inch-to-the-foot-scale; a 22-inch span Travel Air 2000 for rubber or CO_2 power; a 1927 vintage model glider, and a 13-inch span Ercoupe profile model. Other drawings are in the works, and a stamped, self-addressed envelope will bring the complete list of these well-drawn and documented items.

AND KITS TOO

How long since you last saw a good-old-days *wooden* solid model kit? Well, they are still being manufactured, as shown in one of our photos. Chief engineer Jim Longstreth has chosen a varied group of subjects with the accent upon nostalgia. There's the *China Clipper*, the *Mr. Mulligan*, Beechcraft *Staggerwing*, ANT 25, NC-4 Stinson *Trimotor*, B-17G, and AJ Fun-Pak *Fireball* (yup, that's what it says).

These kits are limited production offerings featuring precut-to-outline wood parts, novel construction drawings and historical information. We had to chuckle at a notice on one end of the kit box: "Caution: This is not a plastic kit, but an historically accurate woodcarving project!"

An illustrated information poster is available for $2 from: Swan Island Replications, Box 8942, Portland, Oregon 97207.

PLASTIC PREDATORS PREEMPT PIGEONS

According to an Associated Press release, a new way has been found to rid building roofs of pesky pigeons. The answer is a life-size, plastic owl equipped with a free-wheeling model airplane propeller. Apparently the combination of the revolving prop and the fierce appearance of the owl keeps the pigeons a respectable distance away.

AND SPEAKING OF OWLS

Joe J. Daileda, 4314 West 238th Street, Torrance, CA 90505, operates Wise Owl Worldwide Publications. Among his wares are subscriptions to such magazines as *Aeromodeller, Scale Models, Model Railways, Model Cars, Model Engineer, R.C. Models & Electronics, Plastic Kit Constructor* and many others. Additionally, he stocks Model & Allied Press specials, plans handbooks, and back issues of various publications. Why not drop Joe a stamped-addressed envelope for more complete information? And please let him know **Model Builder** sent you.

THE GOOD GUYS

Neville Coldric, of Liverpool, England writes: *"I can't think of anything better than all the aero buffs and modellers being in charge of this old world of ours . . . we all seem to be tarred with the same brush, some sort of invisible affection not only for models but each other. Over the many years I've been a model builder I've met a great many wonderful people . . . its truly a great hobby this model plane stuff!*

"My interest started when I was about 6 or 7 years old, when I was suddenly confronted with the airship R 101 or R 103, I can't say which now; all I know is to a small boy I'd never run into such a gargantuan monster. From then on I was hooked . . . I started by saving up my weekly old English pennies until I had the huge sum of nine pence, when I'd then walk the four miles to the hobby shop, in order to buy one of Fred Megow's cheapest kits. I still have the plans from these kits, though they are none too accurate, I fear. Nevertheless, they taught me a lot and most flew quite well; great days and great fun.

"I think the youngsters of today with their very sophisticated radio gear and "ARFs" are missing an awful lot of fun and enjoyment myself. Anyway, to each his own."

CONVERTABLE QUOTES

Cliff McBaine and Richard Miller both have a knack for adapting classical quotations to model building philosphy, as witness these examples: "Conclusions drawn from facts can be in error." Although authored by Sir Arthur Conan Doyle for *Shelock Holmes*, Cliff feels it applies equally to trying to analyze

errant models. Richard points out: "You can't learn too soon that the most useful thing about a principle is that it can always be sacrificed to expediency." (W. Somerset Maugham).

AND FINALLY...

Florida's Mike Arak offers this parting thought: "I know you understood what you think I said, but I'm not sure what you heard is what I meant." Ah well. . . . •

Big E..... *Continued from page 37*

stick on any old piece of rubber or neoprene! It takes a bit of doing! If you've got the knowledge, and especially the time and the patience, any of our small gas engines can be properly mounted. Unfortunately, most guys make matters worse and end up with really severe problems; they either amplify the vibration, which eats up the airframe; or they isolate the vibration so well that the engine gets eaten up. Sort of a no win type situation. Well, to calm me down, Pritchard furthered my education by explaining that these are not the standard 20-pound Lord Mounts I was familiar with, but special, harder, 30-pound mounts that actually do minimize vibration problems. Frankly, I'm not too sure how much benefit I'm getting from these mounts 'cause my Zenoah was "hand massaged" by E&L (balance, timing, and compression were optimized) and seemed to run as smoothly on the test stand without mounts as it does in the *BIG "E"* with the mounts.

HOMEWORK: THE NITTY GRITTYS

Before covering, I checked, and double checked, all angles and alignment. The wing, I found, had a heavier right panel, which was due to the right tip block being heavier than the left. I hollowed out both tips to keep them light (it makes for easier turning airplanes) and recommended this procedure to E&L. Four 3/4-inch, No. 10 sheet metal screws countersunk in the underside of the left tip got the wing staight and level.

Both my wife's calculator and my Robart incidence meter agreed that the wing was a hair under one degree positive, with the engine sitting at 1/2 degree right and down thrust. These were good readings, so good in fact, that I wasn't about to mess them up by messing around and trying to make them better.

Not only was the vertical stab vertical and the horizontal stab horizontal, but joy of joys, these two were, indeed, ninety degrees to each other . . . and what almost brought on tears of happiness was finding out that wing and tail were in perfect alignment with each other. Other little things like cranking in a few degrees of toe-in on the mains, angling the tailwheel back, and pinning the hinges with round toothpicks increased my confidence factor even more.

After covering and trimming, I got into the balancing act and realized that Mr. Pritchard is very conservative. He wants every pilot on the safe side and so recommends a balance point between 20 and 25 percent of the mean aerodynamic chord (MAC). My bird, "*Dybbuk*," was initially balanced at 25% MAC because that's where she came out at, without having to move or change anything.

FINISHING

I went for the "quick and dirty" this time . . . mainly because of the close deadline, and partly because this design doesn't have to rely on covering for strength. So, the ubiquitous Monokote (blue with yellow trim and white pinstriping) was slapped on as fast as I could do the dirty deed. I'll be the first to admit that it ain't that pretty up close . . . but with the beholder at 25 to 30 feet, begins to look like a Toledo Class ironing job. Chevron's blue paint is a close matching to Monokote and was used for touching up and coating the already resined engine area. A DGA scale latex pilot was put in the cockpit, and as you can see from the pix, he really looks good.

GUIDANCE

A four-channel Royal receiver, four Maxi and one regular Titan Servos, and an SR 900 mah battery pack took care of the airborne requirements while an Ace Silver Seven Single Stick and a 12 year old Heathkit GD—19 transmitter shared command responsibility from the ground. My Royal receivers always range check at something over 300 feet . . . and always give me total peace of mind 'cause they're able to fly rock-steady through stuff that causes "funnies" with most other radios. And, because I feel that external antennas are a blight to the eyeball (except for a scale installation), I followed my usual practice and snaked the Royal's antenna through a long piece of large Nyrod Hot Stuffed along the lower rear corner of the fuse.

I've been told by many concerned fellow modelers that I can't, and won't, get suitable reception without stringing the antenna up to the vertical stab . . . or even out to the horizontal stab. In defense, I cite over five years worth of inside antenna installations . . . on all kinds of BIG Birds, with and without power . . . and never any problems. Guys, we're out of the dark ages and no longer need vertical whips and the like. If your gear has been recently tuned and is in good shape, and you don't allow a rat's nest of servo and battery wires around the antenna, an inside installation is nothing to worry about. If, however, you haven't taken care of your rig and it hasn't been tuned within the past year, you shouldn't be flying with it, no matter how fancy the antenna is laid out.

THE ENGINE

As I mentioned earlier, my Zenoah 2.3 was reworked by E&L for extra moxie, and although she hand started easily from the first (remember, this engine

has an electronic ignition), I did run into a problem during that initial start-up. After a couple of minutes of beautiful running at 7500 with an 18 x 6-10 Zinger, she started to sag and dropped down to about 7000. I immediately backed the high valve out a half turn and she steadied out at 7150. I had no scale hooked up for thrust readings, but even at that lower rpm the engine was putting out one helluva lot of solid thrust. The idle needed no adjustment and was fine at just under 2000 . . . and throttle response was excellent: crisp, with no lag or hesitation. I put one hour's running time on the engine, still at that rich setting.

A call to E&L that evening gave me the answer I was looking for. It seems that the RBL-8 plug raises compression because it takes up more room inside the chamber than the original equipment RCJ-8. This will cause the engine to overheat and sag till the piston wears in some. Soooo, Ernie is now including *both* plugs and a note to make initial runs with the smaller RCJ-8 and then change to the RBL-8 for more power after an hour or so of running. Another 40 minutes of taxi time around my driveway and in front of my house got the Zenoah to where she'd hold 7500 with the RBL-8 . . . using that same Zinger. However, to be on the safe side, and because I already had such an outstanding power-to-weight ratio, the engine was reset to an even 7200.

FINALLY, THE BEST PART: FLYING

Because of the unusually long-winded wet weather, every bit of outside work connected with this project . . . running the engine, taxi testing the completed aircraft, test flying, and picture taking . . . has been frustrating. We've had almost non-stop rain and/or mist for well over a month, and being fairly new to this area, I'd been expecting to hear my neighbors start talking "cubits," a sure indication that backyards would suddenly sprout arks. I guess when you come right down to it though, some of the weather could very loosely be referred to as being somewhat suitable for test flying . . . but, when it came time to get decent flight pictures . . . forget it! It took a full month before I was able to get some usable in-flight shots, and even then it was on a "least worse day" (haze, fog, and mist do show up on film a lot more than they appear to the naked eye).

Maiden flights were made at the Puget Sound Roc's new field . . . so new that it hadn't even been mowed, which didn't bother the *BIG "E"* at all. After a thorough preflight and a good range check with the engine running, *"Dybbuk"* was lined up on what's going to be our runway . . . and she was rolling. Just a touch of right rudder kept her tracking straight through the bushy grass, and in spite of wheel suckin', semi-fresh cow chips, and a rich-running engine, all 16 pounds came unglued after a 25-foot run. Lateral control was positive, but it was immediately apparent that she was nose heavy; I like to carry a tad of back pressure, but even with full up trim, too much back stick was needed (still a damn sight better than having a tail heavy tiger by the tail and being forced to hold forward stick).

After a minute of easy breathing and some "sorting out," a number of manuevers were tried . . . it was then that I recognized this BIG Bird for what she was . . . a **flying machine**. The crazy tear-shaped airfoil (much like the section used on the CAP 21) and 18 x 6-10 prop combined to keep her at a constant speed, whether executing a large, graceful loop, or diving straight down. Vertical performance, thanks to light wing loading and high power loading, was outstanding. She'd keep truckin' straight up, and even after finally slowing down, the Zenoah never protested about having to work too hard. Inverted flight was not too good, but I blamed that on her temporary nose heavy condition. On high rate, aileron deflection seemed to be about right. Some low speed work at altitude was reassuring; as expected, *"Dybbuk"* had a very wide speed envelope and would not shudder and drop off on her right wing till being milked down to a very low stall speed. Approaches and landings were awfully nice, and with a little practice spot landings should become commonplace.

For the next flights, she was "on the step." By changing to a heavier tailwheel, and substituting a 16-ounce tank for the 24-ounce tank I started with, *"Dybbuk"* now balanced at 31 percent MAC . . .

and did that ever make a difference! Even when nose heavy, she'd handled well . . . but now, she was really a pilot's airplane, responding to firm control input like a thoroughbred; she'd be a great addition to anyone's hangar.

FINAL THOUGHTS, OPINIONS, AND PHILOSOPHY

Vibration is a killer! It not only shortens engine, airframe, and radio life, but also keeps that prop from doing anywhere near its best. EVERYTHING that rotates should be balanced . . . carefully . . . and I know of nothing that'll do the job like the High Point Balancer. Not only were my props balanced (and the tips painted a "fluorescent red" for safety), but the 3-1/2-inch CB spinner was also put on the High Point . . . and brought into balance by Hot Stuffing five to six pinches of microballoons in the appropriate places. There can't be any fudging when it comes to eliminating vibration, and that's why I favor the six-bolt hub. Besides looking real, they allow you to get both of those prop tips tracking in the same arc. If it wasn't important, they wouldn't waste time doing it on full-scale birdies!

The Zenoah Quartz 2.3 is an impressive engine. Besides sporting an electronic ignition system that really does allow easy hand starts, it puts out lots of power . . . and it is S-M-O-O-T-H. I did run it some with an RCJ-7Y, and according to my venerable Heath Thumbtach, it matched the RBL-8's 7500 reading fair and square. An 18 x 10 Zinger was tried, an it also did an excellent job of hauling *"Dybbuk"* around . . . but I got better acceleration and a more constant speed from the 18 x 6-10. Also, I just realized that I'm still running on the last of a 20:1 mix, so going to 50:1 should bring up the rpm.

I still like wide-track landing gear best, but in all fairness, I've got to admit that the not-so-wide-track of the BIG "E" landing gear has caused no problems. It acts like it actually has a wider stance. I don't know how well this bird handles without two or three degrees of toe-in on the mains, because I didn't try it that way (E&L claims exceptionally good ground handling). However, with toe-in, this is easily one of the best mannered tail-draggers I've ever run across. Furthermore, carrier type landings indicate that the landing gear can take a pounding.

The bit on philosophy comes from the designer. Most observers, no matter how impressed they are with the *"E's"* performance, rarely miss the chance to offer constructive criticism in the area of "cleaning up the airplane." Their very next comment usually is, "Invert that %@#$@& ugly engine!" Well, it so happens that Pritchard purposefully designed the plane this way. He wanted a BIG Bird that would equal the performance of the smaller sport/pattern ships, and one that any reasonable, competent, 2-cycle oriented pilot could fly. However, hand in hand with performance had to be simplicity . . . that's why there's so much prefabrication (because she builds so fast, the *BIG "E"* is a timesaver), and that's why the engine is upright. With this upright installation, the worry is taken out of wiping out the plugs, part of the ignition, or the carbuetor in case of a nose-over during this transitional period. I'm sure many guys do their own mod and invert their engines, which does make for a nifty, streamlined aircraft . . . but Mr. P. made me promise I'd leave mine upright.

Ernie, I'm now absolutely sure . . . that your ad doesn't do the *BIG "E"* justice! •

Choppers . . . . *Continued from page 41*

forward firewall. With a heatsink head, as the O.S. .50 has, it catches some of this air as it exits the fuselage. A cut down Hughes 300 fiberglass shroud covers the lower half of the cooling fan and directs air to the cylinder head. This shroud is fairly easy to add on, and is highly recommended. Kobe Kiko will soon be completing a fiberglass shroud especially designed for the R-22, which will be standard in the kit.

Just as important as the cooling shroud is the need to cut a rectangular portion 3-1/2 by 1-3/8 in the bottom rear of the ABS fuselage. This allows the hot air from the head to exit. Without this notch, I found that engine runs were not consistent, even with the lower fiberglass shroud in place. As the directions don't specifically mention this, make sure you cut this area out! In general, the cooling system is the "weakest" sub-system of the R-22 in stock form, but it *will* be adequate if the provided tips are followed.

MUFFLER

This is probably the best place to tell you about the new V-Tech muffler I used. It is made by Mac's Mufflers for Dave Brown Products. Designed by Don Chapman, the muffler is essentially a volume tuned pipe, so the header can be adjusted to "tune" the muffler. As I wanted to keep as much weight toward the nose as possible in the R-22, I did not tune the pipe, but stuck it on as a straight muffler. *Even at this, a 10% gain in engine power can be had, with as much as a 25% gain by tuning.*

I did not have the muffler when I

bench ran the engine, so I can't tell you exactly what it added to the O.S. .50, but I do know that at an all-up weight of 10 lbs 5 oz (with a gyro), the R-22 hovers at just over 1/2 carb opening, with excellent power to spare.

DRIVE TRAIN, AUTOROTATION CLUTCH:

The drive train is a combination of belt and gear drive. As discussed earlier, the engine drives a belt up to the freewheeling unit. From the freewheeling unit forward, a bevel gear engages the main gear which is mounted to the bottom of the main rotor shaft. The main gear is metal with nice, deep teeth, so the gears can be set with slight play, and it's not necessary to worry about them stripping teeth. Upon initial assembly, the gear mesh will sound terrible . . . grease it lightly and let the first few flights break in the gear mesh. After that you'll find that they run smoothly.

From the rear of the freewheeling unit, a flattened steel tube protrudes 18 mm. This distance must be checked before installing the flattened end of the tail rotor driveshaft into it.

This is like the Kavan method of tail rotor drive, and is personally my favorite for being easy to service and set up. However, in the stock kit form, the drive wire runs through a brass bushing midway in the tail boom, and is totally unsupported otherwise. This can lead to the drive shaft whipping and vibrating unnecessarily.

The cure is to add a 21-inch brass tube for the drive shaft to ride in. A piece of balsa wood supports the brass tube at the front of the tail boom, and silicone holds the tube at the center of the tail boom where the brass support would normally be. With the addition of the brass tube, the tail rotor gearbox collar must be canted downward too, see Figure 1. This changes the drive shaft from a bent S to a smooth U. Just one caution: If the tail rotor gearbox collar is already installed straight, you can forget about canting it downward. You'll destroy the tail boom trying to work the epoxy loose. Instead, try a short length of brass tube (one to two inches) midway at the center support, and another piece (two to three inches) near the front of the tail boom. This should suppress most drive shaft vibration. Be sure that the gearbox and drive wire *are in place* as the silicone dries around the brass tubes. This insures that the tubes will angle with the drive shaft as necessary. In short, the drive system is excellent, it just has to be installed differently from that shown on the plans.

The gear ratio from the engine to main rotor is 9.6 to 1. From the main rotor to tail rotor, it is 1 to 4.5. If the engine turns 12,000, this gives a main rotor speed of 1,250 and a tail rotor speed of 5,625. These ratios are excellent, giving good disk rigidity in forward flight, along with maneuverability in hover. This helicopter, along with the *Competitor*, has the best main rotor disk behavior I have flown.

The autorotation clutch (freewheeling

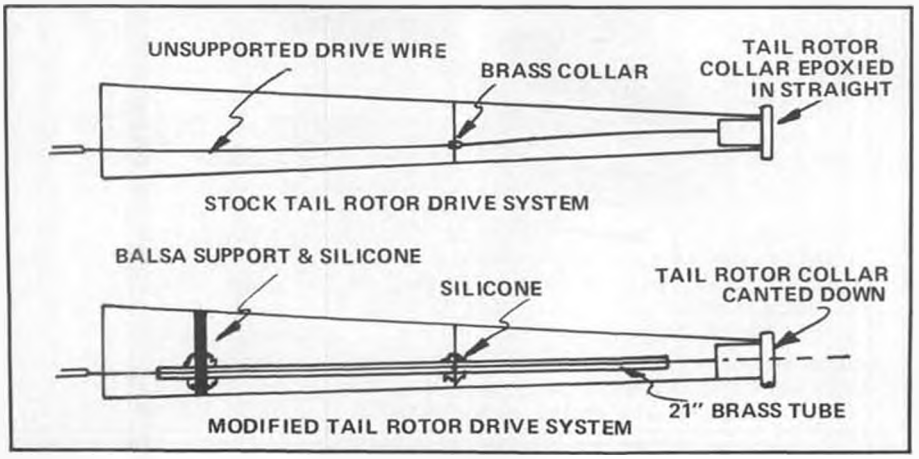
unit) is mounted between the side frames and is inset in the top pulley from the engine drive belt. It will want to hang up after the first few flights, but will unlock if you hold the pulley with your fingers and rotate the main blades clockwise. After a few more flights it will "break in" and work smoothly. Mine locked up intermittently through the first dozen flights, and has been fine ever since.

MAIN FRAMES AND LANDING GEAR:

The main frames are aluminum and come anodized black. They fit together well and form a tremendously strong "box", stronger than any other metal framed helicopter on the market. When the autorotation clutch is fitted between the side frames, tighten all eight bolts slowly and assure yourself there is no binding. I had to enlarge two holes just slightly to achieve this. Just check yours as you do this, and don't forget to put the belt on the pulley before sliding the pulley in place between the side frames!

There is a really impressive molded plastic piece which fits in between the frames at the rear. This changes a square to a circle, and accepts the tail cone with six sheet metal screws to hold the tail cone in place . . . extremely neat and clean.

The landing gear struts are made from music wire. They fit to the aluminum skids via neat little clamps and 1.5 mm socket head screws. The whole landing gear attaches in a slightly different fashion to the fuse. It is bolted at the rear of the frames, then the canopy/fuselage slides on, then the front struts are bolted to the front main frames. This results in the bottom of the fuselage being held in place by the landing gear. It all sounds odd but works great.



MAIN ROTOR SHAFT

The main shaft is a full 10 mm in diameter all the way, set in a 17 mm diameter aluminum pipe. There are bearings in the top and bottom of the pipe to support the shaft, and in turn, the pipe is held between the side frames with two 1/4 inch thick aluminmum plates. They kind of reminded me of the old *Heli-Baby* seesaws. Anyway, the whole assembly is extremely ridid and durable.

COLLECTIVE SYSTEM

The MCS (micro control system) is fascinating in design, again modeled after the arrangement in the full-size R-22. It is difficult to explain the exact operation. Let me just say that it is a push-pull system on pitch and roll. When a roll command is given, the rear pushrod doesn't move, and the two front ones tilt the swashplate to the right or left. Wnen a pitch command is given (say forward cyclic), the rear rod pushes up and the front two rods drop down. This results in a nice, solid control system (see photos). The bellcranks you see are bushed with "dry metals". Ideally, I'd like to see miniature ball bearings throughout, this would make the system even better yet. Maybe later.

MAIN ROTOR HEAD

Along with the MCS, it is the head that makes this flybarless system work. It is

beautifully machined exactly after the full-size R-22 head. The head features a "Tri-hinge" system where the head can flap at the top center hinge bolt, and each blade can cone individually at each lower blade hinge bolt.

The dampening used at each hinge is perfect. Due to the aerodynamics of a flybarless head, it is very important that the head flaps just slightly to avoid touchiness, yet not so much that control inputs become mushy. From the photo you can see the head details. Note the sturdy construction all around, with flat plates for blade holders screwed to the bearing holders at three points. These are strong enough that I don't think they'd bend in any type of crash.

The head also features three bearings in each holder. Inner and outer ball bearings support feathering action, and an outer thrust bearing absorbs all centrifugal loads.

MAIN ROTOR BLADES

Also very smartly designed, the main rotor blades feature a 15% thick, symmetrical airfoil, with a 12.8 to 1 aspect ratio. This gives the good combination of smoothness in hover and excellent disk rigidity in forward flight mentioned earlier. Furthermore, the blades are washed out (twisted) seven degrees from the root to the tip. This gives more equal lift throughout the blade, and more efficient lift. (This is not something you'd want to use on a ship to fly inverted, because the twist would be working the wrong way . . .)

The blades are weighted to achieve a total blade weight of 145 to 165 grams. More details next month. They are covered with Kobe-Kiko's plastic "sock". Just slide the covering over the blade, and shrink with steam from a tea kettle. Then Hot Stuff tips to provide fuel proofing.

TAIL ROTOR GEARBOX

The tail rotor gearbox is a nicely machined aluminum assembly with two bearings to support the tail rotor shaft. It bearings to support the tail rotor shaft. If slides into the collar which was epoxied into the tailboom. A set screw secures the gearbox in the collar and prevents it from rotating.

The pitch change wire slides through the hollow tail rotor shaft, and exits toward the bottom of the horizontal stabilizer with a 90 degree bend. The tail rotor bellcrank has a ball built into the end, so the pitch change wire slides through the hole in the ball. This gives very precise tail rotor control, allowing the angle of the pitch change wire to vary without causing binding. I'm in the process now of fitting one of these bellcranks to my *Competitor*.

The gearbox is filled with grease, then the rear is sealed with a plastic plate siliconed or sticky tape mounted to the gearbox.

TAIL ROTOR BLADES

These are conventional, though nicely laminated with a balsa leading edge, hardwood center section, and two more laminted balsa pieces to form the trailing edge. The airfoil section is Clark Y. They are also covered with little plastic socks, just like the main rotor blades. I managed to ruin my covering when I accidentally Hot Stuffed one tail rotor blade to the workbench! I used Fas-Cal and covered them conventionally.

Next month, I'll pick up with the fuselage and tail cone, setup, flying, assorted hints, and a final critique. See you then.

Ray Hostetler, c/o **Model Builder** magazine, Box 10335, Costa Mesa, CA 92627-0132. •

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

new body and truing sets of tires. And the Moonum Enduro Team of Thompson/Snyder/Rutherford took a very comfortable second place with the *Eagle*.

As with the *RC500*, we used a Kraft radio system in the *Eagle*. All of the stuff mentioned last month goes for this set up in the Eagle . . . with the added advantage that Kraft radios are available from Delta, and the radio tray is already drilled for installation of the KPS-23K servos. This radio has been so reliable that I don't even give it a second thought . . . truly amazing.

The Picco .21 is equally amazing, even if it is not today enjoying a marked superiority, thanks to all the improvements made to the K&B .21. Still, it is the best race car motor I have ever used.

For the '82 season, I had two complete

Picco .21s ready to go, complete with 'wheel, carb, etc. Both engines were run-in, and the carbs were set to a race-ready, but conservatively rich, adjustment.

The primary motor never left the car during '82, and at the start of '83 it was still so fresh that it stayed in the car for another year with nothing more than a new rod being installed in the off season.

With the '84 season coming, old faithful has already gotten another new rod, but will now be the back-up motor, simply because I want the spare to be as strong-running and reliable as the primary motor. Judging by the feel of the motor used in '82 and '83, and remembering how strong it still was at the last race, there has to be another full year of racing in it, at the least. So while other motors, most notably the K&B .21, have gotten better since the introduction of the Picco, it would indeed be very difficult to buy a motor better than a Picco.

BUT WHICH CAR IS BETTER??

Let's look at it from several angles, as the answer is not so simple as the question. Most racers seem to buy their race cars after determining which brand and/or model has the most wins. Sales charts indicate that the theory of, "What wins on Sunday sells on Monday," really does work. Associated easily has the most meaningful wins, thanks not only to a great race car, but to a large, talent-filled racing team as well. Delta's national and world class competitive racing team has only one member, Art Carbonell. He has many wins with his *Eagle*, but nothing compared to Associated's record.

Price is a biggie. In heads-up retail pricing, Associated has the advantage, selling the *RC500* for $475 versus Delta's *Eagle* at $580. I understand that "deals" are where you find them and retail prices don't mean a whole lot in today's hobby business. Again, Associated has the hammer in hand, there are some rather remarkable prices being quoted on *RC500* kits. I would, however, like to caution you that it is in your best interests to buy any RC car from the outlet you are most likely to be dependent upon for spare parts, setup information, and so on. Also, remember that the *RC500* and *Eagle* kits are continually being updated and your local dealer, in many cases, is more than likely to supply you with a current kit.

Availability is a *key* consideration, and I personally see both of these cars as being so good in their own right that it would be difficult indeed to justify being the rebel in any given geographical area. For instance, if there is a Delta dealer in your area, and most of the cars being raced are *Eagles*, it might be to your advantage to run an *Eagle* rather than being a lone wolf. And the reverse is true; if your area is mostly Associated racers, go with the *RC500*.

Any new race car must be built properly to be competitive, and this is particularly true in the case of suspension cars. I have built both cars, but I must say that the *Eagle* has the edge here. Associated offers a list of instructions for the *RC500* and a huge pamphlet full of around 100 pictures (!) to help you get your car built. However, it is my opinion that this quite good effort is not as good as Delta's excellent drawings . . . six pages worth, and all on 11 x 17 stock.

In addition, Delta supplies a comprehensive setup sheet detailing *everything* you need to know about setting up your car, from head clearance in the motor, to ride height, to spring rates, to tire compounds, to steering throw, to driving techniques, plus a bunch of other stuff I'm not going to list . . . it is all there. You simply cannot fail to put a competitive race car on the track if you build the *Eagle* to the drawings and then follow through on setup with the supplied information. Delta wins big-time in this category.

A great deal of enjoyment comes from actually building the car, this is a kind of a sub-category to the above, and again Delta wins out. The car simply bots together with all the parts fitting extremely well. In fact, it is at this stage in assembling a Delta that you start to remember the old saw about "You get what you pay for". The car is so full of small niceties that to list them would be impossible. One example is the radio tray. Where Associated supplies a blank piece of 'glass that has five holes punched in it and is routed to the proper outline, Delta includes in its kits a radio tray that is completely finished and ready to install. No mean trick, their tray has ten cutouts (most for lightening purposes), six countersunk holes, and twenty-nine straight holes punched in! No roll-your-own work involved here, you just start bolting stuff in, and this consideration for the racer/customer extends from one end of the car to the other.

Accessories. A bolted-together car kit

is only about half there, you need a bunch of stuff to complete it. While Associated stocks a number of necessary accessories, including motors, radios, McCoy parts, etc., Delta Again wins hands-down. They offer *absolutely everythng*, all of it top-notch equipment, needed to field a race car. They truly can function as a single source of race cars and accessories. Rather than list a sampling that could not even represent what Delta offers, chew on this: In seven years of racing first a *Super J* and now an *Eagle*, there are only three items which I have used that are not available through Delta. They offer silicone fuel line, but I prefer and use Prather's. I also prefer to use Amps plugs on my battery packs where most racers use the radio manufacturer's connectors. Delta has Kraft Line and Deans connectors for non-standard installations. Finally, I use a neat little molded Lexan receiver cover from MRP.

To appreciate the situation described, you must do three things: firstly you have to suffer through a race car or two that is a pile of mix'n match equipment that may or may not function well as a whole; secondly you have to work with a *Super J* or *Eagle*; thirdly a close look at Delta's current catalog is required . . . regardless of the brand of car you are racing.

Keeping a car race-ready should be another consideration, and both the *RC500* and the *Eagle* fare very well, and *equally*, here. Neither demands constant work, nor is either overly critical to set up. Both have a "magic" setup for each track and driver, of course, but it is difficult to get either car so wrong that it turns into an undrivable pile. The only difference here seems to be that when setting the tweak of the chassis, the *RC500* is somehow more straightforward. Sometimes you will be dialing the *Eagle*, plop it on the tweak board, dial it again, and come to the conclusion that the car is lying to you. I can't explain why this is, but dialing in the tweak on an *RC500* is easier and more predictable. On the other hand, the *Eagle* will hold its setting much longer as it is possible to bang an *RC500* hard enough to tweak the chassis.

Handling: Another biggie . . . both the *RC500* and the *Eagle* handle really well; but there is a big difference. This is best illustrated by stating that for the time being, Joshua (my son) has settled on Associated medium rear tires ("Mellow Yellow" for color freaks) and Delta TR324C tires on the front of his *RC500*. This combination results in a car that is easily drivable, yet will turn with any other car, and quite a lot better than most. However, this same rubber combination on an *Eagle* will see the car push like a pig . . . uh, that's understeer to all the nonracer types out there. I know ther are a lot of variables involved, some much more complex than a simple change of rubber, but overall you will find the above to be true. What saves Delta here is that TR324 front rubber is available in not only C compound but B, A, and AA as well. The AA wears quite quickly but A and B aren't so bad in the wear department, and one of them will get an *Eagle* to turn with . . . but probably not better than . . . an *RC500*. At this time, the *Eagle* owner can only achieve parity in the battle for the inside line, and even at that he pays for it with higher tire bills.

The trick here is that handling is strictly a judgement call: what I like may quite possibly *not* be what you like. So . . . I personally don't rate the handling of a car on how tightly it will turn, although that is a factor. In other words, you can't set a car up to turn tight and then pronounce it as posessing the ultimate in handling. It has to work everyplace on the track. With that in mind, I personally prefer the *Eagle*, admitting up front that I have much more track time with it. The basic reason for this preference is that an *Eagle* that is even close is fantastically consistent lap after lap. It never tricks you, never does it feel like you are on the very edge of control, about to slip into the realm of *oops* from which there simply is no easy recovery. The *RC500*, while it too can be set up to run mildly, when dialed to a competitive level equal to an *Eagle*, simply demands more concentration. An example I like to use is that while a racer with an *RC500* will be turning lap times equal to mine he has to work harder to do it while I am more relaxed, able to look ahead for traffic I will soon

be into, more able to pick and choose places to pass and cranking off laps that are more consistent.

Before taking the preceding too seriously, let me remind you once again that I am stating my *personal preferences* . . . and the only way for you to know which car handles the best is to drive a couple examples of each. Heck, even that might not tell you all you need to know. I regard the handling of the RC500 as very good, so what we're doing here is picking nits. . . .

With all of this and the preceding column in mind, I will take the Delta *Eagle* as the best, by the closest of margins, *for my personal needs* in a race car.

Your selection is quite another matter, as the real winner in this shoot-out is *you* the racer looking for a better, more advanced race car. That's right, I am not going to pick a winner between the *RC500* and the *Eagle* . . . in the general categories each is super and quite comparable to the other. You must then use more specific categories to decide; for example, I would regard price and availability as deciding factors, and only each racer can make up his mind here.

For what it's worth, many times in the past year I have been asked which car is the better. Each time I tell the questioner to buy the car that his dealer stocks and can supply parts for. •

Soaring . . . . . *Continued from page 19*

rials for making the plug. (A plug is a full-size mockup of the fuselage in either wood or very dense foam.)

The best wood for carving plugs has to be jelutong. Jelutong is a tropical soft wood similar to balsa. The density of jetulong is about triple that of contest grade balsa, but it has the same cell structure and uniform density (no noticeable annual rings). Jelutong carves like a very soft pine, sands like a hard balsa, and is just perfect for plug making.

The one drawback about jelutong is that it is hard to find. Most lumber yards do not stock it. I get mine at a hardwood specialty store in West Los Angeles. (House of Hardwoods is the name of the store, and its address is 2143 Pontius Ave., Los Angeles, CA; [213] 479-4196.) I don't know how many similar stores there are around the country, but a look in the local yellow pages should yield an answer for you.

If you have no access to jelutong, you can try clear white pine. It doesn't have the smooth texture of jelutong, but it is significantly cheaper. The extra work it may take to get the pine smooth may be the "hidden cost."

Transfer your full-size drawing to the block of wood. Do the profile view first. If you have access to a band saw, by all means, USE IT! If you don't, a coping saw will work, but it will be 100 times the work. (I know, I've had to do it this way.)

Chances are that the block of wood you will be working with will be a four-by-four. This means that your fin will have to be roughed out separately from the main plug. This is perfectly OK.

After the profile view is cut out, the top (or bottom) view is transfered to the top side of the plug. Pass the plug through the band saw again. Now you have a fuselage that looks like a caveman's rendition of a *Drifter II* . . . all square and clubby.

What comes next is the fun part: you get to plane, carve, file, sand, and swear at that hunk of wood until it becomes rounded to the desired shape. I don't use fancy, cross-section templates to achieve the final shape . . . mainly because I'm too lazy to make them (first you have to draw about a dozen of them, then you have to make them out of cardboard . . . no thanks). Besides, I'm pretty good at eyeballing things, and a half-circle template (just one) is all I need to check the symmetry of fuselage side curves.

After all is carved and sanded, and the fin is glued in place and likewise shaped, it is time to finish the plug. I have found that gray hot rod primer, available just about anywhere that paint is sold, is sufficient for sealing the wood and filling the small sandpaper scratches.

After the first coat is applied, you will probably find a few irregularities in the surface of the plug that you were not aware of before. I would be surprised if you didn't. These irregularities can be sanded out (in the case of bumps), or filled in (in the case of depressions). The best fillers are those that sand easily and fill quickly. DuPont Featherfill is a good, easy-to-sand filler that dries in a short time (less than half an hour) and meets these requirements. Ohio Superstar markets a similar filler, but for right now, I can't remember what they call it. Anyway, both products are polyester resin based and are filled with some very fine grit substance which acts like a microballoon filler. Lacking Featherfill, you can use Bondo. Bondo doesn't sand as easily, but it will work.

After the fuselage is perfectly shaped, filled, sanded, and finish primered, give it the once over with 400 grit, wet-sand abrasive paper and water. When dry, get all of the dust off with a tack rag. You now have the start of the mold.

The next step is to decide how much money you want to spend on the mold. There are three good materials to use in the actual manufacture of the mold. In descending order of expense, we have: epoxy/fiberglass, polyester resin/fiberglass, and plaster. The epoxy/fiberglass mold is the best way to go. Compared to the polyester resin/fiberglass mold, the epoxy mold will last longer without warping. Epoxy is a more stable material than polyester. Its biggest drawback is expense: epoxy can cost three times what polyester can cost. Also, the epoxy mold can be laminated quicker than the polyester mold due to the fact that the epoxy hardens faster than the polyester (within safe temperatures . . . both can become blisteringly hot if misused).

The advantages of polyester are:

availability, low cost, and lower toxicity. There is one extreme danger in working with polyester, and that is the catalyst . . . it is VERY BAD NEWS if it comes in contact with your eyes. You don't get a second chance with this stuff, you will lose your eyesight, period. Wear protective goggles when handling the catalyst.

Aircraft Spruce and Specialty Company, Box 424, Fullerton, CA 92632, markets an epoxy called Safe-T-Poxy. Quoting from their "Model Builder's Edition" catalog, "An exceptional high quality formulated epoxy system which is the least toxic of all systems available. The only one to use!" I've heard that this epoxy is just as good as any of them, for performance, but I have also heard it is one of the more expensive epoxies also. Three-quarter pint kits are $6.50, 1-1/2 pint kits are $8.75, and 1-1/2 quart kits are $14.95. You will use two of the latter kits in a mold of this size, and you may not have enough left over to make a part when it's done.

Another way to go is West Systems epoxy. This is the epoxy most often used by wooden boat makers (full-size). It is available from California Custom Yachts, 531 No. Francisca Ave., Redondo Beach, CA 90277, (213) 821-6762. West Systems epoxy is manufactured by Gougeon Brothers, Inc., 706 Martin, Bay City, MI 48706. I have used this epoxy in mold making before. It is very good, and a lot cheaper than Safe-T-Poxy (but still not as cheap as polyester).

The third material for consideration is the cheapest yet. I mentioned plaster above. What I had in mind is a product called HydroCal. HydroCal is a white powdery substance very similar to plaster in every way . . . except one . . . (no, you can't get high on it). HydroCal is much harder than plaster of Paris when each has been mixed with water and been given the chance to harden. HydroCal is like igneous rock when it is hardened. However, if you should ever drop a mold made of HydroCal, chances are you have just broken it. As HydroCal molds are very heavy, care should be taken to get one's feet out of the way in such an event.

Actually, if you are only planning to make a dozen or so fuselages (at most) from your mold, HydroCal is a very smart way to go. I say a dozen parts because I'm not sure just how long this kind of mold will last with repeated trimming along the edges, and general wear and tear. If you want a mold to make a hundred parts from, you're better off using epoxy.

Let's assume you've never made a mold before and you're not sure just how many parts you are going to make from the mold. Which material should you use? I would recommend the HydroCal. If you only make a small number of fuselages, you're not out as much money . . . or time. Besides, if it turns out to be a real winner, you can always reuse the plug to make an epoxy mold.

Well . . . I hardly believe it, but I've almost used up all my space for the month. It looks like we'll have to continue this mold-making business *next* month.

One last thing about designing your fuselage, don't make the same mistake that I make on my first mold. Don't carve your plug with wing root fairings for any airfoil. Leave the fuselage sides rounded and plain. If you use the wing root fairing idea, you will forever be stuck with that chord length and airfoil on all of your future sailplane designs.

Now get busy with that plug, you've only got 30 days (or less) in which to finish it before we start making the mold!

AIRFOIL OF THE MONTH: SELIG 3002-099-83

Last month I featured one of Michael Selig's latest airfoils for a cross-country type thermal sailplane. I call this to your attention because in the write-up of that article was included a section on how these airfoils are generated. If you missed that part last month, I strongly recommend you read it as it will lend quite a bit of credibility to the Selig airfoils.

This month we will give you a multi-task thermal sailplane airfoil designed expressly for the use of full-span, camber-changing flaps, *a la* F3B. As with all Selig airfoils, you will have to send away for the coordinates. Write to Michael Selig, 715 S. Randolph, Apt. 21, Champaign, IL 61820. We do it this way so that experimental data can be gathered on these airfoils (even if the "experiment" is uncontrolled, scientifically), and so that we can get a good idea of what works and what doesn't. As these airfoils are generated with great care and intelligence, the chances of any of the Selig airfoils being unairworthy is extremely remote. Anyway, on with this month's airfoil. I quote from Mr. Selig:

At the expense of confusing the modeler, there has been an ongoing debate: "Thick vs. Thin," referring to airfoil sectional-thickness ratio. The fact is plain and simple. Relatively speaking, thick airfoils give us a wide drag bucket with high drag. Conversely, thin airfoils give us a narrow drag bucket with low drag.

For F3B type competition, low drag near a lift coefficient of 0.1 is desired for the speed task. Whereas, high lift is desired for launching and soaring. Initially, these conditions may seem impossible to meet; but, there is a solution. The low drag is achieved by using a thin airfoil, while the high lift is achieved by flapping the airfoil. This combination Ralf Decker used on his R/C sailplane to win the 1983 World Champs. Decker's Quabeck airfoil was included in Bill Forrey's January 1984 column.

The S3002-099-83 was designed for F3B type competition. As shown in the figures, flapping this airfoil has its advantages. At the low end of the drag bucket (C_l = 0.1, flap at -5 degrees), the lower surface shows some separation; however, at this lift coefficient the Reynolds number of an R/C sailplane is much higher than 200,000. Therefore, this separation is of little concern for this application. At the high end of the drag bucket (C_l = 1.1, flap at +5 degrees), little separation is predicted. For lift coefficients less than 1.1 at positive five degrees flap deflection, both upper and lower surfaces show separation at the low Reynolds numbers. For this reason, at low lift coefficients and low Reynolds numbers, excessive positive flap deflection is not recommended. Large positive flap deflection is suggested for towing purposes, while small positive flap deflection is suggested for soaring in light lift. This airfoil is recommended for use on an F3B ship.

If all of the lines, squiggles, and curves on these graphs appear confusing to you, or perhaps you don't even know how to read these graphs, stay tuned for the next "Planes an' Facts an' Chickum Tracks," by Fred Lehmberg. Rumor has it that Chickums, Sylvestor, and Fred are going to clarify these things. It should prove to be enlightening reading!

I'm out of room completely for this issue, so I'll have to draw it to a close now. Remember what I said about that fuselage plug . . . get to it! •

Feather . . . . . . *Continued from page 28*

CONSTRUCTION COMMENTS

When I was originally approached to write this review, I was asked if I would like to build an electric powered version of the original *Feather Merchant*. As I am primarily an R/C soaring type . . . although one who has recently softened his heart towards models with built-in lift . . . I agreed that this was the way to go. As they say, electric power is good, clean, QUIET fun!

The manufacturer suggested that I use the Leisure Gear Motor. The publisher suggested I use an average weight radio system so that we could get some idea what the performance would be like for the average flier (not competition minded). So the choices were made: a Leisure Gear Motor (05 Class with a 2.5 to one gear ratio) would be the power plant, and a new Circus Hobbies Century VII FM System would handle the radio control.

The first thing I did to begin construction was soak the 3/16 diameter reeds and 3/16 square balsa sticks needed to form the fuselage sides, wing tips, and the vertical and horizontal stabilizer outlines in the bath tub overnight. This proved more than adequate for the reed parts as they became very flexible in a matter of four hours. The 3/16 sticks needed about a 24-hour soak to get them sufficiently pliable to conform to the fuselage profile. A superior method of soaking the balsa is to take a pump spray bottle of Windex glass cleaner and give the balsa a good once-over spray. The amonia in the solution softens the cellulose of the balsa wood almost immediately. I can't say that I've actually used this method, but it is fequently used by other modelers so I know it works. Give it a try on both the balsa and the reed.

The reed parts were bent around cardboard froms copied from the plans using carbon paper (see photo), and allowed to dry overnight. When they were removed (see photo), they were almost perfectly shaped and ready to go. I did this to unload the delicate ribs in the stab and rudder, and to make sure I achieved the *exact* outline of these parts as well as the wing tips. It worked beautifully, and I recommend that you do it this way also.

The 3/16 square sticks that make up the fuselage sides went together well. The idea here is to put sticks wherever the plans call for them . . . it's that simple. I used primarily Hot Stuff and Super 'T' Hot Stuff for the construction, and Zap and Zap CA+ (Zap-A-Gap) when I ran out of the Hot Stuff. Both cyanoacrylate adhesive systems work well. I also used Satellite City's Hot Shot and Pacer's Zip Kicker to speed the thicker glues along. They both work well, but I prefer the smell of the Zip Kicker over the Hot Shot.

After both fuse sides were done, it was time to install the cross pieces. Having never done this before and having no instructions as to how it should be done, I did it the best I knew how. I cut the required number of 3/16 square sticks (a bunch of them) 2-1/2 inches long and glued them vertically to the inside of the right fuselage side where indicated on the plan. I used a 45-45 right triangle to make sure they were perfectly vertical. This is important as the two sides won't mate well if you don't do this. Formers F-1 through F-3 were likewise installed.

After all the cross pieces were in place, I placed a bead of Hot Stuff Super 'T' along the tops of the firewall (F-1) and the bulkhead (F-2) and carefully positioned the left fuse half in place. It is important to get the alignment right before the cyano goes off, so work quickly, or use Slo-Zap. After this, I glued the vertical sticks in place one by one with Super 'T'.

I now had something that actually looked like a fuselage! The remaining steps were to join the fuse halves at the rear, add the horizontal cross pieces in the tapering tail boom area (tack gluing only!), pull the fuselage bottoms together as indicated on the plan to form the V-shaped cross-section, reglue the horizontal cross pieces permanently, and then add the remaining cross pieces in the tail boom.

The next step was to make the turtle deck formers and glue them in place. A note here is in order. To obtain the best fuselage tail boom shape, scallop the formers between the longerons so that they won't appear as bumps through the covering. When these formers were all in place, the top longerons were glued down.

The last step in constructing the fuselage was to finish the nose area. The landing gear wire (supplied) was bent to shape using a vise and a K&S Mini Wire Bender. This was in turn wired (not glued) to the 1/4-inch plywood firewall (F-1) using baling wire. This method works quite well, and allows for removal of the landing gear should it become too bent up or broken from extensive use or abuse.

As I was only concerned with mounting an electric motor to the *FM* and not a gas engine, I elected to eliminate the hardwood rails called for by the plan when installing ignition engines. (These rails, by the way, are not supplied in the kit. Perhaps this is because most modelers use modern glow engines in *FMs*, and it is easier to use modern, molded engine mounts than to use

rails.) For the electric version, a second firewall was added about one inch from the nose of the *FM*. This firewall was drilled to accept the Leisure Gear Motor in a way that allowed the 1/8 ply to be sandwiched between the motor and the molded, fiberglass reinforced nylon gear box. Two screws hold the assembly together. Access to the motor is obtained through the cabin of the model (firewall F-1 is cut out to allow the motor to pass through).

Perhaps a better way to engineer this motor installation would be to make a 1/64 plywood tube by wrapping a one-inch strip of the ply around the motor and gluing the overlapping edges together. This could then be inserted into a circular cutout in the front firewall and glued in place flush with the face of the firewall. Of course, you would have to be careful to get the required down thrust, but this would be easy with the motor resting inside the tube and with the propeller installed on the output shaft. This way you could use the propeller as an indicator of down thrust. You would then secure the motor to the firewall with the top screw and nut of the gear box. With this setup, access to the motor would be through the front of the fuselage. The only disadvantage to this method would be the additional wire needed to allow hookup of the motor leads outside the fuselage. A small penalty of this additional wire would be the weight and the added resistance in the circuit. You pays your money and takes your chances.

The cowl of the electric *Feather Merchant* is different than the gas version because there is no engine cylinder sticking up through it. This means that the cowl can be taken all the way to the nose of the *FM* minus any cutouts. I like the clean lines of the new snout!

Two helpful things that the plan lacks in this area are a windshield and cowl pattern, but in ten minutes you can make your own, so this isn't a big problem at all.

The only remaining modification to the *FM* fuselage for the electric powered version was the elimination of the rearmost former, F-2. This was actually removed after the model was completed to allow easier access to the electric motor's battery pack. This little mod apparently does not weaken the fuselage significantly at this point, but if I were to do it over again, knowing where the power pack should go for proper balance, I would arrange a vertical installation of the pack and not disturb the former. See photo of final arrangement of components.

The horizontal stabilizer (or stab, for short) was modified for R/C use in a way that I feel is superior to the method described in the plan notes. Instead of making the elevator in one piece and splitting the rudder and sub-fin, I decided to keep the graceful curves of both surfaces, uninterrupted, by splitting the elevator *Playboy* style and running the rudder down to almost touch the stationary part of the stab. See the photo of the *Feather Merchant's* rear end. This meant that the center "rib" in the stab had to be widened . . . see photo of stab. If I were to do this over again, I would run the center "rib" full-width to the leading edge as this gives you an easier surface to cover than the way I did it the first time through. Live and learn!

When the stab was completed, it was glued to the fuselage. After this was done, it was time to begin constructing the rudder. I think that the easiest way to build this surface is to build it in place. As both the rudder and stab have no true ribs (only cap strips over and under spars), the spars were installed first. I cut rectangular holes in the top "rib" of the stab to accept the vertical spars of the fin/rudder assembly. As the rudder spar is left free to pivot about the hinge line, it was not necessary to make a hole for it. These holes are visible in the stab photo.

After the key holes are cut in the stab, the fin spars are glued in place being careful to get them perfectly vertical to the stab, parallel with each other, and not tilted fore or aft. This is easier than it sounds, and can be easily achieved using a triangle and your eyeballs!

The reed and balsa leading and trailing edge piece is fitted and glued over the plan to assure correct outline. Of course, you are at this point building only the upper surface, so split off the sub-fin portion of the reed before you glue the assembly to the fin spars and single rudder spar. To simplify this step, I tack glued two 1/16 balsa spacers between the aft fin spar and the rudder spar. This holds the rudder spar in the proper position until you are ready to separate the fin and rudder. Cap strips were glued in pairs (right and left sides simultaneously) to avoid possible warps.

Don't forget the gussets in the corners of the reed trailing edge and spars. The manufacturer recommends these for strength in both rudder and stab.

The *Feather Merchant* gave me my first exposure to reed construction techniques. I must admit my reservations at first, but after working with the stuff, I find it is a really extraordinary material! It curves beautifully, needs very little sanding (which is done quickly and

easily), and is remarkably light. It is great to work with.

The wing was a little tricky to build. I say this not because the wing's structure is complicated (it's actually quite simple), but because of the wing ribs. The wing ribs look like they are bandsaw cut in a stack. Because the wing tapers, several ribs of the same length are cut at once . . . mass produced you could say. What made the wing's construction tricky was the general inaccuracy of the ribs. A careful look at the photo of the ribs will tell you the story. The trailing edge lips of the ribs are very fragile and small. Some ribs didn't even have this lip. The second rib in from the tip had a very pronounced dip in the upper surface curve. The spar notches didn't line up very well either. *However*, the ribs are most definitely usable, and with a little sanding after the wing is all together, the humps disappear. On about three ribs, I had to add slivers of 1/16 balsa to build up the upper surface curve. This is easily done, and with Hot Stuff, very quickly done also. I would classify these ribs as "average" and grade them a C on the report card.

One final note on the wing: somehow, whether through carelessness on my part or a shortage on the part of the manufacturer, I found that I was missing one of the two 1/8 x 1/4-inch leading edge pieces. As I had a 3/16 square balsa stick left over from all the other construction, I used it instead. The finished wing (covered) is nearly identical to the wing

with the correct LE piece, so no big deal here. After all, we are taking about a very high camber, thin, highly turbulated airfoil . . . certainly non-critical to minor variations and/or flaws in contour.

COVERING

The manufacturer recommended Coverite's Micafilm for the electric *FM*, so that was the covering of choice. Micafilm is an unusual covering material. For anyone not familiar with it, it is a heat-shrink, iron-on skin that is two-ply. The colored (or glossy clear) surface is a thin plastic film. The layer that gives Micafilm its fabric-like appearance is a random weave fabric (I would guess polyester). The combination is very light and very strong. As Micafilm does not have its own built-in adhesive, the modeler must first paint on an adhesive to the framework being covered. This has its advantages and disadvantages. Because you are not applying a covering material with adhesive where it's not needed (such as the large spaces between ribs), the end result is lighter still. The disadvantage is that it doubles the amount of time needed to cover anything.

The wing panel was carefully weighed before each step in the covering process. The bare, sanded, ready-to-go wing panel of the *Feather Merchant* was only 5.2 ounces . . . truely featherweight! After "doping" the ribs, spars, leading and trailing edges, and center sheeting with Coverite's Balsarite (the adhesive), the wing panel gained 0.4 ounces for a total of 5.6. After covering the *FM's* wings, top and bottom, the total weight came to 6.2 ounces, a gain of 0.6 ounces . . . incredible! The last thing to be added to the wing was the painted-on trim, in the form of a feather motif. I used plain-old grocery store enamel (not fuel proof, but with electric power, who needs that?). The gold edge of the feathers was applied using MRC's Tamiya Paint Markers. These markers look and act like ink markers, but they apply paint instead; a paint that flows out of the marker's tip beautifully and dries within minutes. The "Feather Merchant" and AMA numbers were also done (free-hand) with the markers. I recommend you try them.

As far as the application of the Micafilm goes, I had very good luck with it . However, as with anything new, it takes a while to learn how to use it. Micafilm needs to be applied as tightly as possible prior to shrinking as its shrink rate is much less than other non-fabric plastic covering materials (Monokote, for example). What this means is that you must leave an inch or two of spare material around the edge of the surface being covered to grab onto and pull tight when sealing the edges. The sealing step must be done at a very specific temperature, 240 degrees Fahrenheit. I don't think this temperature is all that critical, but with the help of the Coverite thermometer, it is easy to obtain with your heat sealing tool, so use it. The 240° temperature is adequate for shrinking most surfaces tight, but if you run into some stubborn areas (open-structure, compound curves, etc.), I have found that a combination of heat gun at full-blast, one inch from the surface, and iron at full blast (390° F), will usually eliminate all wrinkles. Be very careful with the heat gun, however, as it is all too easy to melt through the plastic if you get too close. Also, when using the iron, don't stay too long in one place, especially near the sealed edges as this will melt the adhesive too much and will not really shrink out the wrinkles because the covering will "float" on molten Balsarite. It takes a little practice . . . but that one-ounce weight gain in the wing panels can't be beat!

When you are finished with the covering, you have a model that will draw the curious . . . they will ask you, "What is that, Silkspan?" or "Gee, that looks like tissue. What is it?" The model will be very puncture resistant, and it will have very good tortional strength. Try Micafilm, I think that once you learn how to use it, you will like it as much as I do. I most certainly will use it again . . . on my next *Feather Merchant*!

POWERING THE FEATHER MERCHANT

Old Timers have traditionally been powered by ignition engines. They have also been traditionally free flight (to the purists). This *Feather Merchant* O/T was intended to deviate from both traditions. With the advent of radio control and more recently, electric power, modeling in general, and the Old Timer movement in particular, has undergone some radical changes.

This *Feather Merchant* is a radical. No ignition engine, glow engine, or four-stroke engine will ever take up space in its nose! Instead, a Leisure Gear Motor . . . an *electric motor* . . . was chosen to power it. This decision was the manufacturer's, indeed, the same man who designed the *Feather Merchant* 45 years ago, Fred Lehmberg.

The Leisure LT-50 Gear Motor, for those who may be unfamiliar with it, is an "05 Class", ferrite magnet motor with a fiberglass reinforced, polycarbonate gear box containing brass and Delrin gears, and dual ball bearings. It is a very good, reliable motor that with a 2.5:1 gear ratio weighs only 6.38 ounces. Its part number is 6003A, and it retails for $59.95. The claimed power for the motor is "up to two pounds STATIC thrust when operated on an 8.4-volt battery."

The Leisure LT-50 Gear Motor will take the 53-ounce *FM* to 300 feet in two minutes in dead air. With a good six-cell battery pack, you should be able to get five to six minutes of motor run time, or two to three climbouts to 300 feet. This is all you need to have a ton of fun with the *Feather Merchant*.

When building your *Feather Merchant*

for Old Timer competition in electric meets, take extra care to "build in lightness". It is possible to make this *FM* as light as 39 ounces (total) by using 1/8-inch square sticks in the fuselage where the 3/16 sticks are presently called for, by using micro servos and the smallest receiver and battery pack combinations, and by eliminating the thick,heavy, 1/4-inch plywood firewall with a sandwich of 1/64 ply (or carbon fiber cloth) and lightweight, 3/16 sheet balsa, by using six or seven of the 800 mah cells instead of the 1200 mah cells (sub-Cs), and by using ultralight airwheels instead of the relatively light Williams Brothers "Vintage" wheels. These are by no means the only areas in which you can save weight, but they are a good place to start.

At 39 ounces, the *Feather Merchant* should climb very well, and should be competitive against other non-cobalt powered Old Timers in the 05 Class. This doesn't mean that a 53-ounce *Feather Merchant* can't be campaigned . . . mine will be . . . but it is really more of a sport or fun-fly model. (You can't imagine the fun that electric O/T models can be if you haven't tried them!)

One last note on the Leisure motor: if you are planning to build the *FM* as I have . . . stock . . . order the Pattern Wind motor with the gear box and 2.5:1 gearing. The Pattern Wind motor has smaller guage wire in the armature for increased torque through midrange rpm, something that overweight models can really use. If you order the Racing Wind motor, you may end up overloading the brushes and commutator . . . with resultant loss of power due to scoring of these two contact surfaces. A lightweight *FM* (under 40 ounces) can use the Racing Wind motor with ease, and probably climb better with this motor too.

While we are under the heading "Powering the Feather Merchant", it might be appropriate to discuss infernal combustion engines. As this is an Old Timer, we will concern ourselves only with powerplants for SAM competition. As many of you know, "Old Timer and Antique (*the FM does not qualify as an Antique-wrf*) models may be flown with either antique ignition, converted ignition, diesel, or glow engines." (SAM Rule Book, 1982 edition, page 8) "Classes for Old Timers are based on the following engine displacements (cubic inches):

CLASS	IGNITION	GLOW
Class A	.049 to .200	.021 to .200
Class B	.201 to .300	.201 to .300
Class C	.301 to 1.20	.301 to .610"

There is one other very important limitation to be aware of if you plan to fly the *FM* in R/C Assist competition, and that is that R/C Assist models are limited to 0.1 cubic inches of glow engine displacement for every 225 square inches of wing area. The *FM-72* (the version being reviewed here) has a wing area of 660 sq. in. which when divided by 225 equals 2.933. This number is multiplied by 0.1 to arrive at the maximum allowable displacement (glow motors) for the *FM-72* . . . .29 cu. in. If you refer back to the chart above, you will see that the max allowable engine size for R/C Assist competition prohibits the *FM-72* from being flown in Class C. It may, however, be flown in Class A or B.

For Class A competition using a glow motor, a .19 cu. in. engine is preferred. Here again you are faced with a decision, whether to use a cross-scavanged or a Schneurle glow engine. By the most recent rules, SAM allows cross-scavenged engines to have a 25-second run during climb-out. Schneurle engines are only allowed 20 seconds. The manufacturer of the *FM* believes that the additional power created by the Schneurle porting more than makes up for the shorter engine run time.

For Class B competition, either a .25 or a .29 glow engine is more than adequate. Again, it's your choice whether to go cross-scavenged or Schneurle. I have witnessed the *FM-72* powered by a Fox .25 (cross-scav.) as it climbed nearly vertically, so this should be a good indication about power to weight ratio. By the way, this *FM* weighed 49 ounces less fuel, with the Fox .25.

Ignition fliers may fly the *FM-72* in any class, technically. However, you are best off flying this *FM* with a Brown Jr. (.60 cu. in.) which was the original powerplant back in 1939. Other engines which work nicely are: (1) a Dennymite (.57 cu. in.); (2) OK .60; (3) Madewell .49; (4) Bunch Tiger .47; or any ignition engine of similar power output. Do not use any-

thing larger, however, as the *FM-72* will be overpowered.

When you order your *Feather Merchant*, ask the manufacturer about special package deals on glow motors, as I believe you will save some money this way.

CIRCUS HOBBIES CENTURY VII R/C SYSTEM

I believe that Eloy Marez has prepared an in-depth review on this R/C system, but I would like to add my own observations. For this particular application, electric powered flight, the Circus Hobbies Century VII radio system seems to be an excellent choice. The biggest test of an R/C system . . . you might say, "the acid test" . . . is interference from electric noise generated by the electric motor. In this respect, the Circus radio receiver (an FM unit, *no*, that's frequency modulation, not *Feather Merchant)* passes the test. Only slight "jittering" of the servos was encountered on the ground during preflight checks. These are not sufficient to cause concern about control safety or range limitation. However, it was discovered that the motor on/off switch (a micro switch available from Leisure) required a cam rather than a simple arm to actuate the lever. The servo jittered just enough to cause the actuation arm to bounce on the micro switch lever . . . which in turn caused very brief interruptions in the flow of current to the LT-50 Gear Motor. There are two ways of fixing this small problem. One way is to solder another capacitor to the motor, doubling the stock capacitance and lessening the noise created by arcing at the brushes, and the other is to make a cam for the servo arm so that small jitters can take place without opening the microswitch connection. I chose the latter. It might be added that this slight jittering is very common in R/C systems, and is no ill reflection on the Circus radio.

The many features of the Circus radio are very convenient for operating R/C models. I found the end throw adjustment on the aileron channel (used for the rudder on the *Feather Merchant)* and on the elevator channel to be EXTREMELY useful. As the *FM* that I built had the rudder situated such that it was possible to interfere with the elevator at maximum deflection, the end throw adjustment feature was used to limit the right and left throws so that interference was impossible. Likewise, when adjusting the amount of total throw desired in the elevator, ! was able to independently adjust up and down throws for perfect handling characteristics.

When you combine this feature with the three different types of stick-to-servo actuation relationships, this works out to be a perfect beginner's radio. The three "relationships" might be better termed throw rates. For the three basic control functions on the Circus radio (aileron, elevator, and rudder) there are three, three position toggle switches. The first position gives a linear relationship between stick throw and servo throw . . . for X amount of stick throw you get X amount of servo throw (with the end of each throw being adjustable, remember?) The second, or middle position of the toggle switch gives EXP (exponential) throw. This is sometimes referred to as "soft center" stick throw; with full stick deflection, you get full servo deflection (same end throws), but with partial deflection of the stick, you get less servo throw than in the linear position. This comes in handy for thermal flying where you are trying to be as smooth as possible in your turns, but where you want full servo deflection on command. The third position is LOW (or dual rate). This position yields a 40% to 100% adjustment of servo deflection for full stick deflection. If you want exactly half throw on your rudder control, for example, you adjust the "trimmer pot" located alongside the switch for 50% throw. Now, when you want less sensitivity on your rudder (at high speed, for example) you can get it by simply moving the toggle to the third position.

The other REALLY nice feature of the Circus radio is the servo reversing capability. No longer do you have to concern yourself with servo rotation direction when installing single-servo control functions. If, when it's all ready to fly, you discover the elevator is hooked up backwards (as I did . . . after the crash) all you have to do is open the panel on the backside of the transmitter and throw a switch, *voila*, you are all in order again. (But please, have someone else check out your airplane on its first flight, my ground check somehow failed to self-inform me that that derned elevator was working backwards!) All seven channels have this feature.

Oh, I almost forgot, the Circus Hobbies radio (also known as a JR radio) has what is called a "direct servo controller" which allows the user to work all control functions by the transmitter *without* actually transmitting any radio waves. This is accomplished via a patch chord from the backside of the TX to the receiver's battery input. This chord is a Y-shaped circuit with the TX and receiver battery pack being the two forks in the top of the Y, and the receiver itself being the bottom of the Y. Don't ask me how it works, but it does, and you won't ruin your wife's TV program while you work in the garage . . . OR shoot down your buddy at the field when you use this device to play around with your controls. Good idea!

FLYING CHARACTERISTICS OF THE ABOVE EQUIPPED FEATHER MERCHANT

The *FM-72E* (my designation for this version of the *Feather Merchant)* is a delight to fly. With the specified 1/2-inch of washout in the wing tips, and the generous, 20° total dihedral in the two wing panels, the *Feather Merchant* flies stably and gently. Stalls are so mild that they appear as "mushing" in the flight path. Tips stalls are impossible.

The *FM-72* can be thermalled "hands-off" simply by using the trim tab controls on the transmitter. To initiate smooth, open turns, you need not be light on the controls . . . this one won't

turn around and bite you as some R/C models will. In fact, most of the time you don't need to use the elevator in wide open turns, just about 1/4-inch of deflection on the rudder stick brings her around. These types of things are what makes the *FM-72* an ideal trainer.

With the LT-50 Gear Motor, climb-outs are perfect opportunities to search the sky for lift. The angle of climb is about five degrees. Any lift that you pass through shows up as a dramatic increase in the climb rate . . . thermals are almost impossible to ignore.

Dead-stick landings are a snap with this bird. Just fly around until you are at minimum sink, keep the trims set up this way, bring the *FM* around to the end of the runway between 20 and 40 feet high, and keep the fuselage lined up with the pavement or grass. The *FM* will take care of the rest. Perhaps a little flare-out would be nice,but it's not required, the landing gear will absorb a great deal of shock. Roll-outs are very short. Remember, this was originally a free flight model!

THE WRAP-UP

Well, if you managed to get through this four-part review on the Lehmberg Enterprises *Feather Merchant*, Leisure Electronics LT-50 Gear Motor, Coverite Micafilm, and Circus Hobbies Century VII R/C system . . . without getting up to eat a meal or go to the bathroom, congratulations! If you didn't, well, maybe you started it too close to mealtime or bedtime. Anyway, I hope you learned something from it . . . and I hope you enjoyed it. It was a real pleasure for me, as I now am a confirmed Old Timer lover and electric flier.

Would I do it all again . . . YOU BET!

Do I recommend the products reviewed in this report? I sure do! There isn't anything I would do differently for a fun-fly, electric powered, *Feather Merchant*. I've had a blast, and that's the bottom line! •

Plug Sparks . . . *Continued from page 34*

west of Ickta Lake, is up for sale according to Jim. Most everyone pooh-poohs this as the photo shows him with a two-ounce sample of gold bearing ore. He has shaken up the natives before with a major gold find.

How about it, fellows? Wanna gold mine? You can write James Bohash, 20721 Millard St., Taylor, Michigan 48180 for details. Just think of it like you are hunting that lost free flight!

GORDON CODDING REPORT

We could run a section of this column every month devoted to just what Gordon is doing these days, but we simply can't stand the luxury. However, Photo No. 11 gives the reader a good idea of the experimenting going on all the time.

As Gordon says, "Being on a pension severely limits the amount of cash outlay for models, hence, all my electric motors are the old models, castoffs and reworks of old electric motors." Right now he is using the Estes Skymax 10 and some other similar motors to power his Hep cat designs.

As can be seen, the models have different nose outlines to accommodate the particular electric motor being used. The rear model by the way is a rework of Clyde Austin's old model. Codding reports that although the models are no world beaters for climbing, these are truly sport models in that they fly and climb without flying away. Certainly reminiscent of the old days of the precision flight contests held in the Los Angeles area during 1936 to 1939.

PACIFIC COASTER REVISITED (AGAIN!)

The latest letter from Dave Benepe, 5901 Wedgmont Circle N., Ft. Worth, Texas 76133, who wrote to Joe Weathers, 2326 Miller Ave., Escondido, CA 92025, inquiring about the *Pacificoaster* and the possibility of preparing a construction article for a midsize version of the *"Coaster"* for use as an R/C Trainer includes a reply which was received from Joe (edited of course for space requirements).

I am glad the Pacificoaster *has added to your pleasure (Benepe has built three versions) over the last few years. The original is now in the AMA museum. As to the article you propose to write (for lesser sizes), I find this most interesting and say this will be perfectly OK with me. I have never tried to control in any way my designs for royalties (plans, kits, etc.), but rather feel more comfortable to see them in 'public domain.'*

If you don't subscribe to **Model Builder** *magazine, you should, as several articles have been written about Harry Fosbury of Portland who designed and produced a beautiful kit of the original five-foot* Pacificoaster *following only the basic mold lines of the side, top, and front views.*

The fuselage was supplied in steam formed balsa quarters of sheet. I built a flying prototype in 1948-49, and it performed much like the original model. When Tip Smiley built this kit and sent in a description of this kit to **Model Builder**, *this prompted a reply by myself and Harry Fosbury to explain the kit situation.*

The kit I built was to have been R/C and went so far as to have a one-to-one bevel gear box within the fuselage mold lines above the tail skid area. This linked the enlarged rudder to a shaft extending into the cabin area for connection to a bellcrank. This aspect never came about.

As a matter of fact, the last plane I built was a towline sailplane called 'Tomorrow' in 1952 (not published). Somehow or another in the last three years, I have been unable to get the ambition to continue designing and building even though the San Diego Aeroneers (SAM 41) has been in close touch. I know they are hoping for an emergence from modeling retirement.

Dave goes on to say that out of a clear blue sky, Harry Fosbury sent a set of blueprints for the Weathers *Mystery Man* (another project that Dave is interested in). Dave is hopeful the Nostalgia event as proposed and devel-

oped by Ralph Prey will continue to grow. The *Pacificoaster* is such a natural for this event.

(Note: In that same line, SAM 21 is working in close connection with Ralph Prey and Harry Murphy, Central Indiana Aeromodellers, to come up with a set of *good* Nostalgia rules for free flight. The pertinent portions will be incorporated into an R/C event to be staged by SAM 21 sometime in 1984.)

Benepe concludes by saying that although he has been bothered by heart spasms, he has still found time to build a *Pacificoaster* free flight and then use it as an R/C trainer, for Class A and 1/2A Texaco. Here's hoping Dave is able to get out these articles for publication. They should be great!

SAM ABROAD . . . AUSTRALIA

This columnist has been in close touch with Monty Tyrrell of Victoria who is responsible for sending in Photo No. 12 with the comment, "Famous Last Words":

I used pine spars, webbed, instead of balsa. These wings won't break, especially at turns at only 200 feet altitude.

Comments Tyrrell, "It's not bloody good if you don't use stouter and longer dihedral doublers. It broke just outside of the braces, clean as a whistle!"

Seen with the ill-fated Anderson Spitfire powered *Powerhouse* (Futaba R/C) are Dave Reynolds (aghast owner), Monty Tyrrell, ready for surfing, Norman Garrett, the original clap-wings expert, and young Warwick Bates, convinced up to a few minutes ago that Old Timers was *the* thing. Nevertheless, he is still working on his *Red Zephyr*. Dave Reynolds is now constructing a *New Ruler* for a Saito .45 four-cycle engine. That should be a nice combo!

SWEDEN

Just received the latest newsletter (magazine type) from Sven-Olov Linden (hope we got that right) wherein are featured photos and results of the big Old Timer meet held on the 4th and 5th of June. (I know, slow boat from Sweden!)

Most American modelers don't know how lucky they are to have such a plethora of engines as compared to other countries. The Swedish O/T meets specialize in rubber and glider events as there is a real dearth of gas engines.

Noted in the results were four different rubber classes with the largest being the Wakefield size, Kordas, New Yorker, etc. Not so surprising was the win by the *"G-B 3"*, a real fine English design by Rushmore.

Two sailplane events on the order of A1 and A2 were staged with a heavy turnout in the larger class. Lars Larsson was the big winner here, taking first in each event. Tough man to beat.

The gas event suffered from lack of official entries as only four were able to register official flights. C.J. Eiroff of Halmstad, using a model called the *"Hail Shot"* won with three perfect flights.

All in all, the meet enjoyed a tremendous amount of interest and entries when you consider the total number of modelers in Sweden. If we can prevail on Sten Persson, newsletter editor, we will feature some photos of this interesting meet.

GLOW ENGINES AGAIN?

After the last unsuccessful attempt to again restore glow powered flying to Old Timer activities, this columnist has kept a strict silence, convinced that those who wanted this form of power failed to act and vote. In the last analysis, it appears that a small core of old timers runs SAM activities, as witnessed by an annual SAM meeting where only 60 members voted to freeze the rules for three years. In short, 4% of the membership is promulgating the rules!!

John Sattler of San Diego writes to say the issue has been brushed aside too long. (Note: The following arguments have been used to no avail.) Sattler says the "purists" possess most of the *good* ignition engines and shudder at the thought of the term glow engines. His claim is that there are only so many ignition engines left, and they would require a second mortgage on the old homestead to purchase them. (This is true. New replica engines are coming out, but unfortunately, production costs have placed all engines in the $150 to $250 bracket.)

To this, John says that the "cottage industries" can only turn out limited numbers of ignition and ignition conversion engines during the year. Sattler feels that the cost of these engines is prohibitively high when compared to (for example) the over the counter cost of OS .25 to .30 glow engines.

One point the columnist is glad to see is the comment by Sattler that the "old guard" is gradually dissipating through deaths, inactivity, and physical disabilities. (No question about it, as it stands now, the rules are extremely restrictive.) John says we will eventually have to "bite the bullet" and start having events for glow powered models in at least two basic events.

In time, John feels the demand would eventually branch out into other classes for added participation from modelers who would otherwise be barred. John says there is no question that this would result in added work for the contest officials, but he feels if we don't do something pretty fast, there won't be enough Old Timer modelers around to have a contest!

Sattler goes on to say, engine classes could be the same as the basic engine classifications, or for that matter, the current AMA gas events with the stipulation that no Schneurles be allowed. (Here we go again! About the only thing being manufactured today is the more powerful Schneurle type engine. Still no solution!)

John concludes by saying the SAM rules are fine just as they are for motor runs, flight times, etc., but he earnestly believes that glow engine restrictions similar to that being developed for the Nostalgia event would work out. As he says, "Why don't you throw this subject out for discussion again?"

This columnist only wishes to report the feelings of the readers and will make no further stands one way or another. Some of the bitterness developed over this controversy has cost him a considerable amount of friends due to statements made by him.

In short, fellows, if you want something bad enough in SAM, you will have to organize it yourself. This "leader" has been burnt enough. This is not meant to discourage discussion; pros and cons will be published as received. Perhaps one of these days someone, somewhere, may come up with something that will appeal to the majority.

READERS WRITE

One way of getting a photo of yourself in this column is to simply send in a good, sharp picture of you and/or your model. Color pictures we can use, but for crying out loud, don't take a photo of a red model against a pink or red background of flowers, etc. You can't distinguish the model when converting to black and white! *(Be aware that anything red will reproduce nearly black, and anything blue becomes noticeably lighter when converted to B&W halftone. wrf)*

Photo No. 13 is a shot of our "Unofficial" SAM Photographter Harold Johnson, of Minneapolis, Minnesota, about to launch his Ohlsson 60 powered *Buzzard Bombshell*. Harold says it flies as neat as it looks . . . great!

This columnist can't say enough on behalf of Harold Johnson as he very faithfully attends all SAM Championships and devotes himself strictly to taking pictures. It is dedication like that which allows the other fellows (like this columnist) to have time to fly and enjoy the meet without worrying if he has enough good shots of the meet. We love ya, Harold!

Photo No. 14, from Joseph M. Prus, Box 55, Williamstown, NJ 08094, is a lovely shot of his *M-G* powered by an old K&B .40. Flies like a dream, he says. For those modelers wondering where to get the plans, you have to write to Mike Granieri, Dryden Road, Box 78, Pottersville, NJ 07979. Mike produces the M-G in four sizes, all the way from the original nine-foot-six wingspan model, down to the 1/2A Texaco size. This is not a beginner's model so make sure you are competent enough to construct this good performing model.

MORE WRITING (FROM READERS)

One of our faithful contributors, Terry Rimert, 367 Orange Ave., Baldwin, FL 32234, writes to complain that this columnist has not been using his stuff, so he has given up as it seems that all this column features is California activity.

That's not fair fellows! First off, you must remember, to make any writeup palatable, you must have a few photos with it. Just like the Chinese philosopher, Confucius, said, "A picture is worth a thousand words" . . . never truer! Then, too, a write-up on the happenings at the meet are a great help. Everyone wants to see his name in print, but what good is it if the reader doesn't know what you are doing?

We are real tickled to get a report on the Jim Kloth Memorial Old Timer meet from Terry (Jim Kloth was a great supporter of the O/T movement), wherein he reports that it was held in conjunction with the regular F/F meet, "The Gathering of Turkeys". He further states that the weather was so good that if you only did fair in the flyoffs, this wasn't good enough.

Terry goes on to say he has been at a lot of O/T contests, but he has never seen such a collection of good flying models as those which turned out for

this meet. Typical of the remarks made was one by Ralph Joubert saying his *Kerswap* didn't glide so good. Rimert asked him how could he tell as the model was just a speck in the sky!

There were the usual good flying *Zipper, Aerbo, Alert* models which made the winner feel like he had beaten someone. In the fun and games, the group is trying out the O/T Towline event. Looks very good, but as Terry sez, we need more people in this event.

Some fun arose at award time when Ron Sharpton's O/T Rubber Scale flew off the field, and he didn't bother to retrieve it at the time. The judges said, "Show us the model or no prize." As Terry says, it makes sense in a way when the flights are unlimited and the longest counts.

All in all, this was a great meet with all having a good time. A great reminder of the man who pushed O/T activity and modeling in Florida for the benefit of us all. Results looked like this:

Class A-B Pylon
1. Mickey Walker 702
2. Tom McLaughlin 682
3. Cliff Betz 664

Class C Pylon
1. Mickey Walker 534
2. Dan Dougherty, Sr. 438
3. Ralph Joubert 328

Class AB Cabin
1. Cliff Betz 480
2. Jim Walston 349
3. Gabriel Martinez 305

Class C Cabin
1. Dan Dougherty 327
2. Mickey Walker 312

Rubber
1. George Batiuk 520
2. Blake Oliver 292
3. Ron Sharpton 279

O/T Rubber Scale
1. George Batiuk 58

.020 Replica
1. George Batiuk 428
2. Clif Betz 336
3. Norm Swan 319

Towline Glider
1. Van Thaxton 319
2. Ron Sharpton 282
3. Lee Campbell 153

O/T H.L. Glider
1. Ron Sharpton
2. Lee Campbell
3. Blake Oliver

1/2A Nostalgia
1. Lee Campbell 520
2. Clif Betz 388
3. Blake Oliver 303

Class ABC Nostalgia
1. Blake Oliver 327
2. Lee Campbell 320
3. Mickey Walker 316

A special event, .020 Replica Sailplane was won by the only contestant, Merle Shammo.

READERS WRITE (O.M.T.)

We have been holding Photo No. 15 for the longest time as we have been looking for a slot for it to fit in. Maurey Fein, 5525 W. 122nd St., Hawthorne, CA 90250, sent in this very colorful model (all orange Silkspan with white striping) of a Roeser *"Swoose"*.

This original Chicago design is an excellent flyer, and with that O&R .29 front rotor in the nose, this model should really perform at a total weight of 23 ounces.

Angus Crosbie has been out of circulation for awhile, but is making up for it with a vengeance. Believe it or not, Photo No. 16 of a pink and white *Playboy Sr.* is quite attractive, despite what anyone thinks of the color scheme. This shot was taken at Sepulveda Basin where only R/C and C/L flying is allowed. The glory days of free flight are gone forever! Blame it on urban encroachment!

THE WRAP-UP

Trust those Australians to have a good story; this one appearing in the fourth issue of the Australian SAM newsletter No. 4. Dennis Parker, editor, after describing the very successful first SAM Champs, relates a most "unbelievable" story that seems to be a fit closing for this column.

Dennis says there is a certain flyer (who shall remain nameless) who answers to the sound of Geoff. To pin this person down a little closer, his wife's surname is Brown. Anyway, he had the audacity to state the following was strictly unintentional:

This nameless one flew his model into a large tree in the back of a property purported to be a doctor's residence as there was a red light in evidence. However, when knocking on the door to inquire if he could go in the back to recover his model, he was greeted by the sight of a young lady in pants only!

Seems like he had stumbled into one of those parlours! Regardless, he was taken through the house to the back to recover the model, aided and abetted by the scantily clad demoiselle.

Now comes the unbelievable part: the model could not be recovered as it was too difficult to retrieve. This has resulted in numerous visits to the parlour to see if there has been any movement of the model in the tree. This is what I (Dennis) have been told.

I don't know about this character, but my mother would never let me out at night to play with girls like that, or to even climb trees with them. Maybe that's what is wrong with me; I am just in a rut . . . model airplane addict? •

P&F&CT . . . . *Continued from page 39*

. . . but let's round off the 2.7 to a nice odd 3."

Chickums went over to Sylvestor's area and rummaged through his notebooks, finally selecting a sheet. Handing it to me he said, "This is a plot of airfoil characteristics, which represent lift and drag on a particular airfoil, in this case the Gottengen 285. It is not a particularly good airfoil, but one where the data was taken reasonably close to a scale factor (Reynold's number) corresponding to that of our prop. Let's concern ourselves only with the drag coefficient. We have calculated the angle of attack to be +3 degrees. At an angle of attack of +3, going straight up to the intersection with the C_D curve and moving to the right to the Drag Coefficient scale we find it to be about .036. Returning to Equalion1, we find the drag of the freely turning propeller to be equal to .00119 x .0625 x 33^2 x .036, or .0029 pounds. This is, for the case we have selected, about 42% of the drag of the propeller when stopped."

Chickums looked at me over the top of his glasses (he doesn't actually wear glasses, but he has a look that makes one feel he has a pair on) and gave one of his famous hedging statements, "Of course, you understand we have treated in a cavalier fashion a very complicated subject, and we have glossed over several things that would require a number of articles to properly describe. However, I believe this exercise does show that *under a given set of conditions*, a freewheeling prop will have **less** drag than one stopped!"

"Oh, I do, I do!" I happily replied. "Now I know why with an electric motor we get the advantage of a low-drag,freewheeling prop without having to build a

freewheeler!"

I got another *Chickums look*, this time, his "Dolt!" look. Shaking his head sadly, he replied, "You are are jumping to conclusions, again! Our example propeller is actually producing a little *thrust*, due to its rotation. But, the bottom line says that whatever rotation is produced must be at the cost of slowing down the slipstream, which is drag. You mentioned your rubber models without freewheeling. Remember the way the glide was *very poor* when the rubber was being wound backwards, and how it was *just poor* when the rubber was wound up enough to stop the prop? The propeller is slowing down as the resisting torque increases, thus slowing the rotational velocity, which increases angle B. As angle A minus B becomes negative, the lift (look at the C_L curve for the Gottengen 285) goes through zero and becomes negative. At the time that the lift is zero, the small amount of thrust that it *was* producing is now zero (remember, the prop's lift is the aircraft's thrust) because the product of rotational velocity squared and zero (C_L) equals zero. The energy extracted from the slipstream is only that required to overcome the rotational drag. As the propeller continues to slow, and the lift coefficient becomes negative, the energy extracted is *added* to that energy extracted to overcome the drag. As the propeller revolutions continue to decrease, the C_L becomes *more* negative, the C_D is still positive (and increasing), but the rotational velocity squared is getting smaller! The total drag is now approaching the stopped prop drag. To sum up the situation, the prop turning freely has minimum drag, for there is some thrust developed, and the drag coefficient is small. As resistance to turning increases . . . for any reason . . . the propeller rpm drops, nad the drag becomes equal to the stopped prop drag. This effect can also happen with a very low pitch propeller.

"The big villian here is resistance to turning freely. With an electric motor in open circuit, the armature passing the poles of the very powerful magnets creates a considerable resistance to turning, but not enough to 'freeze' the prop. Speaking gernerally, the electric motor should have some means to stop the prop. Perhaps a small voltage applied of opposite polarity?"

With that, Chickums signified his dismissal of the problem (and me as well!) by returning to his contemplation of Miss Costa Mesa. Gathering what dignity I could, I returned to the inner sanctum to look over the mail. . . .

To my great pleasure I got a very nice letter from Bob Todd, of San Diego, formerly 2nd Lt. Robert M. Todd, of the 17th Pursuit Squardron, American Expeditionary Force in France, 1918. I had read his 1978 book, *Sopwith Camel Fighting Ace* (Ajay Enterprises, Mosby Branch, Falls Church, VA 22042), and, when finding that this Camel driver was alive and well, sent him a copy of the "Sopwith Camel Effect," **Model Builder** magazine, August 1983, with the request that he comment on it. I quote as follows:

The Camel turned easily to the left, but to the right it had to be held up with full left rudder. When you were in a 'split-arse' turn (an RAF expression), the rudder and elevator changed places.

This supports the article's statements. The strange "side-step" to place the guy on your tail under *your* guns mentioned in the article was the above "RAF expression." This book was one of the best I have read on the subject of WW-I combat. It is loaded with pictures and detail. I recommend reading this very interesting book. Note the cover in the illustration!

Considerable interest was generated by the "Bird in the Cage Problem" included in the January 1984 issue of **Model Builder**. I do wish readers would include some postage for an answer, however, for I always answer.

The problem of the bird in the cage is one of interest that is often presented by college instructors of fluid mechanics. Although apparently very elementary, the discussion invariably becomes quite lively with often conflicting and/or contradictory theories presented. This is the essence of the problem's appeal as a classroom "gimmick" . . . it stirs up the class and makes them think. The following note, in accordance with the **MB** ground rule to write for the average model builder, not the scientist, presents variations fo the "P&F&CT" solution where the total weight of the cage with the bird in flight is only the cage, 10 pounds, not 10.1 pounds, which includes the bird's weight of .1 pound.

I think everyone will agree that the bird's wing in level flight has a lift equal to its weight, and that this lift is due to a pressure difference between the upper surface and lower surface, the pressure on the lower surface being the greater. The most popular argument offered to support the 10.1 total weight when the bird is in flight is that the higher of the two pressures is transmitted to the bottom of the cage and the low pressure to the top, thus producing a net force of .1 pound to the cage bottom and an unchanged weight of 10.1 pounds.

This reasoning violates Pascal's Principle, which states that pressure on a fluid at rest is transmitted throughout the fluid to *all* walls of the vessel. Let the pressure within the cage be one atmosphere with the bird on the swing. When the bird is on the wing, the majority of the air within the cage is still at a pressure of one atmosphere and is exerting this pressure on all cage boundaries. A small volume of air immediately above the wing exerts its pressure of less than one atmosphere throughout the cage as another volume directly below the wing (slightly more than one atmosphere, and greater than the pressure on the upper surface) does the same. Bernoulli and Kutta/Joukowski have well defined this condition. This produces a net pressure,

by Pascal, of one atmosphere on all boundaries of the cage and *no change* in weight measured by the balance due to the *local* pressure changes in the wing's vicinity.

As we have admitted the bird is supported by the wing's lift, the net weight on the balance is 10 plus 0, or 10 pounds. Someone is bound to note that the bird has done work on the air during this performance and increased its temperature and pressure. Because the glass cage is a constant volume system, there is no density change. Someone else will mention the Jacob recovery factor . . . the same answer applies.

The cage was sealed to obscure the solution (a red herrring) and make the problem more interesting. As the pressure within and without the cage is one atmosphere, whether there is a cage top or not is of no significance. Let it be removed, making the cage a barrel. Is there any difference in the weight of the barrel with the bird on the swing and the weight with the bird in flight within the barrel? What is the weight when it flys out of the barrel?

The bird can be replaced in the cage by a very thin walled balloon weighing .1 pound when collapsed. Fill it with air and balance it on the swing. The balloon will displace air equal to its volume, and because it displaces an equal amount of air, Archimedes says the balance will read 10.1 pounds. Replace the air within the balloon with a gas lighter than air having a density such that the difference in weight of the gas and the displaced air is .1 pound. The scale reading will, of course, be 10.0 pounds.

This is truly an interesting problem, though extremely simple nad elementary. This problem may be phrased in ways most fascinating and wonderful but it always boils down to the old bird on the swing routine!

So, this is another "Planes an' Facts an' Chickum Tracks" under the belt! Please write either the magazine, **Model Builder**, or directly to me with suggestions of subjects you would like to see treated. With a title like "P&F&CT", we can talk about the history of aviation, aerodynamics, (Chickums, *DOWN*! We will *not* talk about that! Have you been writing Merv?) and how far would you like to see us go on technical subjects. The Aussies get pretty technical, which may explain certain aspects of yacht racing. Hope it doesn't carry over to our hobby!

See you in the chicken house, y'hear? Alfred Lehmberg, 2646 Bolker Drive, Port Hueneme, CA 93041. •

Electronics . . . *Continued from page 9*

quency is only "your spot on the dial", while modulation is a way of modifying, of imposing intelligence on the radio wave.

In an AM system, the modulation causes an increase in the amplitude, or strength of the carrier. In FM, it causes a deviation of the frequency, with the amplitude remaining constant. It is as simple as that! However, for R/C, the discussion would not be complete without a mention of the **encoder**, which generates a series of pulses of varying length which you adjust when you move the controls. This encoder, which ultimately sets the position of the servos, can be the same in either system, its output to the modulator in an AM system produces a change in amplitude, in an FM system it varies the frequency.

There is more to it than that, but we are keeping it simple . . . remember? Probably more important is what does it mean to you, the R/C flyer. Looking at the FM systems available at the beginning of 1984, the answer in most cases, is *darned little*! For most uses, AM will work as well as FM. Ultimately, with the availablility of more narrow band FM receivers, built to comply with the new FCC regulations, and which by necessity will incorporate other design improvements, there will be more advantages in an FM system, in terms of interference rejection. But at present, the only advantage to FM is that it is generally less sensitive to inteference by radio noise such as is caused by metal-to-metal contacts, ignition systems or even sources outside the model. FM will not give you more range, a tighter stick-to-servo loop, or any of the other features which are important in an R/C system. Many things that will glitch an AM radio will also glitch one on FM.

One of the standards by which the quality of an R/C FM system can be judged is the bandwidth, i.e., frequency deviation being used. With the exception of the Kraft Systems KPR8FD receiver and associated transmitter modules, all of the other manufacturers are being conveniently silent about this point. The bottom line is that, at this point in time, there are FM systems on the US market which are not as good as AM systems, in the matter of adjacent channel and intermodulation interference rejection. It's old, but it's still good advise, applicable to just about anything you may be thinking of buying, that "you gets what you pays for." The better radios are still the most expensive ones, regardless of modulation system, and the *better* "better ones" are the basic expensive systems with good gimbals, good servo resolution, good batteries, but without chrome trim and white sidewalls!

12-VOLT CHARGERS

A letter arrived from Roger F George, Altamonte Springs, Florida, who describes himself as new oldcomer to R/C, having come up the control line route in the '40s, to home brew R/C in the '50s, dropping out sometime in the '60s until just recently, Roger asked for some of the charger schematics and information I have offered in recent columns, and for suggestions about "some sort of charger that will hook to a 12-volt auto battery, perhaps through a lighter plug, and charge my transmitter and receiver battery packs".

Roger, first of all, I am going to recommend two publications to you, both available from Ace R/C. The first one is Fred Marks' book, *Getting the Most From Radio Control Systems*, which includes a wealth of information, being the most current publication now available dealing with present day R/C systems and techniques. I really believe you would find it interesting and worthwhile; it is Ace No. 108K12, $8.95.

The other publication is Ace's catalog, another must for home brewers such as you. In it you'll find listed everthing from complete R/C system kits, down to coils and resistors. In it, you will also find two chargers, one of which should serve your needs perfectly.

You did not mention rates, though if you are in a hurry, you will probably pick the FFC Charge System, No. 34K40, at $29.95 for the kit. It is a fast/slow charger, works from 12 volts, and will charge both packs to 85% in one hour, at a 500 milliamp rate, after which it will drop to a 35 mil rate. The other charger you should consider, especially of you are interested only in the lower charge rates, is a new addition to the Ace line, the Overnighter, No. 34K50, at $22.95 for the

kit. This one is a bit more versatile, in that it will charge one or two transmitters,and one or two receiver batteries simutaneously. In addition, you can program the receiver output for 250 to 1200 mah capacity cells, at either 50 or 90 mil rates, the latter being for those excellent high capacity SR batteries. Of course, I am assuming that the midwest is soon going to thaw out, it is right in the middle of the end of '83 cold spell as I write this, and maybe mail isn't even getting out of Higginsville, Missouri. Oh well, we all have our problems, mine is not to forget my sunglasses and sunscreen for my trip to the flying field in the morning . . . .

CARTER ELECTRIC MOTOR CONTROL CIRCUIT UPDATE

Electric motor control circuits are *in* . . . both Fritz Mueller's (January '83) and Floyd Carter's (April '83) circuits generated quite a bit of interest and mail. The relay in Floyd's design has been a little difficult for a number of reader's to locate, Floyd has come up with some additional information on it. As stated, it is a Bosch relay, No. 0 332 206 106, the Robert Bosch Corp., is located at 2800 S. 25th Ave., Broadview, IL, (312) 865-5459. They have distributors all around the country and can probably put you in touch with someone nearby.

The relay is also used in the 1978 VW Scirocco, as P/N 321 955 531; Floyd recommends that you try a junkyard first, for a better price. It is a windshield wiper relay, and may be used in other models of the VW.

Mr. Carter (no, not THAT one, I mean Floyd!) recommends the following changes to the original schematic to take care of any noise generated by a bad servo, which might confuse the switch circuitry. (1) Add 47uf from Q1 base to ground. (2) Change R4 to 10K. (3) Change Q1 to Radio Shack TIP-120 276-2068. And (4), add 2.2uf across the batter input.

ICM7201 LOW BATTERY VOLTAGE INDICATOR

Joe Tellez, who was with us in the February column, has written in again, as follows:

You recently sent me a copy of the 3909 IC Specification Sheet which I really appreciate. I have now obtained a few of the chips and am about to start playing with them. In the process, I came across another chip which should be of interest to the model community, the ICM 7201. I am enclosing a spec sheet in case you have not run across it yourself. As you can see, the 7201 is a Low Battery Voltage indicator for application to NiCd batteries. When connected to a NiCd, it will light an LED if the voltage drops below a stated threshold.

As I am a gadgeteer at heart, I can visualize of a number of keen little gadgets applicable to RC coming from this IC. Even though the spec relates the 7201 to a three-cell NiCd stack, I see no problem in applying it to four or eight-cell stacks with a minimum of external components. I can conceive of using it as a "go, no-go" cheap and rugged ESV; it may be built into a small can (an old 35 mm film can) which you plug into the aircraft charge plug just before turning on. If it glows red you are no go. You could also cook up something that is normally left plugged into the charge plug while on the ground, as we do with pitot covers on full-size aircraft. It may have a big frequency flag on it which you can't miss and should remove just prior to flight. Before removing you "push to test"; if it glows red, it is NO. If you forget to unplug, no harm anyway as the on-off switch in the harness will disconnect the gadget. (You may be embarrassed flying around with a big streamer.)

The IC Joe is talking about is made by Intersil, and is described on the spec sheet as follows: "The ICM7201 is designed for use in battery operated systems which require an indication when the battery stack has depleted to a fixed voltage. The LED will light at voltages below 2.9 volts; at voltages above 2.9 volts the LED may be lit by connecting the TEST terminal to GROUND.

"The ICM7201 has hysteresis designed into its threshold voltage trigger points so that the LED will not flicker with supply voltage noise and will not be turned on gradually at the trigger voltage. Under all normal circumstances the LED will either be fully on or fully off."

The ICM7201 comes in a four-pin TO-72 transistor package less than 1/4-inch in diameter, draws less than two milliamps of current, making it ideal for R/C applications. The problem, of course, is that of making the circuit trigger at the voltages that we are working with, and still keep things simple and not using an unacceptable amount of current. Anyway, the idea is passed along to you other "gadgeteers" out there, and we ask that you let us all know the results of your experimentation. As a bonus, this is not one of those really interesting-but-impossible-to-obtain IC's, Radio Shack has it, No. 276-2333.

THE BLACK DEATH, ALIAS BLACK WIRE BLUES

A recent letter from Capt. F. R. Grafton took me back to the days when I was C-124'ing around the world . . . I'm one of those with the leftover stuff! Capt. Grafton (why do the British use only their initials?) wrote from Dhahran, a place to which we used to schedule our arrivals and departures only at night, the later the better. The big bird just did not like those 130-degree runway temperatures during the day . . . wonder what R/C flying is like there? At the other extreme, a 200,000 pound C-124 down in the Antarctic would leave the ground like an empty cropduster . . . wonder if that is the place for some sort of R/C record attempt?

Those were the days, and I miss it, but enough reminiscing! F.R. writes:

Your column in the November (1983) issue contains mention of negative wire corrosion, which reminded me of the writings on the same subject by one of

your counterparts in England. I think the caption was, "Black Wire Blues." He had written about this in an earlier issue in much the same way that you have done, certain that it exists and is potentially dangerous (even ruinous), but puzzled about the cause.

Being away from my Jeddah base for a few days, I don't have his most recent article with me, but feel it is among my things back there. He has consulted with an Eveready engineer on the matter and published some scholarly data which should be of interest to you. I will cut it out and enclose the article when I get back there, and send this on to you. Incidentally, I've never had any evidence of black wire corrosion in my equipment, but have never charged at anything more rapid than the overnight rate. Also, I noted with interest that it's useless to try corrosion-proofing, as the corrosive material will creep under any protective coating.

The article, which Capt. Grafton enclosed with his letter, came from the pages of the British *Radio Modeller*, and it does bear the catchy name of "Black Wire Blues." The article contains information received from one Dave Gilham of Ever Ready (their spelling) in answer to queries from Pete Smoothy. Initially, there is some disagreement between the two gentlemen mentioned, as Mr. Gilham first answers Mr. Smoothy's queries by saying that "Negative lead corrosion on nickel-cadmium batteries is not known to be a problem." However, upon being furnished with some physical evidence of the phenomena, the Ever Ready crew apparently took another look under the insulation, and came up with some interesting and very positive conclusions. They agree . . . by whatever name, that negative wire corrosion does occur. The whole report is rather lengthy and I won't take the space here. As I stated in my initial mention of the problem, for us it is enough to know that the problem exists, and to check for it now and then.

However, I will offer copies to manufacturers and other technical individuals who might be interested. It is full of impressive sounding phrases such as "equilibrium electrocapillary", "Marangoni effect", and "creepage film", though I thought the latter was something I see a lot of advertisements for in the local newspaper. The bottom line, in actuality the last line of the article, states, "I do think that the basic problem has been initial cell leakage due to overcharging. . ." A word to the wise, huh?

HUNTER TOOLS
SOLVENT DISPENSER

There are a couple of interesting electric items that I want to introduce you to this month. The first one, from Hunter Tools, a Solvent Dispenser, is not strictly electronic itself, but is made for the electronic manufacturing industry. What looks like a simple plastic bottle with a metal top is in actuality a clever pump equipped dispenser which keeps the cleaning fluid of your choice ready for use, in addition to keeping it clean, uncontaminated, and tightly contained.

The dispenser cap incorporates a stainless steel pump unit. When you press on the top, fluid is forced up and into a concave dish or onto a sponge, brush, or cleaning rag you may be using. An air-tight, one-way valve prevents evaporation of the material, and also keeps dirty solvent from the external collecting dish from dripping back into the bottle. The amount of solvent released is controlled by the number of pumping motions you make with the cap.

I use two, dispensers one on my electronics bench, filled with trichlorethylene (use with good ventilation only), and one on my modeling bench, a bigger one, which I keep filled with alcohol. It's purpose is a ready source of solvent to use to wipe off epoxy, resin, paint, oil, etc., off of my hands and tools as I work. Even if you don't do electronic work, I strongly recommend one of these containers for that purpose.

They are available in four, six and eight-ounce sizes, and they are generally in the tool section of electronic supply houses. For those of you who have to depend on mail orders for this sort of thing, I recommend Wesco Electronic Supply, 845 W. Baker St., Costa Mesa, CA 92626, (714) 556-8788. The price postpaid, for either size, is $10.83; the rather odd figure came about due to my asking for the best possible discount!

The second interesting electronic item that I wanted to tell you about is the . . .

. . . BECKMAN "CIRCUITMATE" DM-73 DIGITAL MULTIMETER

Billed as "the smallest digital multimeter on the market", this one-of-a-kind instrument from the well-known Beckman company is loaded with features of interest to the R/C technician and experimenter. It is small enough to fit in even the most crowded field box, yet versatile enough for all workbench repair work. The DM-73 tells it all on a .20-inch, 3-1/2-digit LCD display, visible even in sunlight.

Its small, probe-like body allows easy handling with the display right there in front of you, no having to look elsewhere.

The actual test specs are: DC volts, 0 to 500 in four ranges, with accuracy between .5 and 1.0%; AC volts, to 500 in four ranges, with accuracy of 1.0% Resistance, to 2M, in four ranges, with accuracy between .7 and 1.2%.

For continuity testing, those times when you are not interested in a specific value, but merely want to assure yourself that things have not come apart or that just-made connections are correct, the continuity beeper tells you

aurally that things are as they should be, or when they are not. This can be a tremendous time and patience saver with all of those small wire we R/C'ers work with.

Other features include autoranging (the automatic selection of the proper range to most accurately display a value being read), overload protection on all types of measurements, a display hold button, so that a measurement can be made on a crowded board and the meter or probe removed with the value still being displayed, and a single function selector switch for ease of initial setting. In addition to the values being actually present in a circuit, the display tells you what you are reading, i.e., DC, AC, Ohms, and even lets you know when the internal batteries need replacement. On that subject, the DM-73 operates off of two readily available SR-44 or LR-44 button cells, which are good for up to 100 hours of operation.

The DM-73 comes with a well written and complete instruction manual which covers the DM-73 from familiarization and operating instructions to specs and maintenance. It even includes calibration procedures, schematics, and parts lists; if only everything else did too! There is a 90-day warranty, and the DM-73 is available from electronic suppliers everywhere retail priced at $72.95. For information on the one nearest you, and for details on the complete Beckman line which includes a number of digital multimeters of more conventional design, you may inquire at Beckman Instruments, Inc., Electronic Technologies Group, 210 Ranger Ave., Brea, CA 92621, (714) 993-8852.

TIME TO PULL THE BIG SWITCH!

No, that has nothing to do with having a sex change operation, it is merely ham operator talk for "I'm going off the air for now." It has been a busy column this month, what with FM, and black wires, and some exciting new products. Of course, the big news as this is written is the extreme cold which has taken over so much of the country. However, as you will be reading this in the April issue, that will be history and you'll once again be headed for the flying field. When you get there, remember what you read in the opening paragraghs about radio being electromagnetic waves being transmitted through space. We know from experience that these radio waves can be blocked by metallic and other dense substances. It has just recently been proven that cigarette smoke, containing as it does burnt ash and other residue, can effectively inhibit the transmission of these radio waves. In other words, *smoking causes glitches*, so if you have to smoke while flying, stand so that the wind carries the smoke in a direction that will not let it get between you and your model. Don't cause an unnecessary crash for yourself. Have good April! •

R/C Boats . . . *Continued from page 48*

on a comparable level as the inboards. The big drawback I find with the modified outboard hydroplane class is the expense of keeping engines together. The outboard engine is basically designed to work at moderate rpm levels. When the performance level is increased through various modifications, the reliability of the outboard motor deminishes.

Something that I did this past racing season was to enter my tunnel in A Hydro and in B Hydro. I didn't do this with the intent of beating the hydroplanes in actual head-to-head racing. I entered the classes to simply get more running time. I had the best results racing the 3.5 tunnel against the 3.5 outriggers. My tunnel never won any heats, but I did manage to pick up seconds and thirds when the riggers quit or flipped. At one race I managed a third overall in A Hydro with my 3.5 tunnel. Racing the 7.5 tunnel in B Hydro was a real challenge. I had to be especially careful when cornering because the 7.5 hydroplanes created some wakes that bounced my tunnel around. On those occasions when three or four of the 7.5 hydroplanes kept running during a heat, I didn't do very well with my tunnel.

My advice to the person considering assembling a boat for competition is to establish what type of racing is most appealing. If racing in an all-out competition class is your interest, then you will want to obtain the equipment that will give you the best advantage. As far as I'm concerned, the best choice of an engine for pure competition is an inboard. An inboard powered hull, be it a hydroplane or deep vee, will provide more speed and better handling than the same hull set up with an outboard.

When it comes to racing outboard powered boats, I definitely favor using stock engines. In some areas of the country the thought of running "stock" elicits a response similar to waving a red cape before a bull. This is unfortunate. A stock class like 3.5 tunnel provides an ideal entry-level contest format individuals just starting out in the hobby.

Our local club has had excellent success with this class. Most members who continue to race for more than one season will ad at least one pure competition type of boat after gaining experience with the 3.5 tunnel. Those who decide that model boating isn't satisfying their interests have not invested too greatly . I know of fellows who elected to start model boating in the R/C Unlimited Hydroplane class. This is the top of the line. For various reasons, they decided not to pursue the hobby after gathering the necessary components. Boy, did most of them lose a bunch of money!

Involvement in model boating is not without a certain amount of financial commitment. This financial commitment should cause the individual to give serious consideration to what he will be doing. There are certain types of model boats that I don't race because they are out of my price range for enjoyment. If participation in any hobby becomes a financial burden on an individual or family, then there is definite need to examine some priorities.

THE "AW, NUTS" DEPARTMENT

This article was written during the height of a severe winter cold spell. I had hoped to take advantage of a holiday vacation to get in a little model boating. It is rather uncommon in my region of the Northwest to have temperatures stay below freezing for days at a time. Such, however, has been the case. All my available running locations are frozen solid. Guess I'll just put more wood in the fireplace and watch the football playoff games.

Jerry Dunlap, 119 Crestwood Dr. SW, Tacoma, WA 98498. •

Tangerine . . . . *Continued from page 11*

left, *light* lift. He milked this till be was near cloud base after eight minutes. There was much talk that he would never make it down. Then, Woody popped the spoilers and headed down; in 30 seconds he was down to organizing his landing. The landing was a 96, the time was 10:02, and the prize was first place, nearly 100 points in front of Dave Edmonds. Tim McDow was third, Brian Agnew fourth, and Gene Little fifth.

In the Sportsman Class, LaMar Henderson of Jacksonville won the event, followed by John Hoover, down from Michigan. Dan Powers was third, Frank Collins fourth, and Rick Phillipi fifth.

There was also a Grand Champion award given for best overall performance. LaMar Henderson won the Sportsman Class, followed by Rick Phillipi. In the Expert Class, Old Champ Woody Blanchard won . . . taking home five awards. Tim McDow was runner-up.

All in all, the Tangerine was an excellent contest, ably run by Bud Moore on Friday, and Stan Post on Saturday and Sunday, assisted by the Orlando Buzzards. You easterners are missing a great contest when you don't make it to this one! •

Dear Jake . . . . . *Continued from page 6*

Dear Jake:

Do you have any airplanes that you actually fly, or do you just sit at a desk somewhere and spout your words of wisdom without the benefit of any personal experience? Anybody can be an expert on paper, but it takes guts to practice what you preach. Do you?

—Real Flyer in Rio Vista

Dear Real Flyer:

I have one airplane which I fly on a regular basis and two others that I take out only on special occasions. The high timer is a scratch built PBY. It spans 71 inches, weighs 23 pounds, has a Fox .36 on the left side and a Merco .49 on the right. It uses an eight-channel Heathkit radio and Mighty Midget servos. Controls consist of rudder, elevator, flaps, and coupled aileron and throttle. It has a retractable landing gear with Trexler air wheels for extra flotation on water landings. The other two airplanes are not quite so ordinary. One is a dynajet powered, Soviet *Foxbat* fighter which I copied from secret photos I took while vacationing in Moscow. The other is a small R/C model of the *Space Shuttle* which I launch out the window whenever I go somewhere in a 747. I feel that these current efforts and my experience in other aspects of modeling qualify me to write this column, and I'm sure my uncle, the editor, agrees.

—Jake

★ ★ ★

Dear Jake

What's the difference between a two-cycle and a four-cycle model engine?

—Neophyte in Newport

Dear Neophyte:

Most model engines are four-cycles. That is, they go through four cycles of existence: **new . . . used . . . tired . . . worn out.** Two-cycles are more rare and usually are the result of a crash, with their cycles being **new . . . broken**. Variations on the two-cycle are: **new . . . lost**, and **new . . . stolen**. The little-known three-cycle is only found at swap shops. It is easily recognized by its cycles of **used . . . worn out . . . for sale.**

—Jake

★ ★ ★

Continued on page 99

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A 1937 Sport Scale ship! From Comet kit, 72" span. Designed by Joe Konefes.

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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 Sherman.

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". Hait/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 II' 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.

Dear Jake . . . . *Continued from page 94*

Dear Jake:

I've read that fuel foaming can be a problem in high powered model airplanes. What is fuel foaming, what causes it, why is it bad, and what can I do to prevent it?

—Worried in Windsor Locks

Dear Worried:

Fuel foaming is caused by engine vibration when a fuel tank is hard mounted to the fuselage structure. It can cause a lean engine run. Mounting the tank in form rubber usually prevents it, but fuel foaming is not nearly as serious as most people think. It almost always looks worse than it actually is. Just as a precaution, however, if your fuel is foaming and the propeller bites your finger, you'd better get a rabies shot.

—Jake

★ ★ ★

Dear Jake:

Could you please sum up for us thew complete theoretical aerodynamics of the helicopter?

—Confused in Hays, Kansas

P.S. (My own theory is that the helicopter flies by creating an intense local commotion.)

Dear Confused:

Your theory is not acceptable because it violates Bernoulli's Law. I think it also violates the Mann Act, but I wasn't able to ask my lawyer friend before press time. Anyhow, there's nothing mysterious about helicopter aerodynamics. They're exactly the same as airplane aerodynamics except that the gravitational attraction to the Earth is three times stronger on a helicopter. If you look at the historical origins of the airplane and the helicopter, the similarities make it clear that the helicopter is not particularly unique. Just as Wilbur and Orville Wright studied birds in flight and then invented the airplane, Igor Sikorsky also studied a phenomenon of nature and then invented the helicopter. The phenomenon that Igor studied was pinwheel hats.

—Jake •

Workbench. . . . *Continued from page 6*

send them to **MB's** office, to Ray's attention. We'll forward the material no matter where his work as a helicopter pilot may take him.

PINK SPITFIRE

And speaking of California Model Imports, which we were just doing, Dave Robertson called to chide us about omitting some where-to-get-it information when Bill Hannan mentioned the Bentom rubber powered models from Japan in his January '84 *Hannan's Hangar* column. Obviously, CMI is the source, and if your dealer doesn't stock these clever little geared drive rubber models,

write to Dave Robertson at CMI, Box 1695, Garden Grove, CA 92642.

INDUSTRY NEWS

WILSHIRE MODEL CENTER, which has been located on Wilshire Blvd., Santa Monica (two successive locations) for 30 years, has moved to 2836 Santa Monica Blvd., Santa Monica, CA (same phone 213-828-9362, zip code changes to 90404).

Under the proprietorship of Hans Weiss, WMC is particularly well-known for its imported line of R/C sailplanes, and more recently, a whole raft of supplies, kits, motors, batteries, and accessories for electric powered aircraft, from top manufacturers in Europe. Check the ads in recent issues.

Hans must be in a slight dilemma now. Here is Wilshire Model Center on Santa Monica Blvd. Does he change the name to "Santa Monica Model Center"? Or is that too many Santa Monica's in a row . . . Santa Monica Model Center, Santa Monica Blvd., Santa Monica? Yes it is. I think he'll stick with the 30-year old name of Wilshire Model Center!

SCALE MODEL RESEARCH, as already mentioned in *Over the Counter*, has been acquired by long-time modeler and occasional writing contributor to **Model Builder**, Bob Banka. SMR's main bag is Foto Paaks. Don't be dismayed by the apparent inability to spell "Photo Packs" as these packs . . . er . . . Paaks contain many color print photos of almost 600 aircraft, helicopter, sailplane, and engine subjects, averaging around 25 per aircraft. Would you believe 50 photos of a Stinson A-1, low-wing, trimotor airliner from the 1930's?

Best that you send $1.00 and a large SASE to Scale Model Research, 418 East Ocean Front "B", Newport Beach, CA 92661, and see for yourself.

VALLEY MODELS COMPANY, 6072 East Alta Ave., Fresno, CA 93727, may not ring a bell. but if you're a competition free flighter, the names *"Shocer"* and Mel Schmidt should make you sit up. A complete write up for *Over the Counter* appears in this issue for two sizes (A or B at 620 sq. in., and 1/2A or A at 244 sq. in.) of *Shocer* being kitted by Valley Models, and the guy in the photo leaves no doubt as to the source.

Mel was **MB**'s first "Free Flight" columnist, and his *560 Shocer* for A or B Class, appeared as a construction article in the January 1972 issue (only the fourth issue of MB!). At the time, he was a prominent free flighter, and a member of the AMA F/F Contest Board during the tempestuous hand launch vs. VTO controversies.

See *"Counter"* for more details on the *Shocer* kits.

GORHAM MODEL PRODUCTS and its owner, John Gorham, are justly proud of a recent achievement in the business world. The following press release really tells it all.

Gorham Model Products has been selected by INC Magazine *as one of America's top 500 fastest growing private companies in 1983. The criterion was the growth record over a five-year period. The number of potential candidate businesses for this honor in the United States exceeded 500,000. Gorham Model Products was the only model aircraft manufacturer which has earned a place in the INC 500 awards.*

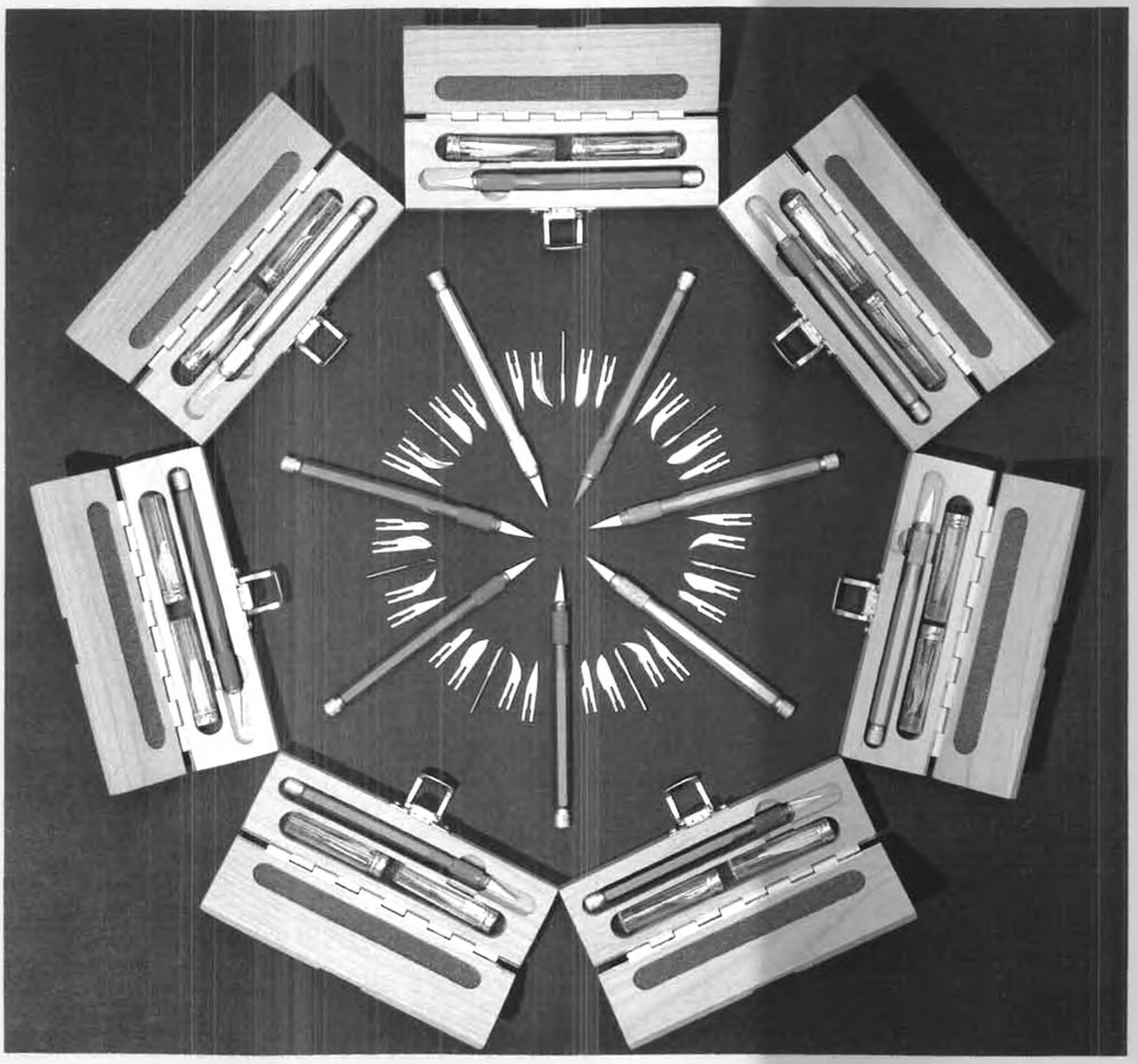
'GMP' is well known in the hobby industry as the largest American manufacturer, importer and exporter of RC model helicopters. Located in Calabasas, California, 'GMP' employs 12 full-time office and factory personnel and uses the services of more than 35 American companies as sub-contractors in the manufacturing process of their helicopters. 'GMP' products are now stocked and sold by more than 1200 hobby stores nationwide and are also exported to many foreign countries. The sale of its "Cricket" helicopter, which started the growth trend of the company, now nears 10,000 kits. The .60 powered "Competitor" helicopter, a joint Gorham/Hirobo development, won nearly all the major contests of 1983. Many new helicopters are under development, including an advanced technology, .40-powered contest machine, and one with a rotor span of over 10 feet, for the U.S. Army.

ONE POINT TWO IS IN

An emergency vote by the R/C Contest Board has been completed, resulting in a change for the maximum size of a four-cycle engine for the pattern event. In keeping with the maximum size now specified for FAI R/C Aerobatics, the new AMA rule permits 1.2 cubic inch four-cycle engines (10 cc, or .61 cu. in. is still the maximum for two-cycle engines) in AMA "Pattern".

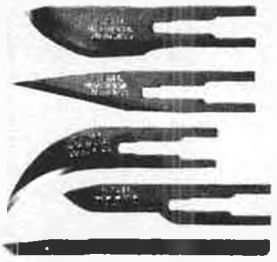
If one of those don't hack it, you must be flying a "Lead Sled"! •

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*



NEW PRICES AS OF NOVEMBER 1, 1983

Available in seven satin anodized handle colors: silver, blue, red, green, gold, black, & 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 . . . . . $16.95

Individual handles (specify color) $6.95

Vial of 6 blades (No. 10, 11, or 15) $3.00

(No. 12 or 20) $4.00

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

4-CYCLE SUPREMACY

ONCE AGAIN ENYA TAKES THE LEAD

The power belongs to Enya. Smooth, quiet and fuel efficient, Enya's 4-cycle series stands alone when it comes to power.

From our 4-cycle 40, to our new giant 120, Enya is in a class by itself in power and reliability.

Our 120 4-cycle, the biggest engine allowed under F.A.I. rules, weighs in at a lean 28.2 oz., yet puts out the highest horsepower. It'll turn the largest props with ease and offers all the high end power needed for extended maneuvers.

Even our 40 4-cycle leaves the nearest competitors trailing in its prop wash with a massive 12,000 RPM output, a full 2,000 RPM better than the nearest competition.

We don't know of a 60 4-cycle that even comes close to Enya's 0.9 hp and 13,000 max RPM punch.

This years ahead 4-cycle engineering also gives you more value, reliability and performance than any other 4-cycle engines you can buy.

Compare. 4-cycle supremacy belongs to Enya.

For maximum enjoyment and safety, read the complete instructions included with each engine.

Enya Model Engines

Altech Marketing
P.O. Box 286, Fords, N.J. 08863 (201) 572-5792

Enya parts and engines are now available at hobby shops throughout Canada.

It takes a technology advantage to make statements this powerful

CHARTING ENYA'S 4-CYCLE POWER			
ENYA ENGINE	BRAKE HORSEPOWER	MAX RPM	RECOMMENDED RPM RANGE
90 4-cycle	1.3	12,500	2,500 to 11,500
60 4-cycle	0.9	13,000	2,700 to 11,500
120 4-cycle	1.6	12,500	2,500 to 11,000
40 4-cycle	0.5	12,000	2,500 to 11,000

Coming soon, Enya's unique 46 4-cycle with revolutionary performance characteristics