

ICD 08545

MODEL BUILDER

volume 11, number 115

\$2.50

AUGUST 1981





JR

...**"SPECTRA"**CULAR!

ADVANCED R/C TECHNOLOGY SETS EXCITING NEW STANDARDS IN 7 CHANNEL PERFORMANCE

SPECTRA SERIES

Meet the challenger in the R/C field, JR's SPECTRA SERIES. A composite of advanced electronic R/C design and engineering utilizing the latest knowledge and experience from space age electronics. Modern integrated components as well as mechanical engineering features never before offered to the hobbyist. JR's and CIRCUS HOBBIES' dedication to quality and service make the SPECTRA SERIES the logical choice for champions and champions to be.

SYSTEM 7C-4SH (Transmitter illustrated)

Includes:

Dual aileron and elevator rates. 2 auxiliary trim functions located on top of transmitter. Retract function. NET-127 Transmitter. NER-227 Receiver. 3 NES-101 Servos. 1 NES-102 Servo (reverse). 500 MAH Receiver Battery Pack. Charger. Aileron Extension Cord. "Y" Harness. Servo Trays. Necessary hardware.

FEATURES

JR Transmitters:

Dustproof open gimbals. Adjustable stick length and angle. Double Trim (adjustable). Rugged aluminum case. Bright LED "on" lamp (visible in bright sunlight). "On/Off" switch lock. Cross checked side panels to assure firm but relaxed handgrip.

JR Receivers:

Unique and exclusive "3H" system assures high selectivity, high sensitivity and high stability without compromising quality of any individual factor. Decreased interference. 6 to 10 decibel increase in signal to noise ratio. 50% range increase.

JR Servos:

Powerful (45.67 oz./in torque). Extra long life servo potentiometer. Miniature size, (1.5 x .7 x 1.75 w/o mounting lugs). Light weight, (1.5 oz.). Watertight. Gold plated NASA quality 3 point connectors. Splined output shaft for mechanical neutral adjustment. Special moulded rubber mounting cushions.



Send \$1.00 for catalog

SPECTRA SERIES SYSTEMS are available in 2, 4, 5, 6 and 7 channel models.

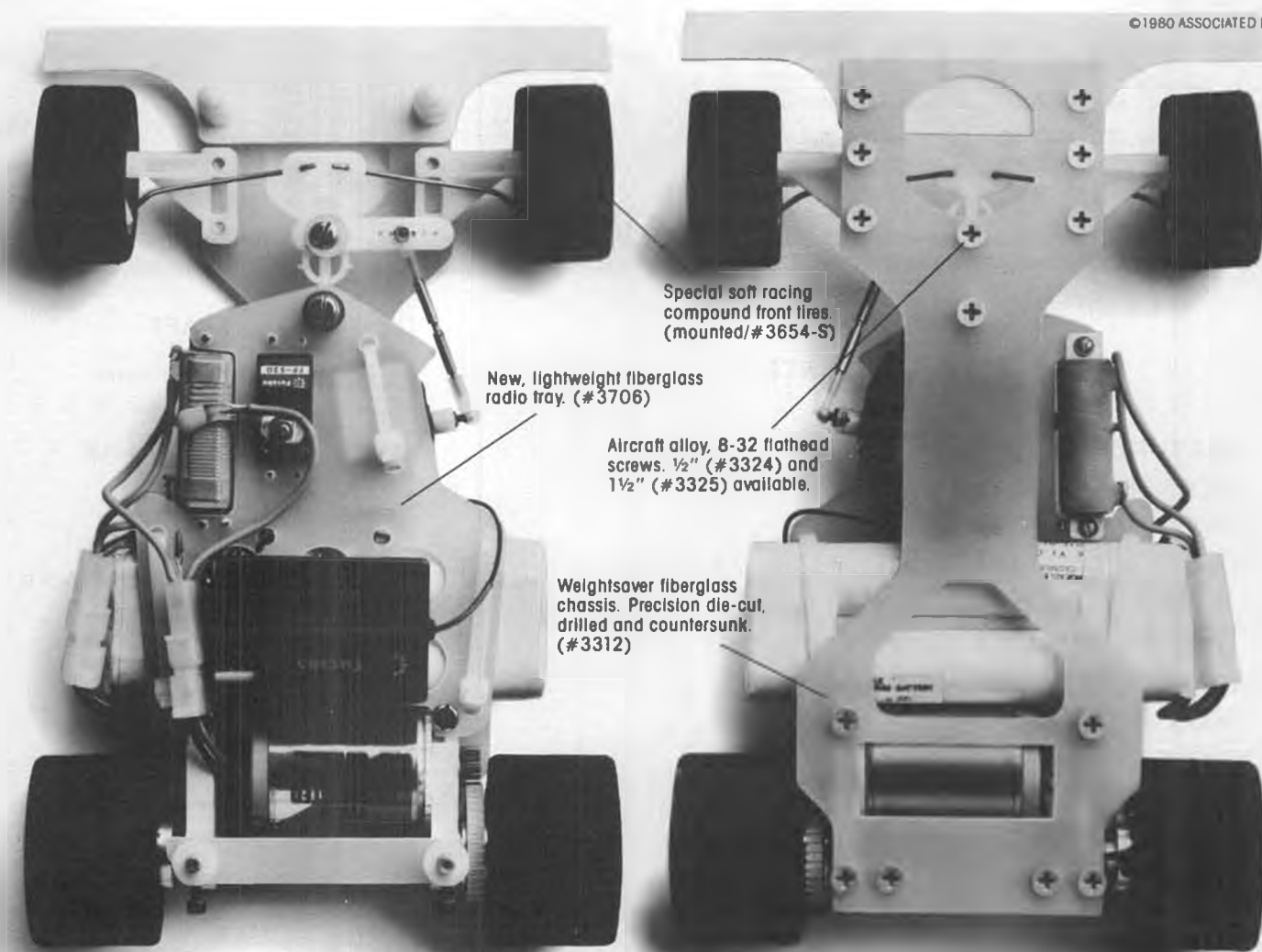
CIRCUS HOBBIES

CIRCUS HOBBIES INCORPORATED

P.O. Box 5215

A subsidiary of CIRCUS CIRCUS HOTELS, INC.

Reno, Nevada 89513



TWO SIDES OF TEAM ASSOCIATED'S FORMULA FOR SUCCESS



Associated captures the sleek Lotus 79 F1 in 1:12 scale

No matter how you look at it, the Associated RC12E is a winner. The RC12E was designed by racing enthusiasts for all-out competition. But the Team never stops looking for more performance.

ROAR Nationals Expert Class 1:12 Scale Electrics				
		Production	Stock	Modified
1978	4 cell	No event	MRP	RC12E
	6 cell	No event	RC12E	RC12E
1979	4 cell	No event	RC12E	No event
	6 cell	RC12E	RC12E	RC12E
1980	6 cell	MRP	RC12E	RC12E

It takes a close look at a Factory car to see all of the tricks the Team has developed. Some, like precision ball bearings, (#3655/front and #2222/rear) you can't see at all.

But what a difference it makes. Special, lightweight fiberglass chassis plates. Featherweight alloy flathead chassis screws. Even superflex, high-temp wiring (#3731). They're all part of the Team's winning cars.



Track-tune your RC12E with the Team's selection of fiberglass chassis plates

Take a tip from the Team, use Genuine Team Associated racing products to keep your RC12E running up front.

Write or call for a complete catalog, and your free action and info-packed issue of "Racing with the Team."

TEAM ASSOCIATED



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

MODEL BUILDER

AUGUST

1981

volume 11, number 115

Box 335, 621 West Nineteenth St., Costa Mesa, California 92627

Phone: (714) 645-8830

CONTENTS

FEATURES

WORKBENCH, Bill Northrop	6
OVER THE COUNTER, John Elliot	7
THORNBURG AT LARGE, Dave Thornburg	10
"1 TO 1" R/C SCALE, Bob Underwood	20
TWO SIDES OF SCALE, George A. Wilson, Jr.	23
HOW TO FLY PATTERN, Dick Hanson	24
PLUG SPARKS, John Pond	28
R/C AUTO NEWS, Dan Rutherford	34
R/C SOARING, Dr. Larry Fogel	38
R/C POWER BOATS, Jerry Dunlap	42
FUEL LINES, Joe Klause	44
SPORT SCENE, Larry Renger	45
ELECTRIC POWER, Mitch Poling	46
HANNAN'S HANGAR, Bill Hannan	48
CONTROL LINE, Dan Rutherford	54
INDOOR, Ken Johnson	57
FREE FLIGHT SCALE, Fernando Ramos	60
FREE FLIGHT, Tom Hutchinson	64

SCALE VIEWS

GRUMMAN F3F-2, Peter Westburg	37
-------------------------------------	----

CONSTRUCTION

MINI BIRD, Mark Smith	16
ROTATING RETRACTS, Col. Art Johnson	25
SAL TAIBI'S "HORNET" O.T., Sal Taibi	32
POTTIER P100TS PEANUT, Walt Mooney	49
MINIATURE AIRCRAFT SEVERSKY P-35, Collector Plan	56
PROFESSOR BACKWARDS, Mark Fineman	63

Cover: Mark Smith's "Mini Bird", a two-meter version of Dave Thornburg's well known "bird of Time" design, cruises along the cliffs of Torrey Pines, north of San Diego, California, the most popular and scenic slope soaring site on the southern Pacific coastline. Kodachrome transparency by Rod Smith.

STAFF

EDITOR/PUBLISHER

Wm. C. Northrop, Jr.

GENERAL MANAGER

Anita Northrop

ASSISTANT EDITOR

John Elliot

ASSISTANT GENERAL MANAGER

Dawn Holcomb

ART DEPARTMENT

Al Patterson

OFFICE STAFF

Eddie Downs

Debbie Holobaugh

A. Valcarsel

CONTRIBUTING EDITORS

Dave Brown	Walt Mooney
Jerry Dunlap	Mitch Poling
Larry Fogel	John Pond
Jim Gager	Fernando Ramos
Bill Hannan	Larry Renger
Dick Hanson	Dan Rutherford
Tom Hutchinson	Dave Thornburg
Ken Johnson	John Tucker
Joe Klause	Bob Underwood

ADVERTISING

John Elliot

Wm. C. Northrop, Jr.

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

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

Copyright 1981 by RCMB INC. All rights reserved. Reproduction without permission prohibited.

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

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

AFTER FLIERS LEARN WHAT WE'VE DONE WITH ENYA THERE'LL BE NO KEEPING THEM OUT OF THE HOBBY SHOPS

Enya engines, long respected for their enduring reliability, revered for their quality, and precision craftsmanship, the envy of fliers throughout the country, has launched a new program for the 80's. A commitment that is already bringing the most advanced engines in the world to your hobby shop, along with an almost unbelievably competitive price structure and a whole new era of availability.

A COMMITMENT TO THE NEW

To our broad line of reliable performers we've just added state-of-the-art designs like a high performance, Schnuerle ported, front intake rear exhaust 60XL, destined to be the pattern champion for years to come. And a remarkable new 60XFIII GM10P... a front intake, Schnuerle ported side exhaust with built-in Perry Pump. There's also our advanced .35 4-cycle with unique overhead cam. On the way is a powerhouse of a .40 4-cycle, as well as a competition .21XTV for car racing. And that's just the beginning. We're committed to engineering for the future.

A SURPRISE AT THE HOBBY SHOP

When you get to your hobby shop, you're going to learn something startling about our pricing, too. You'll be astonished to find that the quality Enya engines you've heard about, for years, the engines that have become an industry legend, are now priced just like the ordinary engines you've been buying. Imagine that, now you can own an Enya engine and at a popular price, too.

And one more thing. We've reorganized our distribution pattern, so now you'll not only be able to afford the best, but it will be available. No more putting your name on a waiting list, or depending on a favor to get an Enya engine. They're in stock, along with all the parts you may need. It's true, for the cost of an ordinary engine, you can now buy the renowned Enya of your choice.

Get in on the excitement. Get in on the Enya commitment for the 80's... see the full line at your hobby shop, today.

ENYA MODEL PRODUCTS CO.

P.O. BOX 286
FORDS, NEW JERSEY 08863
201 572-5792



SIG KITS AROUND THE WORLD



Marc Churgel (Fountain Valley, CA) has about 50 flights on this sharp looking version of the Smith Miniplane, powered by a K & B .40 engine. He called the results "superb" and said he was very pleased with the model.



Joe Murray (Markham, Ontario, Canada) has turned his Sig Skybolt into a year round fun flier. In the summer he has a "Waterbolt" on floats, flying from the big lake seen in the photo. When his summer cottage is closed for the season (it gets cold early up there) he reverts to wheels until the snow flies. Then it's on to the "Snowbolt", with a set of skis. Why not "Skibolt", Joe?



Jeff Hargis (Harrisonville, MO) writes, "I started flying RC three years ago with the Sig Colt. After becoming confident at my skills on trainer type planes, I wanted to advance to scale-type aircraft. When Sig came out with the Beechcraft Bonanza, I knew I had to have it. After six months of work . . . and detailing, I was really proud of the finished product. It's a great airplane. It's sleek, very fast and looks better (to me) than any other plane at the field. So when Sig came out with Hank's Cessna 172 I didn't hesitate to buy it. The 172 went together a lot faster than any other plane I had ever built!"



Sal Iasilli (East Norwich, NY) modified his Sig Piper J-3 for best scale appearance. The wing bolts on for the inside of the cabin. A scale tailwheel and a scratch-built detailed dummy engine were added. It's Webra .40 powered, Pro-line radio.



Sal Alu put a lot of fine finishing touches on his beautiful Kadet Mark I. Fiberglass wheel pants on an aluminum gear add a racy look and this effect is topped off by the red and white checkerboard paint scheme.

SEE THESE FLIGHT-
PROVEN DESIGNS AT YOUR
FRIENDLY SIG DEALER.

SIG

RC-3	PIPER J-3 ..	\$59.95
RC-34	SKYBOLT ..	\$92.50
RC-41	BONANZA ..	\$92.50
RC-38	MINIPLANE .	\$71.95
RC-51	KADET MK I	\$49.95
KBRC-5	SKYHAWK	\$99.95



It's float time this month! From Kenai, Alaska comes this shot of a rubber powered Sig Cabinaire built by David Unruh. He has also built two Liberty Sports and two Kadets.



This float-equipped Kadet Mark I by Art Kapa (Mayville, MI) is sitting in the snow, not water, and has taken off from it as well as from the water. He also has another older Kadet equipped with skis, plus 3 Sig J-3 Cubs, a Skybolt, a Kiwi and a Cessna 150. He commented: I like your Kadet. I have more fun with it than any other airplane I have."

SEE YOUR DEALER FIRST! TO ORDER DIRECT, ADD \$1 PSTG. UNDER \$10, PSTG. FREE OVER \$10. NO C.O.D.
SEND \$2.00 FOR LATEST CATALOG OF KITS, ACCESSORIES AND SUPPLIES BY SIG AND OTHER MAJOR COMPANIES
SIG MANUFACTURING CO., INC. MONTEZUMA, IA 50171

All This and More!



Quality that provides performance you won't believe! Made possible through pride in craftsmanship, in-house production and an intense desire to manufacture the best helicopter you could hope to buy . . . at any price!

Mantis - the R/C Helicopter with something for everyone.

FEATURES:

- ★ A Full Size Master Plan with Nomenclature
- ★ Instruction Manual - fully comprehensive with over 70 photographs that takes you step-by-step through all stages of construction and flight.
- ★ Injection Molded Side Frames
- ★ Variable Pitch via Tail Rotor Adjustment
- ★ Easy Set-Up and Trimming
- ★ Fail-Safe Clutch
- ★ Shielded Bearings
- ★ Contains No Metric Parts - Spares Readily Available!
- ★ Schnurle Engine Not Required
- ★ No special tools required for assembly

MANTIS... It's Alive!

SPECIFICATIONS:

- Rotor Diameter - 41½"
- Tail Rotor Diameter - 9"
- Length (Nose to Tail) - 43"
- Height - 13½"
- Flying Weight - 6 to 6½ lbs.
- Radio - 4 Channel*
- Engine Size - .40"

*Radio System and Engine Not Included

Priced Under Two-Hundred Dollars*

*Does not include collective pitch

Send \$5.00 for main plan & further information

In Canada Contact: UDISCO

4660 Decarie Blvd. / Montreal, Quebec, Canada H3X 2H5

Telephone: (514) 481-8109

DEALER and DISTRIBUTOR INQUIRIES INVITED . . .



American

R/C Helicopters, Inc. 635-11 North Twin Oaks Valley Road • San Marcos, CA 92069

For Further Information Call or Write: **(714) 744-7533**



from Bill Northrop's workbench

WHO PULLED THE CORK?

As this is being written, we're trying to untangle any legal ties that might complicate changing of the magazine's title back to **Model Builder**. If we can get it all together in time, the cover of this issue may indicate the desired results.

What surprised (and humbled) us the most about this title change subject was the unexpected volume of mail and telephone response to the comments we made in our June '81 "Workbench" column. Without exception, the vote has been (they're still coming in!) to "change it back to **Model Builder**." Basically, there have been two types of responses; those who tell us to change it back, and those who say they don't give a d--- what we call it as long as we don't change the format. That last comment, "Don't change the format," was the basis of nearly all of the responses, and is that which humbles us with gratitude for your compliments. To all of you who took the time to write or call in (several hundred so far), and to the 20 times that many (according to statistics) who *felt* the same way but did not respond, thanks... we'll do our best to keep your faith.



The cross-country travelers in Sedona, Oak Creek Canyon, Arizona, on the last leg of a 10-day trip from Boston to Newport Beach. Travelog in text.

4150

If this issue happens to arrive just a little late, it could be blamed on the above figure. It represents the number of miles we drove, with wife Anita and daughter Belinda, between May 11 and 21, returning us to the office about four or five days behind our normal schedule for getting into production on an issue.

On May 8, we boarded a World Airways DC-10 at LAX (they *really* look big when you climb up from ground level!) and flew to Logan Airport in Boston (\$172 each, one way). We were met there by Joe "Golden Age Reproductions" Fitzgibbon, who hauled us and our luggage to Braintree and a motel, just minutes from his home, and also only a short distance from our 95-year-old aunt's home. The main purpose of our trip was to pick up many family heirlooms, valuable antiques, and other odds and ends that she wanted us to have, and which we could not trust to be packed and shipped by professional movers.

Prior to leaving California, we had reserved a Jartran truck, which we would pick up in Braintree, load with the items we were taking back, and then

start the long haul across the U.S. You may have seen Jartran trucks and trailers going here and there in the last year or so. Like Ryder, U-Haul, and others, the company rents trucks and trailers for local and one-way hauling. Many young families are finding this to be a much less expensive yet *more reliable* way of moving their household from one location to another. Load up the truck, hitch on the family car (disconnect the drive-shaft if it has automatic transmission!) and away you go.

Incidentally, if you've wondered about the name Jartran, the first three letters stand for James A. Ryder. For whatever the reason, Mr. Ryder, who we understand is over 65, left the company which carries his name, and started a similar rental service about two years ago.

Jartran has, among many other sizes, a line of 12 and 15-foot trucks with sort of motorhome-type cabs up front. Ours was a 15-footer on a Ford chassis (they also have Dodges). The cab is equipped with two bucket seats, and they have automatic transmission, power steering, and sometimes, cruise control. They're

Continued on page 97



Jack Britton, owner of The Hang Glider Shop in La Habra, explains ultra-lights to the students of Sierra Vista Elementary.



Paul Deutsch (at mike) and Cliff Rose explain the fine points of soaring and the "Phoebus C" sailplane.

OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases furnished by the manufacturers and for 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.

Northeast Aerodynamics announces its Bel-Air .40, a sport biplane designed for the popular sized .40 engines is now available. It is slightly larger in size as biplanes go, to give smoothness in flight, and is equipped with extra-wide landing gear for easy ground handling. With a wing area of 675 square inches, and a weight range of 4-1/2 to 5 pounds giving a wing loading of 15 to 18 ounces per square foot, it should be a fine, medium sized barnstorming bird! Featuring a symmetrical airfoil wing, jig built, and bolted on for positive alignment, plug-in cabane wires, machine-cut balsa wing and fuselage parts, and easy-to-read plans and instructions, it goes together quickly and easily. Wing and fuselage kits are available separately, too. See your dealer or contact: Northeast Aerodynamics, 568 Main St., Haverhill, MA 01830; (617) 374-0229.

★ ★ ★
New, heavy-duty hinges, No. 257 from Du-Bro, are perfect for 1/4-scale or large models where maximum strength is needed. With a removable brass cotter pin, which could be replaced by a .047 dia. wire for easy alignment, the control surfaces can easily be removed for transportation or repairs. Du-Bro's new, heavy-duty 4x40 ball link, No. 259, with a threaded steel ball and heavy-duty,



A whole gaggle of Beechcraft from Byron Originals; A-36, V-35B, F-33A, T-34C, and T-34B.

molded nylon socket with a hex shaped end for easy adjustment, comes complete with a brass coupling sleeve and threaded coupler. Just the thing for

large models, also suitable for R/C car steering linkages and plane wing strut attachments. Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084.



Sig's famed quickie field box, now a regular catalog item. One buck!



Tightest packing job of the year award goes to M.E.N. for its now released "Big John" kit.



Honey bee checks out Gee Bee "Z" from Williams Bros.



The Astro-Hog "20", history in miniature, by W.E. Technical Services.



Eldon Lind's "Duplicator" sander.



Heavy-duty hinges for "biggies", by DuBro.



Larger ball/socket rod ends, by DuBro.

★ ★ ★
Sig has had so many requests for its field box, it has been assigned catalog No. BX-001, and is now readily available to retail and wholesale customers. Made from heavy-duty corrugated cardboard, it provides four compartments and a

carrying handle, and is shipped flat with instructions, ready for assembly by simply folding on scored lines. A coat of clear urathane or dope sprayed on will help preserve it. Retail, \$1. Sig Mfg. Co., Route 1, Box 1, Montezuma, IA 50171.

★ ★ ★
Chris Church, Sales Manager of the Hobbyoxy Division of the Pettit Paint Company, would again, like to remind all modelers, that their company's now famous "Hobbyoxy Painting Pointers" brochure is still available, free, simply by writing in and requesting a copy! Actually, the brochure details the use of all Hobbyoxy glues, Quick-Prep Resins, Primers, Fillers, Filler compounds, Hobbyoxy enamels and Custom Metalizers. The experienced modeler, as well as the

newcomer to the hobby, whether his interest is in cars, boats, or planes, can profit from this wealth of information generated by 'John E. Pox.' Write to: Hobbyoxy Division, 36 Pine St., Rockaway, NJ 07866.

★ ★ ★
Vito Tomeo Models announces plans and parts availability for its 1/6-scale Hawker Sea Fury. With a wingspan of 77 inches, wing area of 1120 sq. in., and suitable for a straight-drive .90 or a .60 with prop driver, flight characteristics are an experience to behold! The plans/pack contains three, 3-foot by 7-foot plan sheets loaded with detail showing scale flaps and gear. Also included are: a scale canopy, fiberglass cowl, wing oil and air scoops, construction notes, and



Improved Top Flite maple props in new display packaging.



The Bel-Air .40, by Northeast Aerodynamics.



Etched glasses for your favorite beverage, from "Alman".

scale three-views. The complete pack is \$68 postpaid in the USA. Plans only, are \$28 postpaid. A 5-inch spun aluminum spinner is also available for \$22.95. Vito Tomeo Models, 1050 Alabama Ave., Ft. Lauderdale, FL 33312.

★ ★ ★

Annco Manufacturing Co. announces its "Giant Scale Retracting System." Features such as automatic up and down locks actuated by the gear leg air cylinder, functional scissor link system, heavy-duty shock absorber that will support a 50-pound model during landing loads of up to 10 G's are only a part of this system. Wheels are die cast and machined aluminum, P-51 scale appearance. Tires are 6-1/2 inches dia., and 2 inches thick, molded of genuine rubber and filled with heavy-duty urethane foam, giving a low bounce characteristic. Complete system, including left and right retracts with wheels, air supply tank, control valve with fittings and tubing, and installation drawing for Nosen's P-51, is only \$189.90, FOB factory direct only. Wheels are available separately for \$29.95 per pair. Send for free brochure. (See R/C



A 1/6-scale Hawker Sea Fury, by Vito Tomeo Models.



Cast aluminum wheel, with molded, low-bounce tire, by Annco.

World Toledo July 1981 R/C M.B.) Annco Manufacturing Co., P.O. Box 23089, Minneapolis, MN 55423; (612) 869-1000.

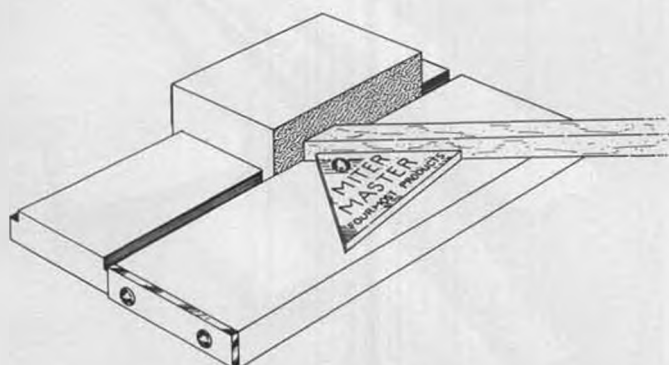
★ ★ ★

Williams Brothers, Inc. is pleased to announce a new release in its popular 1/32-scale Golden Age of Air Racing plastic model kit series. The subject is the Gee Bee "Z," first of the barrel-shaped racers manufactured by the Granville brothers. Five times a winner

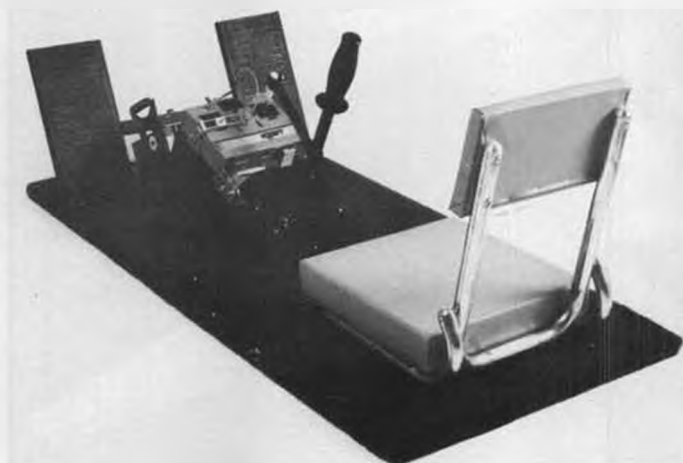
Continued on page 78



Scale retracting gear to fit Nosen P-51, from Annco.



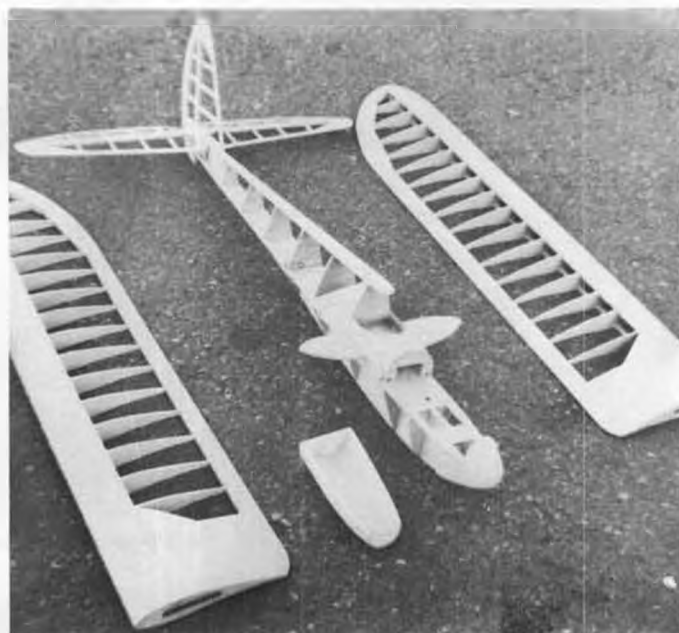
Miter Master, precision sander from Fourmost Products.



Full-size cockpit controls operate your H/C transmitter, by Cockpit Control Systems.

THORNBURG AT LARGE

Scratch-building a fuselage for that old set of wings out in the shop is the quickest and cheapest way to get a new model in the air. Here's how . . .



Don Quixote (Dec. '72 MB) uses horizontal fuselage crutch, with slit formers. Build top half, invert model, build bottom.

• The other day I was helping a friend clean out his workshop. He was in one of those "everything goes" moods: out went a perfectly good set of Olympic II wings, the right wing panel from an old Hobie Hawk, a stick-covered wing and stab for a Falcon 56, a set of badly mauled but still repairable Windrifter wings, and much more.

Two thoughts occurred to me during this clean-out. The first thought had to do with recycling: *one person's trash is always another person's treasure*. For this reason, every club needs a "salvage officer," someone willing to come at a moment's notice and pick up all these potentially valuable bits and pieces — pick them up and haul them to the next club meeting for distribution to people who can use them. (I slipped the Hobie panel into my car when my friend wasn't looking. All it needed was new Monokote!) When the clean-up mania strikes a

modeler, he doesn't want to pile his junk in a corner until someone needs it . . . he wants it out of his sight immediately, so he can begin a new collection. A club salvage officer would thus perform a valuable service, saving a lot of good models from the trash compactor. And what would that officer get for his pains? Why, pick of the litter, of course! That's better pay than club presidents get, by far.

The second thing had to do with fuselages . . . or the lack of them. My friend's workshop was littered with wings and empennages, but where were all their fuselages? I went home and looked at my own workshop. Same story: lots more wings than fuselages.

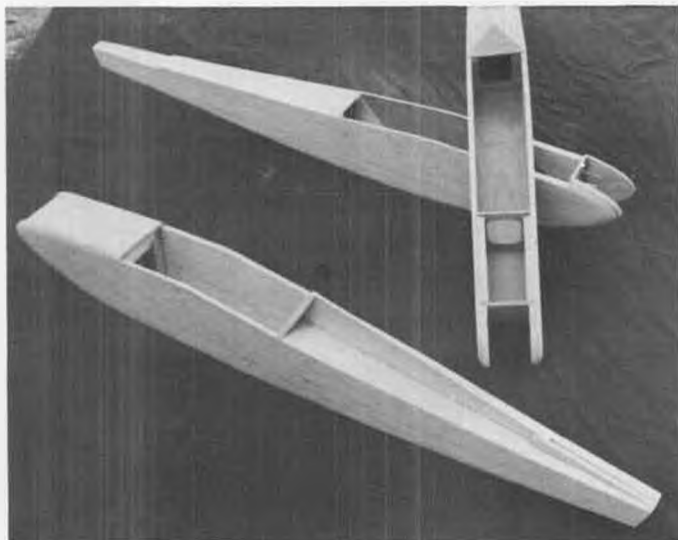
The sad fact is that wings, on the average, outlive their fuselages . . . just as wives outlive their husbands. I began to examine some of my widowed wings . . . lots of life left in some of these old gals. Why shouldn't some of them

remarry? Take this old pair of Windfree wings, for example. Strip off the dried and brittle Monokote, examine them for fractures, dress them up in a new suit of bright orange (white would be in bad taste . . . this isn't their first wedding, after all) and then step back and dream for a moment.

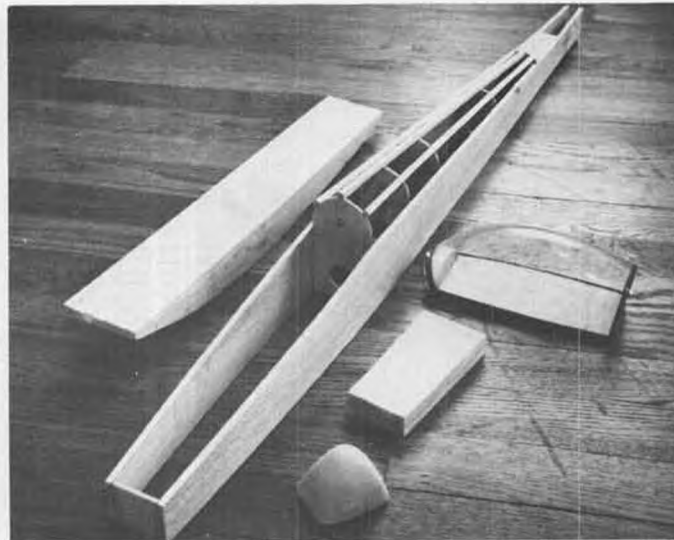
What kind of bridegroom do they deserve? A motor-glider of some sort, perhaps electric? Or a long, lean sailplane fuselage to match their slim tapered look? How about a semi-scale Schweizer 1-23? Or maybe something with a short nose and swept-back wings, like the early versions of Sean Bannister's "Algebra" series, over in England? Or a pod-and-boom fuselage with vee-tail and . . .

The fuselage possibilities are endless for a shiny "new" set of wings like these. All you need is a little imagination. And even the very best imaginers get most

Continued on page 88



Three Honker Rocket fuselages . . . the basic square box dolled up with a triangular turtleneck and rounded corners.



Major pieces for Schweizer 1-26. A few balsa blocks carved round, stringers, and the box fuse begins to look streamlined.



Sandy Peck proudly displays the plaque awarded to Peck-Polymers by the H.I.A. for Creative Excellence. Award was for the Peck-Polymers 11-foot, radio controlled Pony Blimp, shown at right. Peck has made it available in kit form.

WORLD

Text and Photos by JOHN ELLIOT

• Before we continue our running account of the hobby shows, contests, happenings, and such, congratulations

and a tip of the hat are in order to Bob and Sandy Peck, of Peck-Polymers. At the H.I.A. (Hobby Industry of America)

show held in Atlanta, Georgia, this past February, a very special award was earned by Peck-Polymers. To the uninitiated, the H.I.A. show, now 40 years young, is the show, where many hobby manufacturers show new products for the first time. This show also includes Hobby-Toy and Crafts! The format is that of new products being presented to distributors, jobbers, and chain store buyers. The public is not invited to attend, and much time and effort is spent for displays, promos, etc. (Having attended and worked several of these shows, I can attest to the efforts expanded.)

This year, the H.I.A. recognized outstanding and innovative new products with the 'Creative Excellence Awards' based on originality, concepts, uniqueness, quality, and distinctiveness. There were seven divisions, including Adventure Gaming, Aeronautics, Car Racing, Plastic Kits, Radio Control (MRC won here), Railroad, and Rocketry. For winning the Creative Excellence Award in the Aeronautics Division with their 11-foot, radio controlled airship kit, the Pony-Blimp, a jolly good "Well Done" to Bob and Sandy Peck... (See 'R/C



Model display area at the Southwest Modelers Show, Dallas, Texas, was this plushly decorated portion of the Holiday Inn lobby.



Randy Getchell, Willis, Texas, won 1st in Jumbo and Best of Show with 9-foot span J3 Cub built from Sid Morgan plans. Complete with chipped paint!



"Round Ralph" Warner of RAM, enjoys a sneak preview of the July '81 Model Builder.



Show managers Jim Simpson (left) and Chuck Holden momentarily break contact on the CB's to make direct conversation.



Chuck Wood, Zia Models (formerly Air-Forms) talks about the "Delta Dart" sport model and sharp looking F-86 Sabre.

World' in the April '81 issue.)

★ ★ ★
The Macs Hobby and Craft show, following only two weeks behind the Toledo Weak Signals 'Happening' sure keeps the manufacturers hopping around the country! Barely enough time to catch one's breath. At least the weather was a bit more cooperative. . . Outside demonstrations several times a day highlight this show. Sailplanes, helicopters, electric and fuel powered

craft were flown. Dave Wilson, well-known local pattern flyer was demonstrating an RTF Cessna and succeeded in making two passes under a small bridge in the flight area (his nemesis last year!). Would you believe he had to go for it the third time? Oh, well, there is always next year. . . Inside, an area was set up to demo R/C cars and needless to say, the younger generation took delight in the collisions and wrecks as the exhibitor/drivers kept pushing just a little bit

harder in the corners.

And another show under our belt. . .

★ ★ ★
The next weekend, May 2 and 3, found a "Gathering of Eaglets" (scale types, that is!) at the Scale Olympics, hosted by the Riverside R/C Club, very ably conducted by the past C.O. of the Scale Squadron, Don Lien, CD. The contest manager, Mike Miller, and his assistant, Tom Hamm, had quite a bit of help from other club members. Flight



Giant Scale SE5, Quadra powered, by Bob Jones.



Dale Yaney's XB-70 at high angle of attack but flying slowly per the real bird. Couldn't get it "on step".



Bob Pray's Royal P-38, two ST .60's, Kraft radio, retracts, Fowler flaps. Ticked prop on low pass, but survived.



John Lockwood looks pleased at being allowed to crank up Quadra and fly Larry Sutherland's Tiger Moth. World Expert S/S radio.



Interesting, and documented military paint job on Rich Westlake's Ercoupe, flown by Bert Baker as team mate.



Randy Hinton's razorback Jug was one of four P-47's at contest. His first scale job!



Royal B-25 by Bob Parcell.



Staggerwing Beech by Dick Skoglund.



John Lockwood performs realistic fly-by with Sutherland's Bud Barkley Tiger Moth.



"Pilotless" Aeronca on slow fly-by. Don't know builder/flier.

judging duties were handled by Bill Semler and crew from the pattern judges association (USPJA). Interesting to note is that Bill has been conducting skull sessions with respect to pattern and scale flight differences and then going out to the field and having practical judging seminars. . . Not too many gripes at the local pattern and scale contests. . . Saturday was quite overcast and windy, but the level of flying was quite high, and only a few wing tips became scratched.

Insofar as aircraft types, it was the day of the 'Jug,' as four P-47's were on the flight line. Two Beech Staggerwings, two Stafford Ercoups, a B-25, P-38, and an XB-70 rounded things out along with a Gere Sport, J3 Cub, SE-5, Aeronca Champ, a Dauntless, and a Zero adding to the variety. Bob Jones rented a large truck to haul his giant scale air force, consisting of his big Gere, J3, and SE-5. He came to fly and, he did. . . Kent "Cowboy" Walters was first in Stand Off with his Dauntless (hey guys, he does his homework), John Lockwood 2nd, and Jim Meister, flying a 'Razorback' Jug was third. Bob Frey, of 1/8th Air Force fame, was high point in static with his much modified P-38 based on the Royal kit,

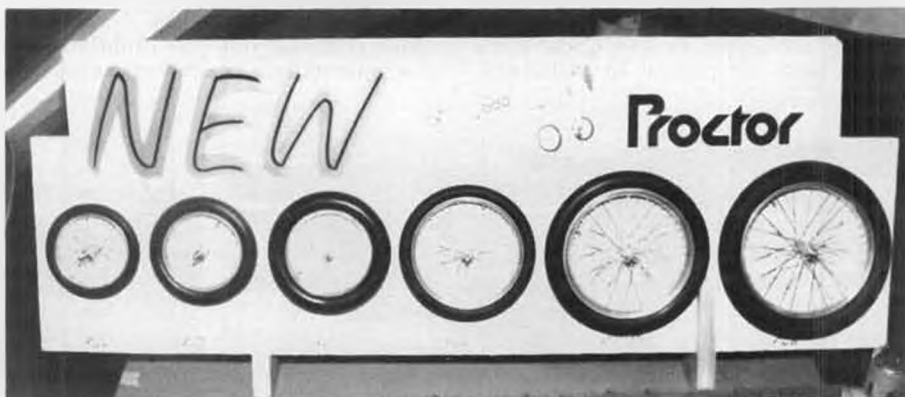
but upgraded considerably with such things as Fowler flaps, etc. . . . Bob couldn't amass enough flight points to pick up the big marbles, but after the contest closed on Sunday, he fired up the '38, took off, and made like Tony LeVier. . . except on one low low, pass, the asphalt "reached up" and ticked a prop. Bob pulled up, cut the power, did a 180, and came in for a landing, just scratching a wing tip. . .

Dale Yaney, ex 1/4-midget pylon jock turned scale type, had several good flights on his entry, an XB-70, complete with retracts. Looked a bit touchy on the ailerons and the hot K&B had to work hard to push it through the sky at a decent rate of speed, but knowing Dale, he will get it right. John Lockwood's Eindecker, complete with wing warping via R/C, had to work at flying upwind! 'Big' Bert Baker joined forces with Rich Westlake in team scale and flew Rich's "Military-ized" Ercoupe. T'was painted

in a sharp military type paint scheme. Had the documentation to prove it, too! Along with flying his own models, John Lockwood joined forces with Larry Sutherland and treated the crowd to some nice fly-bys with Larry's Bud Barkley Tiger Moth. . . Place this contest on your "must go" list. Very well organized and executed.

★ ★ ★

The weekend after the Scale Olympics was sort of a hobbyist holiday, I think. . . Or, let's go out to Chino Airport and



New wire wheel series coming from Proctor Enterprises.



Dave and Sandra Robertson, of California Model Imports, at Macs Show in Long Beach.



Scott Christensen and Charlie Bauer (holding) get ready to flight demonstrate Top Flite's new J3 Cub, Fabrikote covered, of course!



Larry Jolly catches sailplane after flight demonstration.



Smoke generating expert Don Harris shows off cast and machined retract gear parts for giant scale Beech Bonanzas.

enjoy a 12-inch-to-the-foot airshow! Not a full blown airshow, mind you, but a procession of fly-bys of many pre, during, and post WW-II aircraft, including the Boeing P-26 Peashooter, a Stinson Reliant in military camouflage, a restored Culver Drone being flown, not R/Ced, a P-38, 2-place P-40, an F6-F Hellcat, Hawker Sea Fury, a B-25 and Douglas B-26 (originally A-26) in tight formation, all this and more . . . performing nice, easy, fly-bys. Quite a few of the birds are part of Ed Maloney's

"Planes of Fame" museum, while others are privately owned. Many other Oldies were on display, including a razorback P-47 B or C, a for-real P-51A "camelback" being restored, but sitting on its gear sans engine, an ME-109G and an ME-262, a P-39 Airacobra and P-63 Kingcobra, a B-17, a deteriorating B-25 from "Catch-22" . . . and the list goes on. Peeked through a hangar door and saw a for-real "One a day in Tampa Bay" Martin B-26 being restored to flying condition! Was sitting on its gear; an impressive restora-

tion job being done. Any one remember the Warner Bros movie, "Air Force," starring John Garfield, with Martin B-26s painted up to resemble Japanese Bettys? I saw one out of MacDill field in Tampa, fly over St. Petersburg, Florida as a kid; saw the same plane, now a faded hulk, being cannibalized for spare parts in Chino, California, 39 years later. . . Small World. . .

★ ★ ★
Not necessarily the last show of the
Continued on page 83



A Culver Drone being flown "first hand" rather than by radio control.



Nicely polished Vultee "Vibrator" taxis by at Chino Airport.



"Mr. Tojo, we suggest you break left immediately!" Only remaining Zero being tracked by P-40, F6F, and P-51.



"Ah, so. Very good idea!" Kinda gets up the hair on the back of your neck!



Two-seater P-40 "Warhawk".



Boeing P-26 "Peashooter" from the '30's.



Grumman F6F "Hellcat".



North American B-25 and Douglas B-26 (formerly A-26) fly by in close formation.



P-38, without superchargers, but who cares, it flies!



Boeing P-12E taxis by. See Westburg article in March '81 Model Builder.



Douglas O-47 still going strong.



Remains of Northrop N9M, 1/3-scale version of XB35/B49 flying wing.



Hawker Sea Fury, with five blades stirring the air.



MINI BIRD

By MARK SMITH . . . A two-meter version of Dave Thornburg's "Bird of Time" by one of our nation's foremost glider guiders. The "Minimoa" wing planform is a trademark of this design.

• Mini Bird is the answer to the question asked by many R/C sailplane pilots, "What can I build that is not a fragile blimp, that can be flown in both calm and windy days, yet won't have the flight characteristics of a brick outhouse?"

We think you will agree with us when you see your two-meter Mini Bird "scoot" up to the top on tow, streak off to a thermal, then slowly circle up and up until it is a mere speck against the clouds.

If the plane has drifted with the wind, as it circled in the thermal, you will be pleasantly surprised by the way Mini Bird can penetrate the headwind and

return to the launch area.

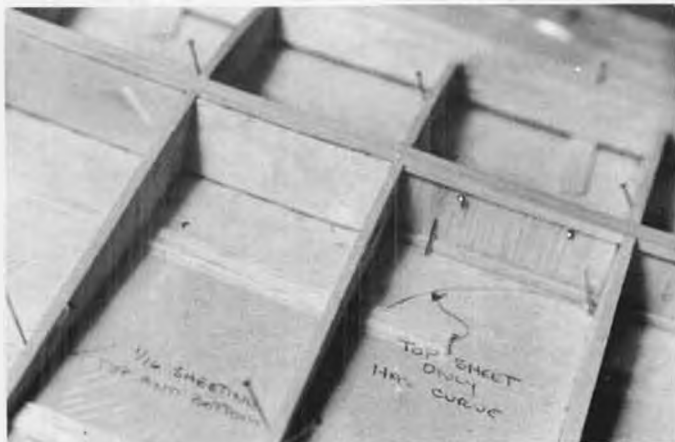
Before you start construction you have a major decision to make. What airfoil do you want on your Mini Bird? Mark's Models has introduced a new concept to sailplane kits by providing two sets of wing ribs in this kit. If you decide to build the 11% thick wing then go over the die cut rib sheets and apply cyanoacrylate adhesive to the cut that forms the 8% ribs.

If you do not know which wing to build then build the 11% wing. Thin wings are fast in flight but a lot of skill is required to fly an 8% wing. So, if this is your first or second sailplane then build

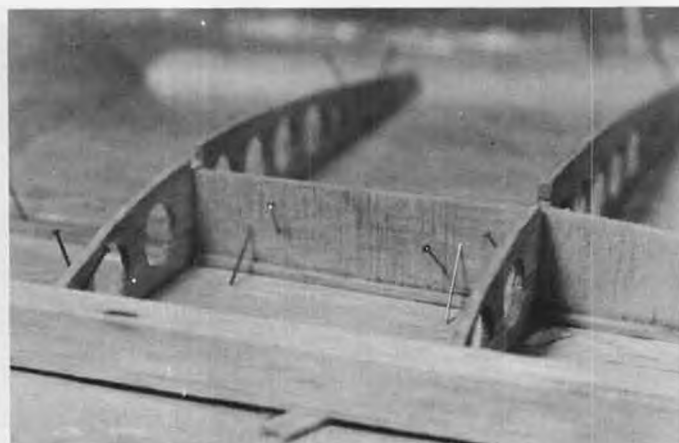
the 11% wing. If you are the local "hot pilot" on the R/C sailplane contest circuit and you know you can handle a 8% thick wing, then go for it! (I wonder what kind of a wing you could get out of the thin ribs that are left over when you build an 8% wing!) Another decision is a two-piece or one-piece wing. The one-piece wing is easier to build and a little bit lighter, while the two-piece wing is easier to transport.

WING CONSTRUCTION

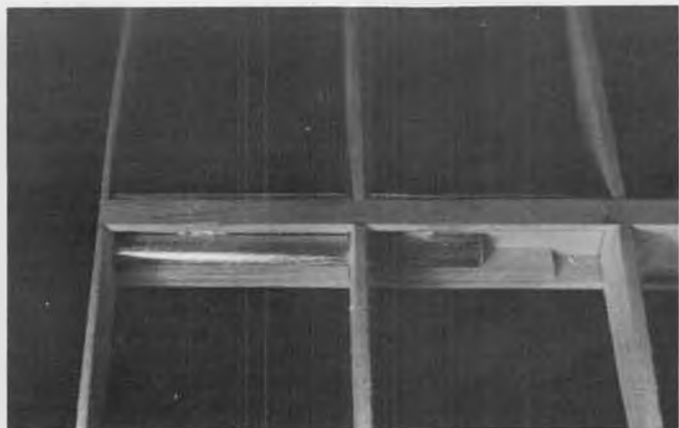
1. Tape the drawing of one of the inner wing panels to the work surface. Tape a sheet of wax paper or plastic wrap over the drawing.



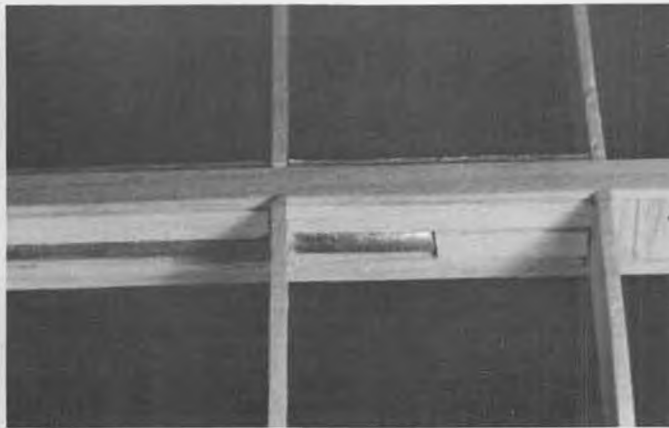
Plywood shear webs at root. Note shims under root ribs, which will be sheeted.



Outer wing panel under construction. Note punched-out ribs, shimmed L.E., and vertical shear webbing.



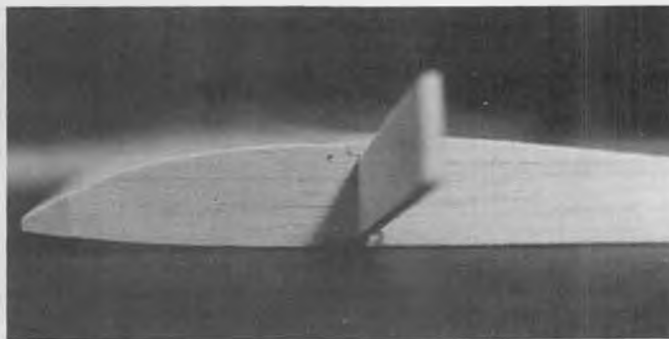
Brass tubing for wing joiner (two-piece wing only). Align and tack in place prior to final epoxying.



Wing tube blocked in with balsa and thoroughly epoxyed in place. Sheeting will taper load stresses.



Slot in inner panel about to receive dihedral brace already attached to outer panel.



Proper contouring of leading edge follows curve of rib. Note Phillips entry (Phillip will explain it to you).



Tip butts against L.E. and spars; T.E. continues. Mark and trim before gluing in place.

2. Place the bottom $3/32 \times 1/4 \times 18$ inch hardwood spar in place over the plan. Shim the leading edge up off the work surface with scrap bits of $1/16$ balsa and pin the leading edge in place. Shim the K10-W1 ribs above the work surface with $1/16$ inch balsa and glue all of the ribs in place.

3. Cut the $1/8$ sheet balsa shear webs to fit and glue them in place. Be sure that none of the shear webs extend so high that they will hold the spar above the top surface of the rib where the $1/16$ sheet balsa is glued in place. Do not install the $1/8$ poplar dihedral brace at this time.

4. Glue the top spar in place.

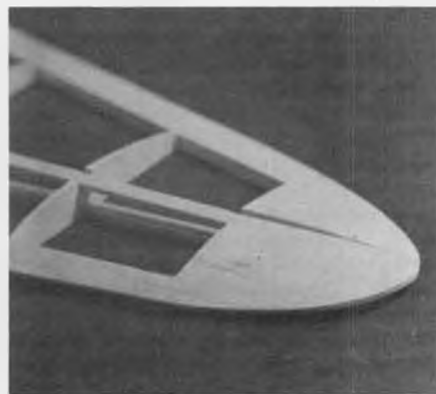
5. Glue the $1/16$ plywood shear webs to the rear of the spar. Leave the front of the spar open so you can install the $1/4$ o.d. wing tire tube. If you are building a one piece wing, glue in the front $1/16$ plywood shear web.

6. Build the other inner wing panel to this stage of completion.

7. Install the wing wire tube in each panel for the two piece wing. Drill an oversize hole in the ribs to provide clearance for the tube. Plug the ends of the tube with $1/16$ balsa, use the tube itself as the "plug" cutter. Chamfer the inside corner of the tube that will be at the junction of the wing panels. Remove any tarnish from the outside surface of the tube with sandpaper and wipe the surface clean with a cloth and acetone. Coat the center of the $7/32$ dia. wing wire with parafin or oil so the epoxy will not adhere to it. Set one center section panel flat on the work surface and butt the other panel up against it with the wing tubes and wire in place. Raise one panel so that the end is 2 inches above the work surface as shown in the $1/8$ scale drawing on the plan. When the panel is blocked up to the proper height and the panels are aligned with each other, put the $7/32$ filler blocks under the tubes and epoxy the tubes in place with spots of five-minute epoxy, or cyanoacrylate and baking soda.

8. After the epoxy has cured, remove the panels from the work surface and complete the installation of the tubes. Fill in the voids between the tubes and the spars with filler blocks and epoxy. As soon as the blocks and epoxy are in place, install the front $1/16$ plywood shear webs. The wing panels will have to be resting vertical on the trailing edge until the epoxy cures.

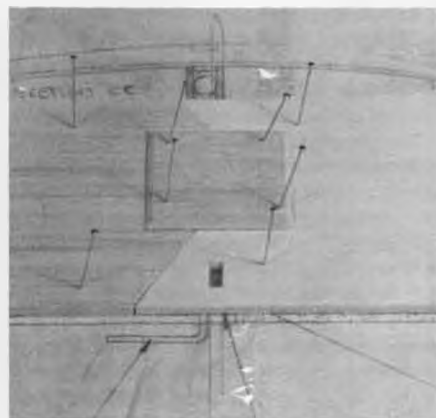
9. Sand the leading edge so that it blends into the curve of the ribs. Section



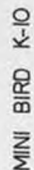
Cut tip out, to spar, to accept L.E. sheeting.

C-C shows how the top $1/16$ sheet bends over the leading edge. Use a sanding block that is at least $3/4 \times 2 \times 9$.

10. Pin the wing panel flat to the work

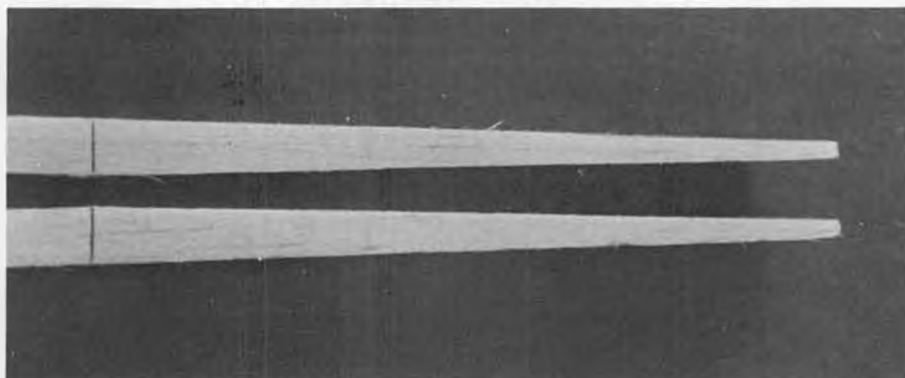


Doubler reinforces joint of balsa and plywood sides. Be sure not to make two left sides!



DESIGNED & DRAWN BY: MARK A. SMITH
TRACED IN INK BY: *St. John*

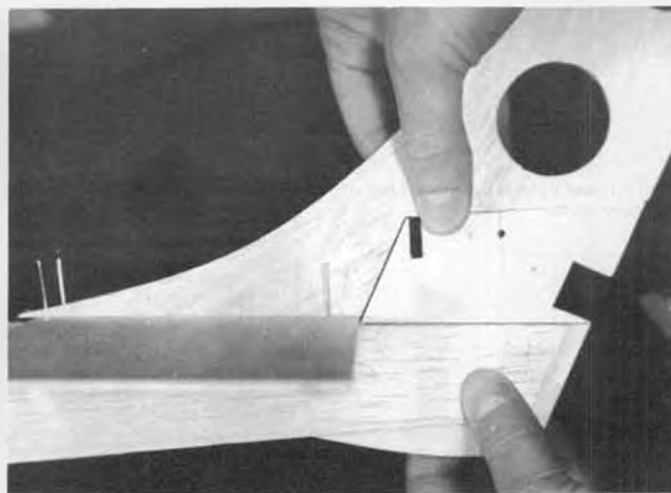
MODEL BUILDER
magazine
Plan No: 8811



Above: Triangular fuselage corner stock is tapered at rear for joining of fuselage sides. Right: Bottom of front bulkhead is cut away to clear triangular fuselage corner stock.



Fin and dorsal fin are joined over plans. Note lightening holes. Saves use of excessive nose ballast for balancing.



Positioning ply sub-fin on fuselage. It carries pivot and joiner wires for flying stab.

surface and apply a filler of aliphatic resin glue to the junction of the 1/8 shear web and the bottom spar. Coat the top spar, the leading edge, and the ribs with glue on the surface that contacts the top leading edge sheeting. Pin the sheet in place.

11. Let the panel dry for several hours before you remove it from the work surface. If you are building the 8% wing, then cut away a 1/16 wide strip from rib K10-W2 and K10-W1 to permit the installation of 1/16 plywood shear web doublers as shown on the plan.

12. Cover the top and bottom of the wing in the area of ribs K10-W1 with 1/16 balsa sheet. Butt the sheet balsa on the bottom of the wing center section

against the leading edge, the spar shear webs, and the trailing edge. This is shown in the cross-section of the wing drawn on the fuselage side view.

13. Bevel the root ribs so that when the panels are brought together there will not be a large gap at the junction.

14. Skip this step if you are building the one-piece wing. Glue the 1/32 plywood root ribs in place. After the glue has dried use a model knife to open up a hole in this rib for the 7/32 dia. wing wire. Set the inner wing panels aside and start the outer panels.

OUTER PANELS

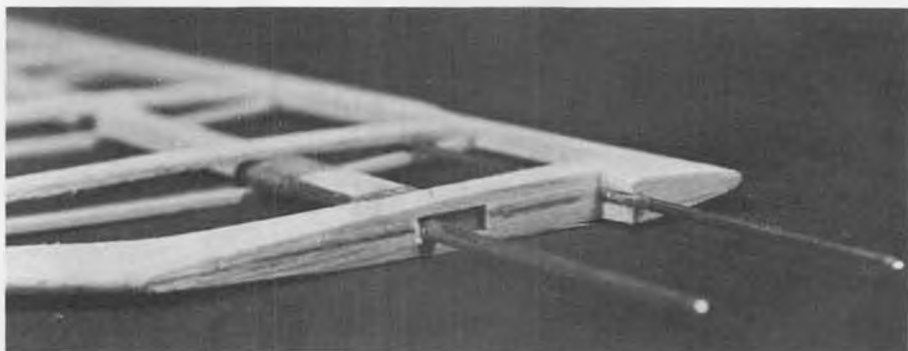
1. Cut out the drawing of the outer panel and repeat all of the steps required to build the inner panels to the

point (step 3 or step 7) where the 1/8 balsa shear webs are glued in place. The ribs are, of course, different. Leave the leading and trailing edge about 1/8 long where they butt with the inner panel.

2. With the outer panel pinned to the work surface, glue the 1/8 shear webs in place. Fit and glue the wing tip block in place.

3. Use the 3/32 x 1/4 spar, temporarily set into the spar notches, to arrive at the proper thickness for the wing tip. When the glue has dried, remove the outer panel from the work surface and sand the leading edge and the wing tip so that they fair into the curve of the wing tips. Sand a shallow step in the top of the wing tip block where the leading edge sheeting glues to the block.

4. Check the height of the 1/8 poplar dihedral brace by setting it on the bottom spar and seeing how it matches the top spar notch in rib K10-W4. Next cut a 1/8 wide slot in rib K10-W3, between the top and bottom spars for the 1/8 plywood dihedral brace. Check the fit of the dihedral brace between the spars. If all of the parts fit, glue the dihedral brace in place in the outer panel. When the glue has dried, fit the inner and the outer panels together. With the inner panel flat on the work surface, block up the outer panel so that



Stab fairing blocks above and below spar and wires. Note light weight strip-rib construction.

Continued on page 91



Bill Kinsey's Dornier 335 taking off at 1981 Mint Julep contest. Lost both spinners on first flight. All photos of Mint Julep action by Cathy Underwood.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• Life seems filled with traumatic experiences in this day and age. Paying for the kids college education, buying a new house or car, coping with world affairs, are but a few of the problems we encounter. All of these pale into insignificance when compared with the first-contest-of-the-year difficulties. This year, while the northern climes enjoyed a mild winter and an early spring, we were fraught with less than normal flying weather due to high winds, especially during the weekends. As a result, the first scale bash for the year in this area, the Mint Julep at Rough River, was

just that, a bash. The attendance was outstanding in that there were some 70 entries of which 69 flew. Giant Scale had 11 big ones, Sportsman-Division I had 11 entries, Sportsman-Division II included 20 models, Expert-Division I had 20 with a bundle of multis and ducted fans, and Expert-Division II with 7 rounded out the field. It was fortunate that a much larger than usual number bit the dust. Many could be traced to pilot error pointing out the inability of many to get much stick time. Your writer, for instance, attempted to accomplish a three turn spin in two spins worth of altitude.

It doesn't work! That old saying "I should have -----" reared its ugly head. There could have been some winter weary equipment but that's hard to trace. In addition, it appears that some models were flying with rather high wing loadings.

The static scores in each division were generally tightly bunched with virtually everyone being in the running on the basis of flying. The results were predictably very close.

SPORTSMAN DIVISION I

1. Clifford (B-25)	155.5
2. Kummer (F 16)	147
3. Morris (P 47)	147
4. Pound (Tony)	139.5
5. Du Vall (P39Q)	138

SPORTSMAN DIVISION II

1. White (Waco)	157.5
2. White (Tiger Moth)	
3. Kleinhaus (C 3)	154
4. Barbee (Chipmunk)	153
5. Echerd (Superfli)	152.5

GIANT SCALE

(scores not based on 120 static/flying)



Mr. and Mrs. Paul Clements at work firing up his Giant Scale Pitts.



Scale Masters Qualifiers (l to r): Tom Cook, Ralph White, Bob Underwood, and Skip Mast. Fifth qualifier Harold Parenti missing.

1. Tacie (Citabria)	161
2. Clements (Pitts)	160
3. Slater (Cap 20)	156
4. Santich (Baby Bullet)	155
5. Workman (Cosmic Wind)	153

EXPERT DIVISION I

1. Underwood (PE 2)	180.5
2. Cook (F4J)	180.5
3. Parenti (F8F)	178
4. Mast (C-130)	178
5. White (P51 D)	176

EXPERT DIVISION II

1. Tacie (Citabria)	167
2. Underwood (Chipmunk)	165.5
3. Workman (Laser 200)	165.5
4. Bunch (Smith Mini)	160
5. Taylor (Jungmeister)	159

(Ties broken by highest static.)

Several very notable models were entered this year. Tom Cook's F4J twin ducted fan is an awesome model which he flies expertly. The effortless approach of Tom and his pit crew is wonderful to watch and defies the usual ducted fan fiddling that occurs. When the drag chute pops out signaling the end of the flight, you know that you've witnessed an outstanding flight.

Bill Kinsey's Dornier 335 is of special note. It is a large model and it garnered a very good static score. The significant aspects were the mechanical considerations. The push-pull engine set-up was handled by placing the rear engine in the center section of the model, just behind the cockpit. A very long 3/16 inch shaft carried the power to the rear prop and the engine uses a liquid cooling arrangement. Another flight score of 82 would have put the model right in the competition. Bill's unique model finished 8th with a score of 172.

Skip Mast's C 130 is equally outstanding. The fuselage, with its diameter as big as a person's waist is hard to believe. Skip is working on building one that will meet FAI specifications. It should be a very competitive model.

The competitors and the many spectators enjoyed a very well run contest and super weather which was warm and sunny both days.

OF NATS, FAI, AND STUFF

Notice was given some time ago that the 1982 Scale World Championships competition had received only one bid and that was by the USSR. They did not include Standoff competition. As a result, many assumed that we would not select a team as a result of their decision. Developments since that initial announcement has made it clear that a team would be selected at the 1981 Nats. NASA, (National Association of Scale Aeromodelers) has developed World Championship plans and has let it be known that they will submit a formal bid this December at the CIAM meeting in Paris. The site proposed is Reno, Nevada at the same field where the Reno Air races are held. Informal conversations with a number of persons around the world indicate that there is interest in the acceptance of such a proposal. The intention would be to offer and hold not only the F3C and F4C Control line and



Giant/Sport Scale Citabria won two firsts for Cliff Tacie. Mind explaining that, Bob?



Paint job on Underhill's Ansaldo, which earned highest static points in Sportsman Class, Div. II and finished 7th, really attracted photographer Cathy Underwood.



Giant Scale Heath Baby Bullet, by Dan Santich. Finished fourth. Two-cylinder engine could be O.S. Gemini.



Gear looks quite a bit shorter than scale length on Taylor's F8-F, built from Royal kit. Finished 9th. Well flown.



Skip Mast's C-130, which placed 4th. Suffered damage after losing engine during flaps down "slow cruise" fly-by.



Bill Kinsey's Dornier 335 on takeoff roll, before throwing both spinners.

Radio Control precision classifications, but Stand Off R/C (provisional event), Giant Scale, and possibly Free Flight and a full scale antique fly-in on the final weekend. Details and firm planning for this offer are in the works. NASA and AMA personnel are involved.

As a result of this planning and the fact that whomever gets the bid may see fit to add events at a last minute, the US will select a Stand Off team as well as Precision at the Nats in Sequin, Texas in competing for a birth on the team must

meet the following requirements. The contestant must have an FAI stamp on his AMA license, pay the team selection fee prior to competing (they will be collected at the Nats when the model is processed), and the model must meet FAI requirements for weight, engine size, wing loading, etc. Any modeler not interested in the team selection will not be affected in any way by these requirements.

This year at the Nats, several procedures which have been used at various

contests and at the Nats individually but rarely all at once, will be instituted. A previewing session will be held for both Precision and Sport Scale prior to the formal judging. In Sport Scale this will be done from a distance well beyond the standard judging but it will allow the judges to have a general overall impression of the model quality prior to closer scrutiny.

In Sport Scale one judge will handle one section of the judging concerns. That is, one judge will consider outline, one color, finish, and markings, and one, workmanship.

All presentations will be checked at the time they are turned in to determine that no more than six pages 8-1/2 x 11, or the equivalent have been used. If more than this is included, the modeler will be required to remove portions to get down to that limit.

Sport Scale judges will not be allowed to handle the models at any time. In addition, they will be kept from the judging area until the previewing time at 10 o'clock on Wednesday.

All models will be weighed and safety checked at the initial check in time and spot checks will be made during the flying period. In addition, all models in competition for the FAI berths will be processed for FAI specifications.

The FAI figure eight will be used in place of the AMA eight listed in the rule book.

A pilot's meeting will be held on the evening prior to the flying and it is recommended that you attend. No formal pilot's meeting will be held on the field immediately prior to the flying. In that way, we hopefully will be able to effectively use all the allotted flying time.

Hand scoring will be used at the site and machine tapes of the computations will be available after the flight for the competitor.

All options not specifically listed in the rule book will be approved in advance of the flying period for inclusion in the modelers program. Changes of maneuvers from round to round will be allowed but must be made from the rule book or approved list. Proof of unusual maneuvers or of specific maneuvers for certain aircraft may be required.

A strenuous effort will be made, depending upon entry numbers, to fly from one site in order to allow everyone maximum viewing of the competition.

All static judges will be required to make written comments on the static sheet relating to their judging of the model. Comments will be designed to be constructive in helping you understand how they perceived the model and arrived at their evaluations.

In light of the fact that I will be filling the capacity of RC event director, I would appreciate hearing from you concerning these and other items you feel might be important to consider. I hope to see you at Sequin in August and again at Reno for the World Champion-



Second in Sportsman, Division II, White's Tiger Moth. Sorry, didn't get first names.

Continued on page 82



Bob Upton with his full and quarter-scale Upton Baby Aces, both of which he built. Model was featured as construction article in May 1978 MB. Photo by Dick Tichenor.

2 SIDES OF SCALE

By GEORGE A. WILSON, JR. . . . No doubt this will not be the last discussion about "scale speed", but in our mind it certainly is the simplest and most direct approach to the situation we have seen to date.

INTRODUCTION

Most modelers could not care less about the technical side of why their models fly. Over a period of time, they learn by experience and from their peers how to get good flight performance from the models they fly. Depending on their talent and their level of drive and their competitiveness, they become experts or, like the most of us, just enjoyers of the hobby.

However, most of us, at one time or another, get into the edge (if not the middle) of arguments about how well our models can simulate the flight of the real thing. With a few notable exceptions (the great art of microfilm models, typically), our models do look like the

real thing. For most of us, this is good enough!

On the other hand, there are many people who use models for scientific investigation of how full size aircraft fly. For the most part, these people are professionals. Occasionally, an amateur turns "pro." This was the case with Henry Arnace, who several years ago used his R/C modeling experience to help design a full size homebuilt airplane. Upon completion of his project, he wrote an article entitled "Radio Control to Scale" (*Sport Aviation*, Jan. 1977, Vol. 26, No. 1). This article is not totally accurate with respect to some of the scaling factors, but Mr. Arnace's general approach and the conclusions

he reaches are well worth reading about.

There are two distinct areas of scale modeling: "dynamic scale," used by the professional (or serious amateur) designer, and "visual scale," used by the hobbyist who needs no mathematical relationship between his model's flight and the full scale equivalent. If we identify and understand these two areas even in a non-technical manner, many of the arguments about the flight of scale models will go away. Typically, one of the longest lived and most vigorous controversies in the airplane hobby is whether or not "scale speed" can be achieved by a model airplane. Scale speed here is defined as the speed determined using linear scale factor. Said another way, a quarter-scale model should fly at a speed equal to one-quarter that of the original.

This type of scaling is important to the modeler who wants his scale model to appear like the original as it flies by. The answer to the controversy is: "Yes, linear scale speed can be achieved." This article will try to dispel some of the controversy and shed some light on the reason why it was there in the first place.

DYNAMIC SCALING

Aircraft flight is subject to certain basic and well-known natural/scientific rules. These rules are complex and contain many "non-linear relationships." For the untrained, a "non-linear relationship" exists when you double something and the result is more or less

TABLE I
DYNAMIC SCALING FACTORS FOR MODEL AIRCRAFT

Characteristic	Scale Factor	If the model's scale is			
		1/4	1/5	1/7	1/10
Dimensions	F	0.250	0.200	0.143	0.100
Areas	F ²	0.062	0.040	0.020	0.010
Weights	F ³	0.016	0.008	0.003	0.001
Wing Loading	F	0.250	0.200	0.143	0.100
Speed	F	0.500	0.447	0.378	0.316
Power	F ³	0.008	0.004	0.001	.0003
Proportional Speed	1/√F	2.000	2.236	2.644	3.162

TABLE II
VISUAL SCALING FACTORS FOR MODEL AIRCRAFT

Characteristic	Scale Factor	If the model's scale is			
		1/4	1/5	1/7	1/10
Dimensions	F	0.250	0.200	0.143	0.100
Areas	F ²	0.062	0.040	0.020	0.010
Speed	F	0.250	0.200	0.143	0.100

The other factors in Table I have no practical meaning in visual scaling.

Continued on page 94

Pattern Flying

By DICK HANSON . . . Part 15: The Figure 'M', Top Hat, and Reverse Top Hat.

• We are off and running this month with a maneuver that has been rehashed twice to include rolls (1/4 and 1/2) but remains in its original form, one of the prettiest maneuvers in the Masters Class schedule. This apparent simplicity allows the slightest mistakes to show up. The typical mistakes are: 1) Failure to get a sharp "Hammerhead" turn; and 2) Loss of wing orientation after the turns.

Some designs simply are not well suited to hammerhead turns due to forces exerted by thrust line (engine placement and angle) which are oddly placed, and wing to stab relationships, dihedral angles, etc., which are not conducive to neutral flying characteristics.

You can actually do very good hammerheads with only a little rudder deflection if you have a good neutral design and a crosswind to work with. It must be understood that this maneuver (as well as all R/C Pattern maneuvers) is oriented to the ground, and therefore any wind or crosswind must be dealt with to prevent shifting or drifting of the flight path.

Placement of the "M" is similar to the "M" with 1/4-rolls and the "M" with 1/2-rolls. The height of the "M" can be less than the rolling versions because the roll is absent. Remember to only *reduce* power after the vertical climb is established. The plane should still have a fair amount of propwash over the rudder as it reaches the "stall" or apex of the vertical legs.

A nudge of rudder in the correct direction should start the hammerhead turn, and the throttle can then go to low idle, making a very tight turn which is smooth and easy for transition to a vertical dive. We prefer to wait until the pull-out is completed before adding power. This makes for a smoother look in our opinion.

On all of the "M" maneuvers, the rudder must be played to hold the model on course during crosswinds. Sometimes the model will appear to be flying in a heavily "crabbed" attitude, but the rules don't say anything about downgrading that. (Correct. It's the path of the plane that counts, not its attitude. wcn)

TOP HAT — REVERSE TOP HAT

Somehow we missed the Top Hat during the descriptions of the Expert class maneuvers, so we will catch it now. (Sorry. Richard, you get a Zero anyhow! wcn)

The standard approach to the Top Hat has been to try for a ballistics shot with rolls. This technique was logical in a situation where thrust was 6 lbs. and the

plane weighed 9 lbs. Coupled with a wing loading of 30 oz. per sq. ft., you had to use inertia to make it over the top.

If you have ever seen a full scale Pitts do vertical power rolls, you have an idea as to the best procedure for the Top Hat. Brute thrust is required, and there is no reason you can't get it. (Also, for best results, the ailerons should have a high roll rate available.) A rough estimate of good power loading can be had by holding the model carefully with the nose straight up and having your assistant set the throttle to full power. The propeller you use for flying should provide enough thrust to lift or balance the weight of the model. Be extremely careful when attempting this, and keep the propeller well above and away from your head and body.

The approach to the Top Hat is the same as used for the "M" with 1/2-rolls. That is, make certain the wings are level before starting the initial climb and be sure you establish a vertical heading before and after the 1/2-roll. The shape of the maneuver has been a matter of discussion over the years. This time, the shape is up to you; Top Hat, Stove Pipe Hat, Pork Pie Hat, etc.

As a matter of opinion I suggest the following; start the maneuver approximately 45° or less from center. Start closer if there is a noticeable crosswind. This will allow you to complete the top of the hat with less apparent drift. Remember the maximum altitude allowed is approximately 300 feet!

Another suggestion is to cut the throttle as much as possible before starting down the far side of the top. This will help control speed build-up. We find that it's also best to recover to level flight before adding any throttle.

REVERSE TOP HAT

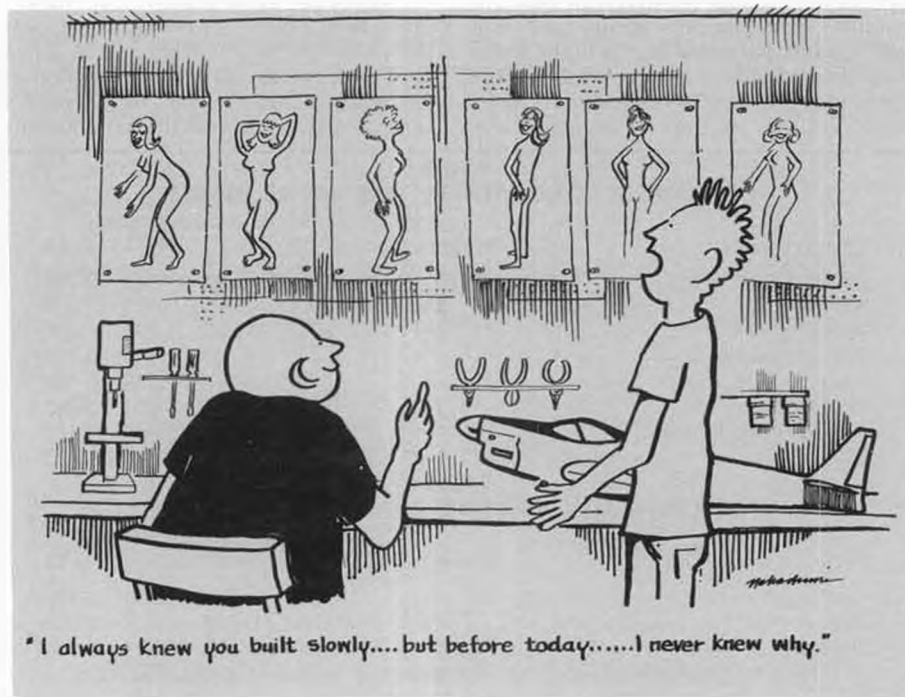
The Reverse Top Hat is just exactly that, except this time the distance across the bottom is to be the same as the distance covered on the vertical legs.

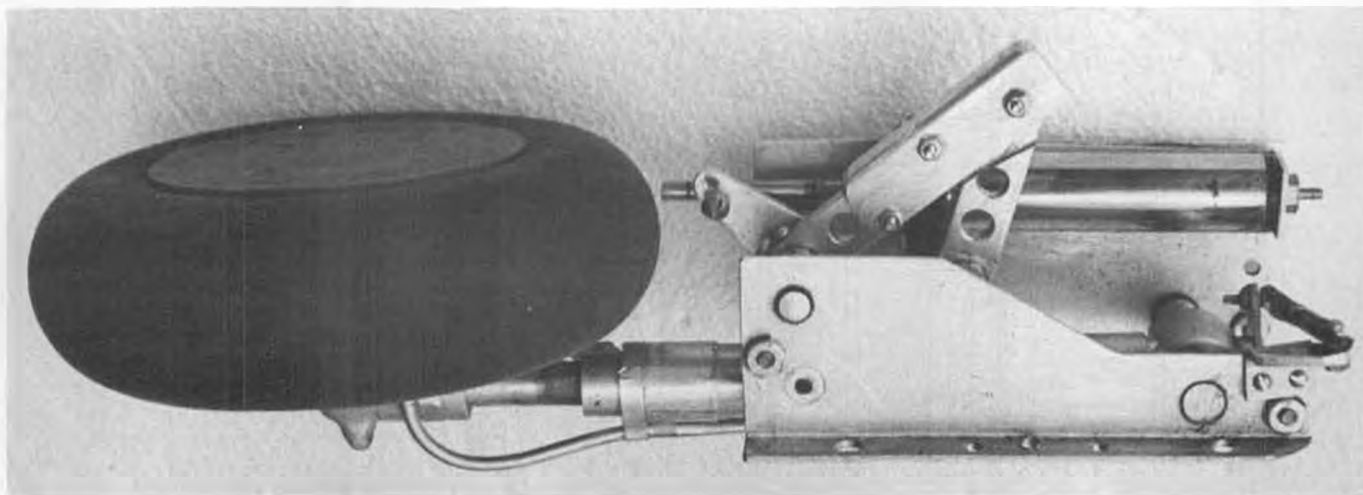
The accent is *really* on thrust this time, because the first diving leg must be kept at minimum speed in order to make the 90° turn at the bottom. This means that power is added only a few seconds before turning 90° again and climbing and rolling vertically. That requires maximum thrust! The best bet is to keep this maneuver on the smaller side to prevent speed build-up in the dive and minimize vertical power requirements on the climbing leg.

Here's the technique we like: Start the maneuver at a moderate altitude, say 300 ft., with the model flying as slowly as practical. Remember, if the vertical legs are 200 feet, the bottom leg will also be 200 feet, so . . . start at a lateral position and distance which gives the best presentation. For example, the larger the model, the further out the maneuver can be flown.

After the maneuver is called, wait a second, then make a fairly sharp vertical dive and establish the heading. We use a high rate aileron switch to permit a rapid

Continued on page 91





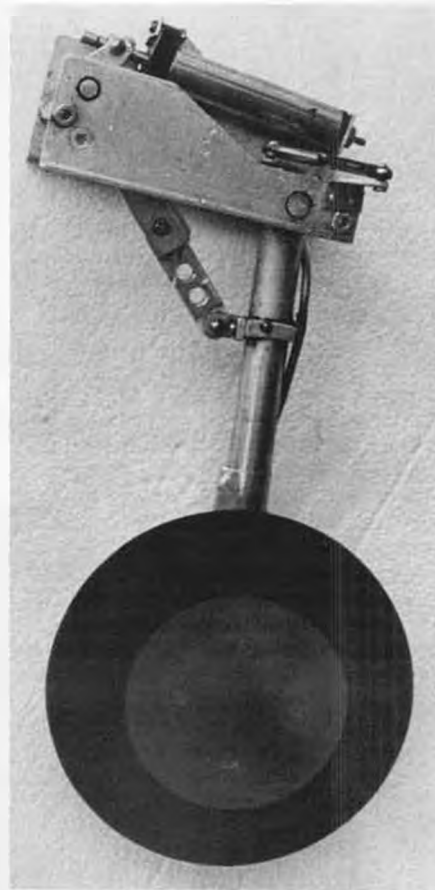
RETRACTS ROTATING

By COL. ART JOHNSON . . . As soon as we saw the author's article and drawings for the P-40 in our June '81 issue, we knew the retracts deserved a special treatment of their own. This material should get you on your way for any model requiring rotating retracts.

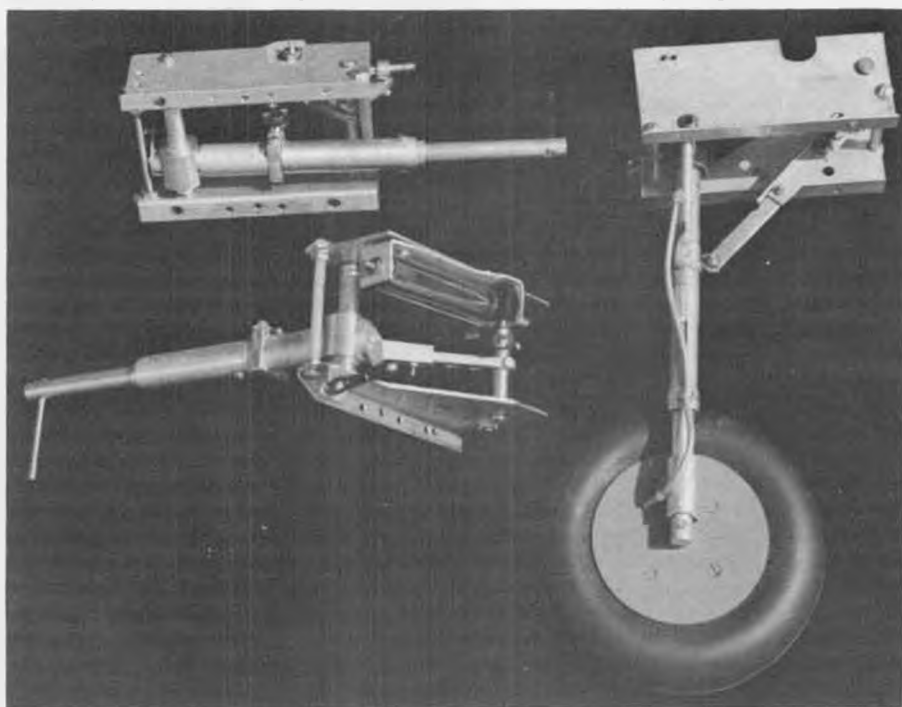
• Up to now, World War II fighters have been an extreme minority of the complement at Giant Scale contests and fly-ins. I suspect a major reason is that retract gear mechanisms suitable for these big birds were a bit slow in development. Sure, I know that you can fly these models with the wheels hanging down on a fixed gear and that a WW II fighter with fixed gear has even won a first at the NATS. However, to this old fighter pilot, watching a WWII fighter model put in a whole flight with the

wheels hanging down is enough to make you want to turn in your wings. Let's face it, it just was "not done" that way and I knew that when I built my new P-40, it was going to have the gear come up after take off.

Easier said than done when you consider the size wheels needed for this model. The P-40 had very large low pressure tires designed for grass field operations. The 5 inch Giant Dubros look right but when modified with scale wheel covers, they weigh more than one



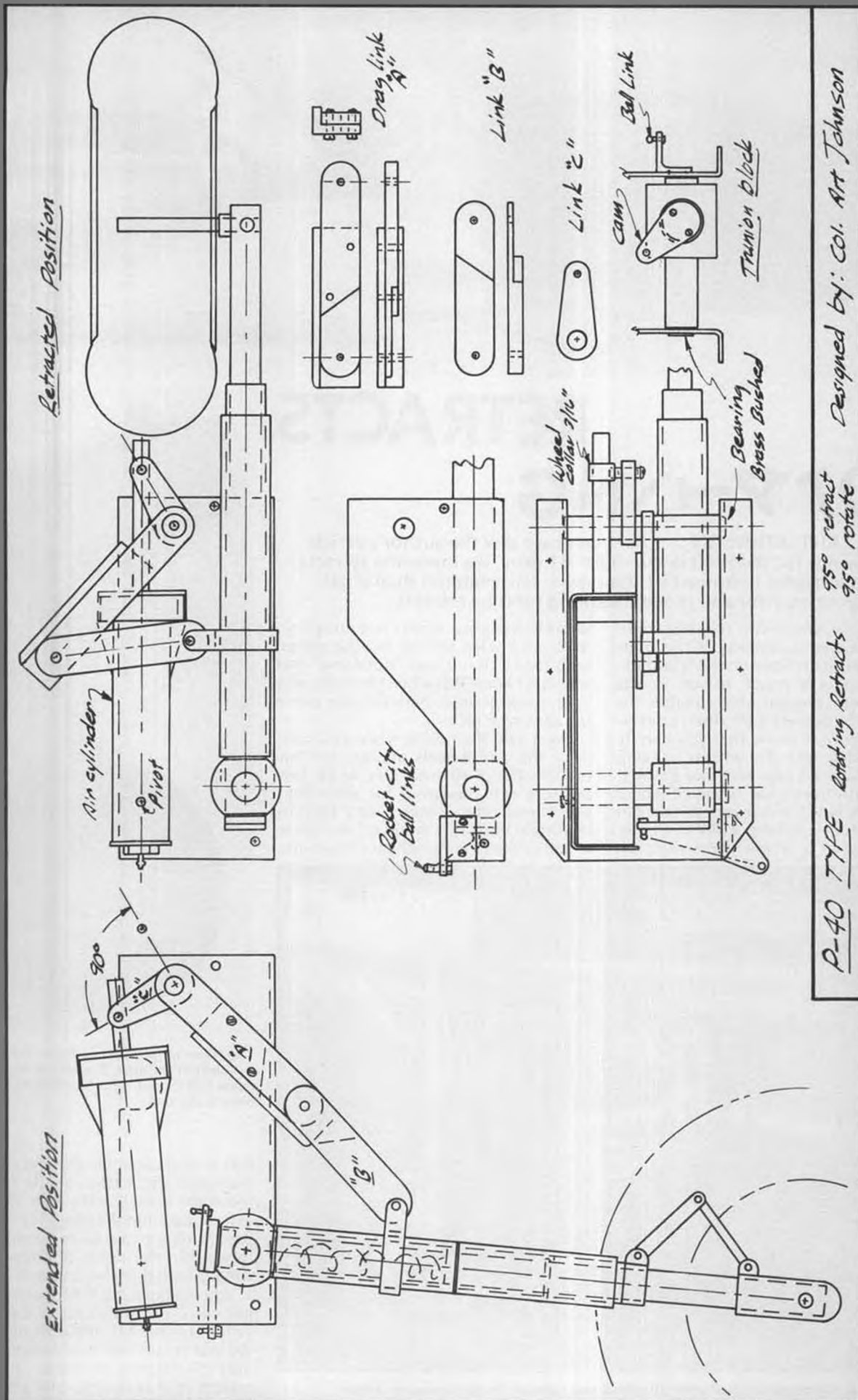
Top: Gear in retracted position. Rocket City ball links at far right. Directly above: Gear down and locked, with 5-inch DuBro wheel. Note brake line.



Original brass and aluminum gear with wheel and two views of the all aluminum version.

half pound each! On the end of a seven inch gear leg, it takes a little muscle to move the wheel up through 95 degrees as it retracts into the wing. The 5 degrees past 90 in each case takes care of the cant forward in the down position and the wing dihedral in the up position.

When I built the P-40, Dave Platt had just come out with a heavy duty retract system for his ME 109G. At that time it did not rotate and it retracted through only 85 degrees. However, his spring loaded strut was long enough and the heavy duty air cylinder he was using



looked good. Starting with these parts, I worked out a design that I thought would do the job. The design was based on what I remembered of full scale practice but it was not until I visited the Air Force Museum while attending the 1980 NATS that I found out what had been in my subconscious. I must have climbed past the rear rotating and retracting nose gear of the A-26 a thousand times while getting in to fly the plane, but never thought much about how the gear worked. Looking at the one in the museum, I realized that it works exactly like the drawings of the design for the model P-40. Even the rotating link works the same. So much for originality!

The original set of retracts for the P-40 design was made from aluminum and brass parts obtained from the local hardware and hobby shop. The only tools used were a Dremel saw, file, butane torch, electric drill, and a couple of taps. The gear worked well through all the first flights of the P-40 but the grass field proved a little hard on the brass tubing parts.

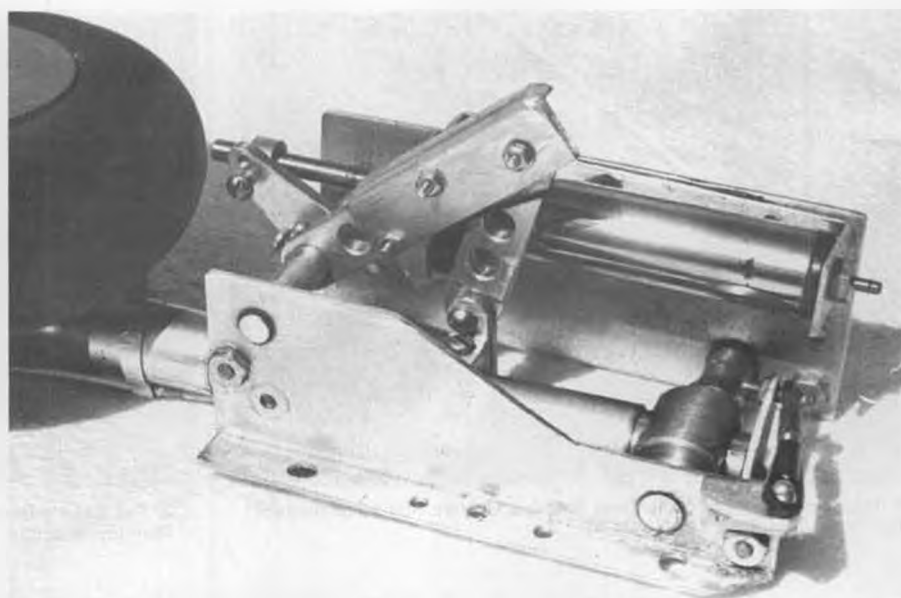
I next showed the design and prototype to Bruno Brunelli, one of our club members with a metal lathe and the knowledge to use it. Bruno came up with a lathe turned aluminum strut pivot and link pivot strong enough to take almost anyones landings. He also thought of a wheel collar link to the air cylinder shaft that permits easy adjustment of the mechanism to any type air cylinder. The only requirement is that the cylinder have at least 1-1/4 inch of shaft movement and sufficient thrust.

Final development of the retracts followed the usual scientific methods. When any part failed in use, it was replaced with an improved version (bigger and heavier). The all aluminum design shown in the plans is heavier than the original brass and aluminum version, but it is rugged and it works.

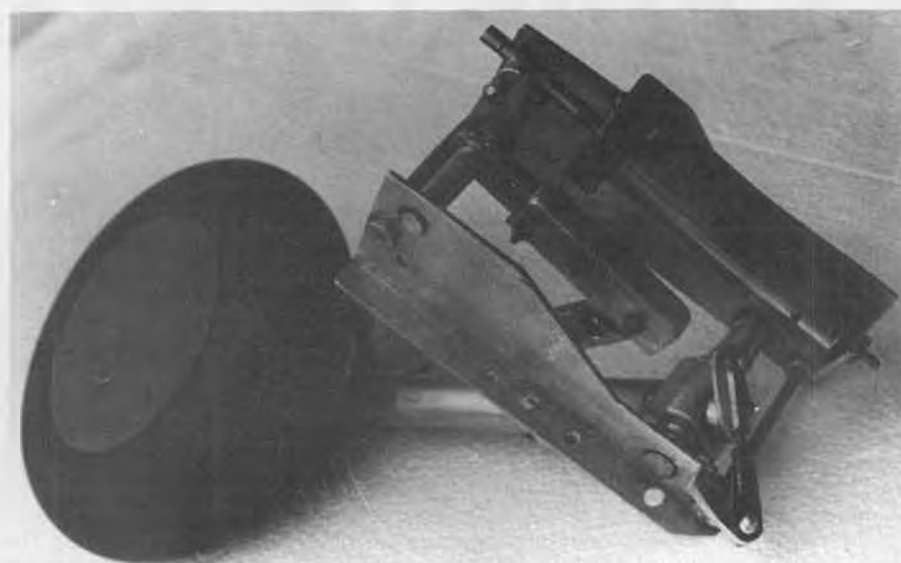
The side plates for the gear are cut with a hacksaw from 5/64 aluminum angle material available at hardware stores. Brass eyelets are inserted at the strut and link pivot points to serve as bearings for the pivot shafts. The plates are held together with 6:32 threaded rod with adjustment nuts on either side. Drill holes in the angle portion of the plate to suit your installation in the aircraft. Mine are held down with six 4:40 bolts and blind nuts.

The lathe turned strut pivot shaft is drilled so that the 1/2 inch strut will rotate in the shaft without slop or binding. The strut is held in the pivot shaft by an aluminum cap pressed into the strut on top and by two pieces of 3/8 O.D. tubing on the bottom. The top piece of tubing is pressed onto a projection of the pivot shaft and remains fixed to the shaft. The bottom piece is pinned to the 1/2 O.D. gear strut and rotates with it.

The gear strut is retracted by the action of links A, B and C as the air cylinder rotates cam C through 90 degrees. The links and cam are sawn and filed to shape from 3/16 hard aluminum.



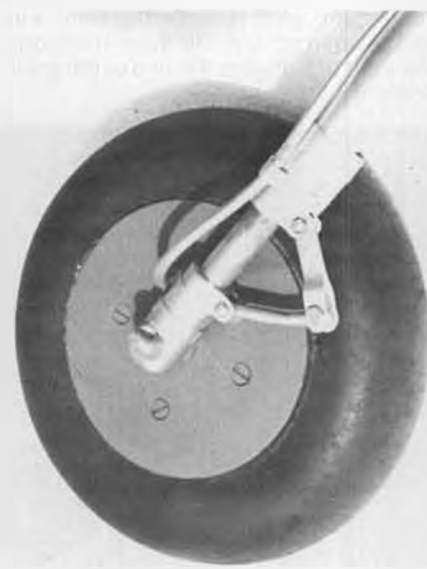
Close-up of gear in retracted position, showing pivot shafts and ball link.



Halfway through retract cycle. Wheel has turned 45 degrees.

A and C are pinned to the link pivot shaft in the position and angle shown in the drawings. Use 2:56 bolts or music wire steel pins if you are sure you have the angles right. Note that links A and B are locked slightly off center when down by the piece of angle aluminum bolted to A. One-eighth hard aluminum is adequate for the down lock bracket. Both pivot points on link B are bushed with brass tubing and fastened with 4:40 bolts.

You may have noticed that the bracket holding the ball linkage that rotates the strut looks out of place sticking out the side of the bracket. Well, I first put this linkage on the opposite side in a very neat internal installation. It worked great until I put the gear in the wing and found that the wheel rotated in the wrong direction. The bracket is cut from 1/8 angle aluminum and bolted to the



Close-up of spring-loaded oleo with scissors, brake line, and tow bar eye.

Continued on page 90



1. Winnahs! John Pond and Dave Sherman display first-place plaques for Power/Sailplane Team contest.



2. Ted Kafer's Dennyplane looks like real thing as it takes off. Uses Dennymite engine.



PLUG SPARKS

By JOHN POND

• Tired of that fierce competition? Don't like that head-to-head confrontation? Well, SAM 21 has proved again that there is still a great amount of fun to be derived from old timers with their Annual Power/Glider Team contest.

Team contests in the past have always proven to be the most fun but with just the right amount of competition to bring out the best in each flyer. After all, you are helping each other rather than in the deadly business of trying to outguess your opponent.

The Power/Glider idea, generated by Jack Alten, President of SAM 21, is the outgrowth of his long experience with the South Bay Soaring Society. Inasmuch as the two phases of modeling, old timers and gliders, have the same end result, soaring, Jack hit upon the happy thought of bringing the two contingents together.

In setting up the teams, Jack cleverly "handicapped" the hot power flyers by matching the other member of the team with a glider man of lower ability. This little gimmick was easy to accomplish as all entries are processed before the teams are made up. As Jack put it, the procedure was to place the power contestants in order of past performances and invert the list of the glider contestants and match the teams. Hence, a number one power man would be teamed with a number ten glider man (this is based on a ten team setup). The results were surprising as most all teams had a chance to win right down to the last round of flights.

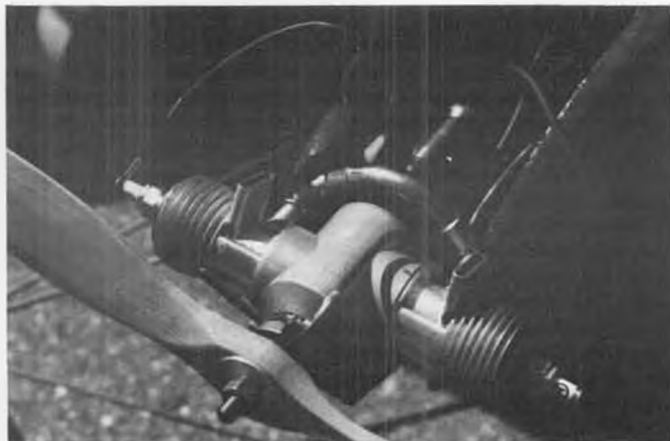
This year, because of a conflicting glider contest, entries from the glider group were small compared to last year when three man teams had to be made up. Matter of fact, former glider men

Jack Alten and Ted Kafer flew gliders to help balance out the teams.

As reported by Steve Roselle, newsletter editor of SAM 21, John Pond awed and amazed onlookers when the wing of his Playboy Sr., separated at several hundred feet altitude and quickly reversed itself earthward with the engine running wide open all the time. Steve reported "good old John" killed the engine about fifty feet high just in time for all to enjoy the noise of the loud crunch as the Playboy hit that adobe hardpack. Seemingly unfazed, John unlimbered his backup Playboy and in teamwork with his glider pilot, went on to win. (Oh yeah? wcn)

Photo No. 1 shows Pond and Dave Sherman with the outstanding aluminum-over-wood placques made up by Jack Alten. Of note is the Playboy Cabin between the winners. This was originally a free flight model of some 20 years vintage that was converted to radio assist using a Super Cyclone for power. Surprise! It flew great! Sherman won with a Paragon, an excellent Ed Slobod design, marketed under the firm name of Pierce Aero.

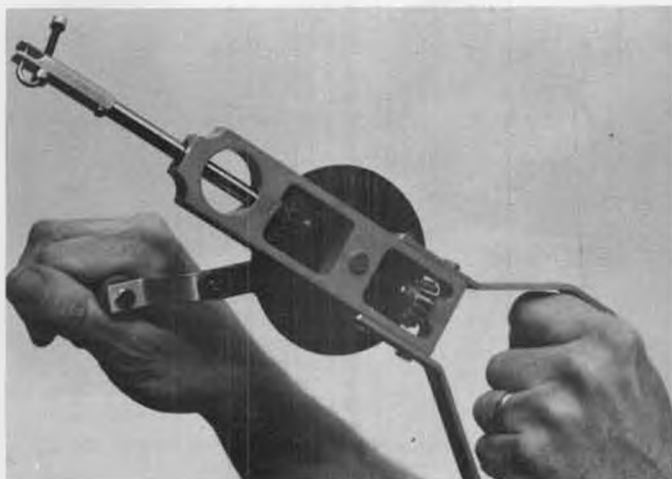
Photo No. 2 also illustrates what is going on in SAM 21 with a heavy swing to ignition powered old timers. Dave Bruner removed the Kraft 61 from his scaled Lanzo 1.1 Record Breaker and



3. Dave Bruner mounted ignition Hurlerman Twin in his Lanzo 1.1 Record Breaker. Ran well, but needed break-in.



4. Another Bruce Lester photo shows Frank Zaic launching his New Yorker III at the 1938 Detroit Nats.



6. Latest thing in rubber winders, by John Morrill, called "Side-winder". Uses Stanley drill gears. See text.



7. John Morrill built Cleveland Cloudster to demo his latest Simplex .285 motor. Photo by Harold Johnson.

installed one of Herb Wahl's jewels, a Hurleman Twin. Unfortunately for Dave, the motor still needed breaking in. First flights were of the hairy Borneo gorilla type; i.e., barely clearing the brush at the end of the runway. By the end of the day, the model was making presentable times, each flight successively improving. Anyway, it was simply great to hear the crackle of that Hurleman Twin!

Photo No. 3 is one of the best takeoff shots seen in quite awhile. Ted Kafer brought his Dennyplane (powered by a Dennykite, natch!) to help spur the fun. Takeoffs were most realistic with the Dennyplane looking for all the world like a Fairchild 24W (W for Warner power). If you thought takeoffs were great, Ted outdid himself on landing as he found a pile of dirt at the head end of the runway (a result of some excavation for a pipe line) and neatly bounced the model over the mound. Real neat!

Roselle reports that an examination of the times registered showed that Old Timers were more than able to hold their own against the more sophisticated and streamlined sailplanes when it came to registering time. The leveling factor appeared to be the tow winch employed

by the sailplanes limiting the altitude they could attain. This really made a difference in marginal air for lift.

Besides all the fun flying, Jack Alten made sure the boys had plenty to keep them busy by supplying hot coffee along with doughnuts, danish pastry, etc., just in case you missed breakfast in the rush to the contest. Let's take a look at the results to see how the fun developed:

1st	John Pond (OT)	1128
	Dave Sherman (SP)	1253
		2381
2nd	Don Bekins (OT)	1163
	Lee Pfefferman (SP)	951
		2114
3rd	Steve Roselle (OT)	579
	Bob Brown (SP)	1123
		1702
4th	Ed Solenberger (OT)	1114
	Brian Thornhill (SP)	579
		1693
5th	Charlie Critch (OT)	1019
	Jack Alten (SP)	622
		1651
6th	Don Carll (OT)	829
	Steve Couch (SP)	729
		1558

We only listed the first six because of space limitations but interesting enough the average old timers score was 788 compared to the Sailplaner at 808. Pretty darn even!

So what is the moral of this tale? It is simply that fun can be found in any phase of modeling. A mix of two or more is really a fun ball! Try it, you'll like it!

ENGINE OF THE MONTH

In the September 1946 issue of *Model Airplane News*, a full page color ad appeared announcing the arrival of the Viking 65, a new twin engine illustrated with red case and red three bladed variable pitch propeller.

Called in the early days "The Red Knight of the Sky," the selling price of the motor was \$24.75 with an additional \$2.35 for the fancy three bladed prop. The two items could be purchased on a package basis for \$26.50.

Built by the MacVal Mfg. Co., 3223 Burton Ave., Dept. 9MA, Burbank, CA, this motor was another attempt to produce a twin for the control line scale model, the craze presently sweeping the country in the late forties.

The Viking 65 was actually .647 cu.in. displacement brought about by a bore



8. Fred Lehmborg proudly displays his Class C "Feather Merchant", with Ohtsion .60. Design just approved for O.T.



5. Frank Parmenter launches his Class C Swoose for first test hop, in summer of 1941, Virginia. Later enlarged stab.



9. A George Dela Mater "1-1/2" cabin rubber job, by Bill Crovella. Hot flier has placed in 8 out of 9 contests.



10. Fred Emmert enjoys wife's help as he readies his Toft Stout Winner . . . at SAM Champs.

of .812 and stroke of .625. Weight of this twin was 11 ounces, quite light compared to the OK Twin at 22 ounces. Surprisingly, the competitive Scout Twin and Ace Twin engines weighed only 11 oz. and 9.5 oz. respectively showing quite some similarity in design construction.

The Viking engine featured die cast aluminum alloy cylinder head and crankcase. Crankshaft was machined from Chrome Moly steel with steel piston and liner. The timer case was plastic, located in the rear for ease of adjustment. Two ball bearings supported the crankshaft.

Performance figures are pretty meager on the Viking with only the manufacturer claiming 1/2 horsepower at 8,500 rpm. However, there is no indication these figures were obtained with the advertised three bladed propeller. As a matter of fact, the prop shown in the advertisements was a wooden model. According to reports received, the plastic three bladed propeller never went into mass production. Hobby dealer Art Swift (at that time) stated the propellers were completely unsuitable with the red plastic propeller blades separating under high rpm from the two piece die cast hub.

As for Viking engines, back in 1964, Dan Sitter had all the molds, patterns, dies, etc. to the engine. Where and who has the parts now is unknown to this columnist as he has not kept up with the engine collectors that closely. If we receive more information on the status of the engine, we will be sure to let you know.

THIRTY YEARS AGO I WAS. . .

During a bull session at this columnist's home the other day (so it seems!), Bob Oslan, former proprietor of Cal Aero, 7142 Bluesails Dr., Huntington Beach, CA 92647 was reminiscing about the World War II days of modeling. His comments were so interesting, this writer simply had to have Robert put down some of his thoughts about Joe Ott and the "good old days." Here's what Bob had to say:

"Those old Joe Ott 'Otto Former' kits I was rummaging through in your shop really took me back a bunch of years. I

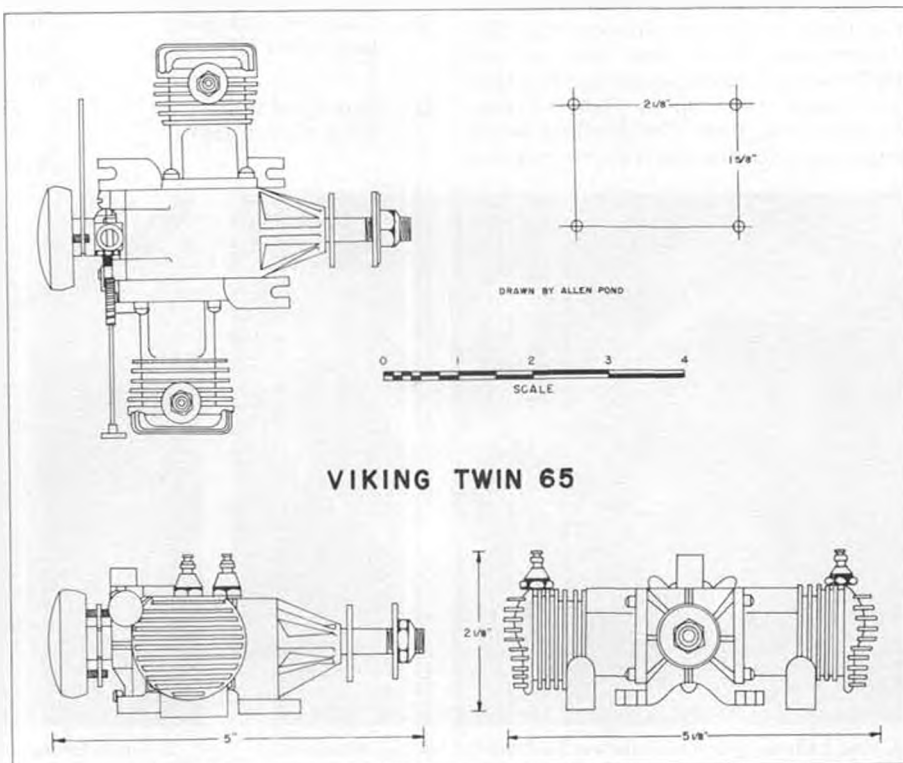
was a freshman in high school in Chicago in 1941 when Joe developed those kits for construction from wartime materials. I was one of a group of about 4 or 6 modelers who made prototypes for his kits. We rarely made complete airplanes. Usually it was a 45 inch P-47 wing followed by a Spitfire wing — then a set of wheels composed of laminated rims, three spokes and cardboard covers. Ribs were saw cut from 1/32 mahogany, leading edge, trailing edge and spars were bass or pine and the tips were cardboard. I never met the fuselage and tail group 'specialists.'

"One day a fellow wing builder and I were in Joe's office for what reason I don't recall but he was showing us his latest design fuselage which became the familiar built-up inner frame with card-stock formers. The inner structure and stringers were 3/32 square bass. Joe was really proud of the strength of the fuselage which he demonstrated by hurling it against an office wall . . . it

wasn't fazed, model or wall.

"When the prototyping was complete, we began building complete display models. As I recall, we got \$3.50 or \$4.00 for a 16-inch span model covered and doped. It usually took me a week to turn out a model and under the circumstances, I was making pretty good money for a kid in 1941. One of the display model builders could turn out two complete planes in one day. I was always amazed at his speed, and still am for that matter. His stuff didn't look too good but it served Ott's purpose.

"After the 'Otto Former' kits were in production, Joe developed profile Idenito Planes. These were 'spotter' models for home defense I guess. Joe needed 12 or 14 prototypes right away and my modeling buddy, Stuart Sack, and I were given the job. We picked up several sheets of 1/16 basswood, glue and black paint one morning and had to deliver the completed models the next day. Granted, they were only small



VIKING TWIN 65



11. Cactus Club SAM 31 member, Damon Adcock, seen at VAMPS Annual with well built, Ohlsson 60 powered Spook 72.



12. Maxine Thomas improves this photo of hubby Ross's Cleveland Cloudster.

profile models but a synchro vibratory jig saw only cuts so fast. We worked our behinds off and had the models all assembled with glue drying by about midnight. We began painting the flat black the next morning. Don't know what kind of paint Joe gave us, but after a little while we had to move from my friends room to the back porch, the fumes were about to knock us out and the darn stuff wouldn't dry. We delivered the models on time, still sticky. We got 50¢ apiece for them, we really cleaned up. . .

"Idento planes were followed by solid models made from laminations of 1/16 basswood. We got \$4.00 apiece for these and each one required a weeks work. They were finished in clear dope so the laminations would be visible.

"Those were great learning years for me, I accrued great gobs of experience and had the good fortune to associate with Joe Ott who was and probably still is a superbly creative gentleman.

"Along with his model work, Joe was also a pilot and owned a Stinson 105. He designed a small 'coastal Patrol Bomber' and was having a large prototype model built. Seems like it had about a ten foot wing span. It was a twin engine, high

wing plane with bombs stored vertically in the fuselage. Never learned what became of the project but this high school freshman was really impressed.

"The operational headquarters for all this activity was a model shop on 47th Street on the South Side of Chicago. The proprietor was a gentleman by the name of Ed Hazen. Mr. Hazen was one of the real pioneers of modeling along with Joe. He was one of the charter members of the Junior Birdmen of America, but that's another story."

Photo No. 4 is another one of those priceless Bruce Lester photos taken at the 1938 Detroit Nationals showing Frank Zaic about to launch his New Yorker III rubber model.

In a letter exchange with Frank, he was unable to identify any of the other people in the photo. However, the identification of his model leaves no doubt as to its authenticity as three-views were published in "The National Model Airplane Meet in Pictures" as published by Model Aeronautics Publication (Frank Zaic), 100 E. 10th St., New York (Publication date, 1939).

We have run plans of Frank Zaic's New Yorker IV in *Model Builder*, but perhaps Frank could be encouraged to get up a

set of drawings on this model based on the three views. After all, Frank Zaic did win the Open Class Outdoor Cabin Event that year with a flight of 17.06m; not too shabby!

OBIT NOTE

Just received word that Hi Johnson of Johnson Motors fame (and numerous other items) was killed in a glider accident on May 4. Hi was a great supporter of free flight. We're gonna miss him!

Photo No. 5 is another old shot showing Frank Parmeter launching his Class C Swoose on the very first test flight. Frank was one of the original Hampton Roads Brain Busters gang that worked out of Langley AF Base.

As noted in the photo, Frank found that a larger lifting tail was required to maintain balance with such a short moment arm. Subsequent photos show the larger tail on the available plans. Frank freely admits he got his ideas from Jack Roeser, the designer of the original Swoose (a Class B model). This Chicago design has proven to be a winner whenever entered.

The Brain Busters received a tremendous amount of publicity from their

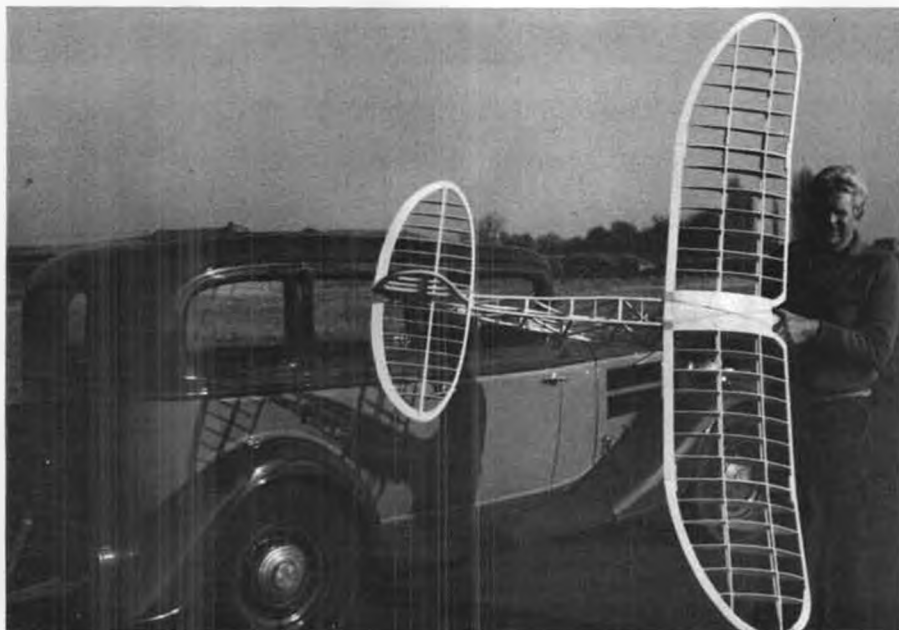
Continued on page 68



13. Glad to see the ladies in print. Phyllis Harmer, with hubby Bill's Air Trails Sportster. O.S. 15 power.



14. Marion Knight with his beautiful Jeffrey Streamline Cyclone (Jasco 1938 Yearbook). Harold Johnson photo.



HORNET!

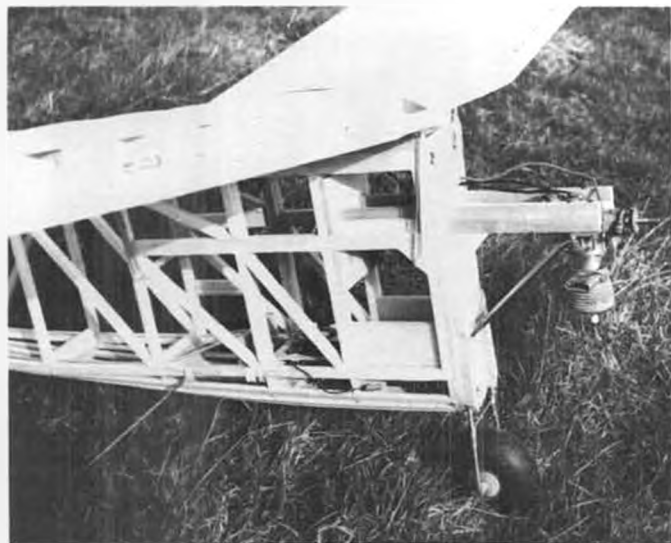
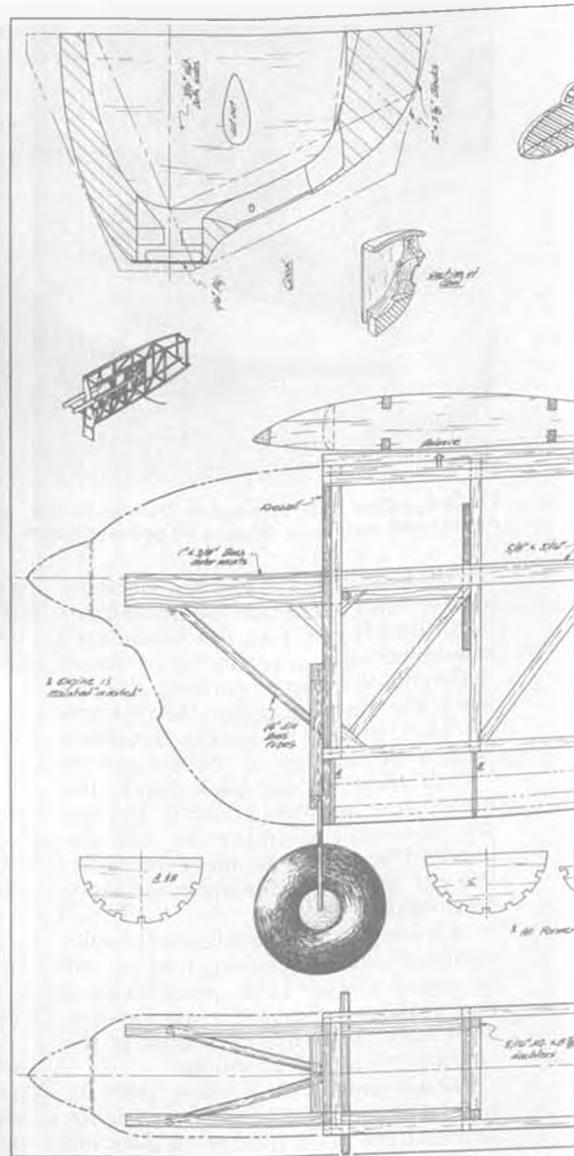
Designed by: Sal Taibi
 Drawn by: Al Patterson
 Text by: Bill Northrop

Just as in the July issue, where the OT Model of the Month was selected because of the receipt of some unique photos, so it is with the August OT Model of the Month. Along with his order for a subscription (thank you!) Sid Sutherland, of South Woodford, London, England, sent photos of his still uncovered Hornet, Sal Taibi's 1940 design for the Forster 99. What made the photos unique was the inclusion of a 1933 Hudson Essex Terraplane which Sid uses on those appropriate occasions when he goes out to fly old timers! Adding to the uniqueness of the photos was the fact that Sid is using a Super Cyclone engine in the Hornet that

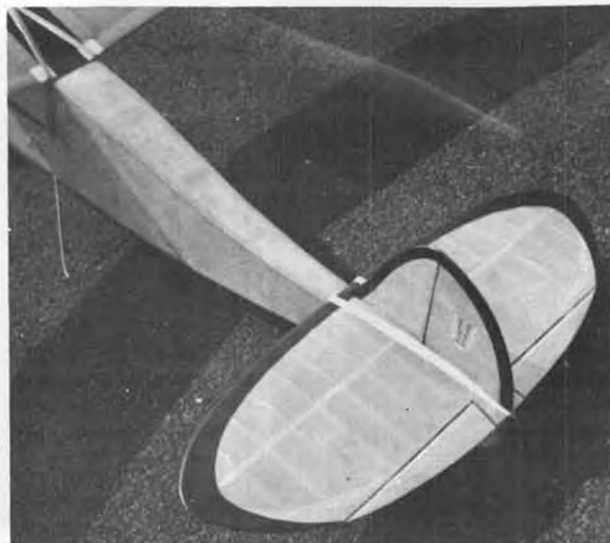
Continued on page 97



Sid Sutherland and his completed Hornet, on the famous Battle of Britain aerodrome.

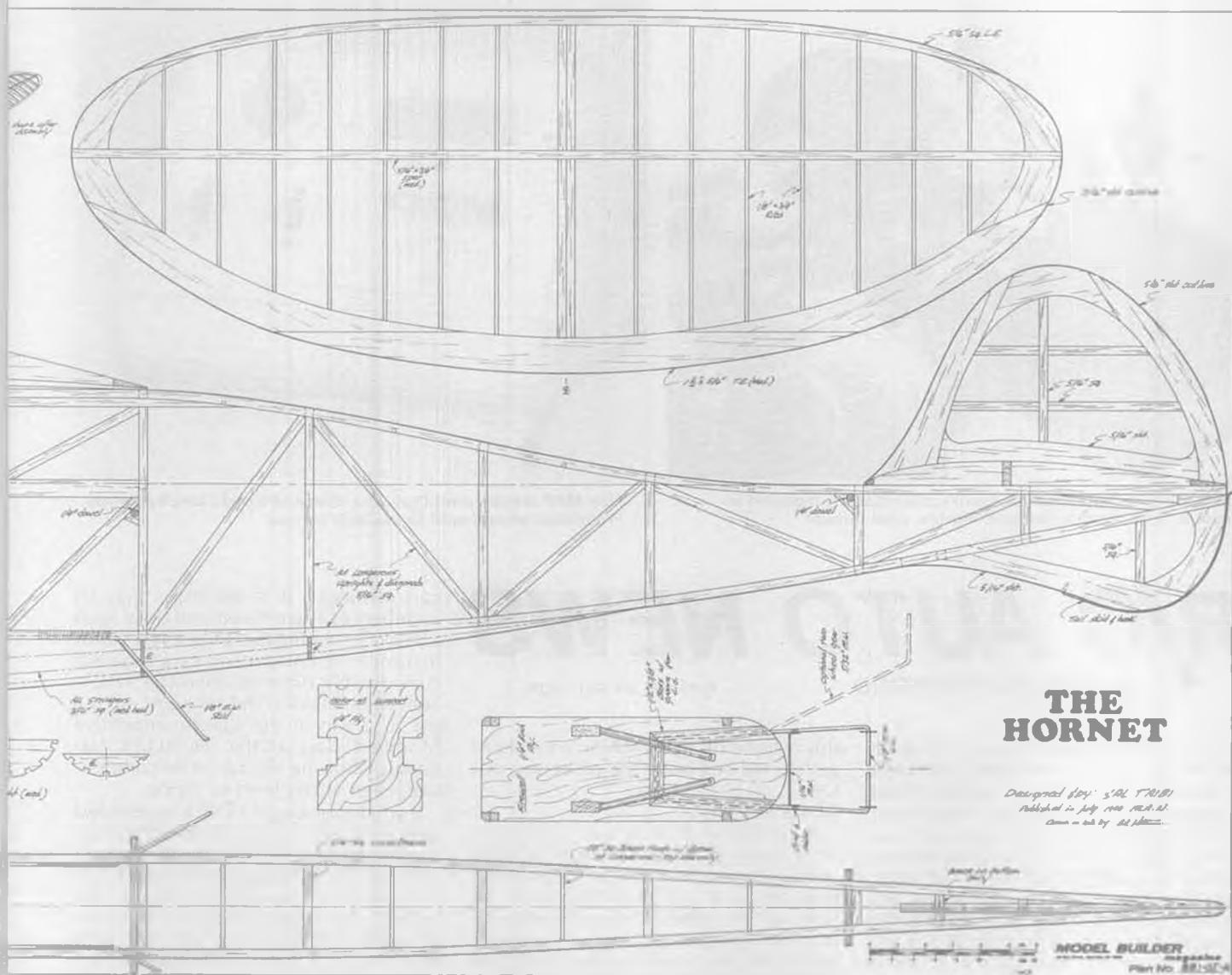


Close-up of Super Cyclone formerly owned by the late Eddie Keil of KeilKraft fame. Ballast needed to make up for 99!

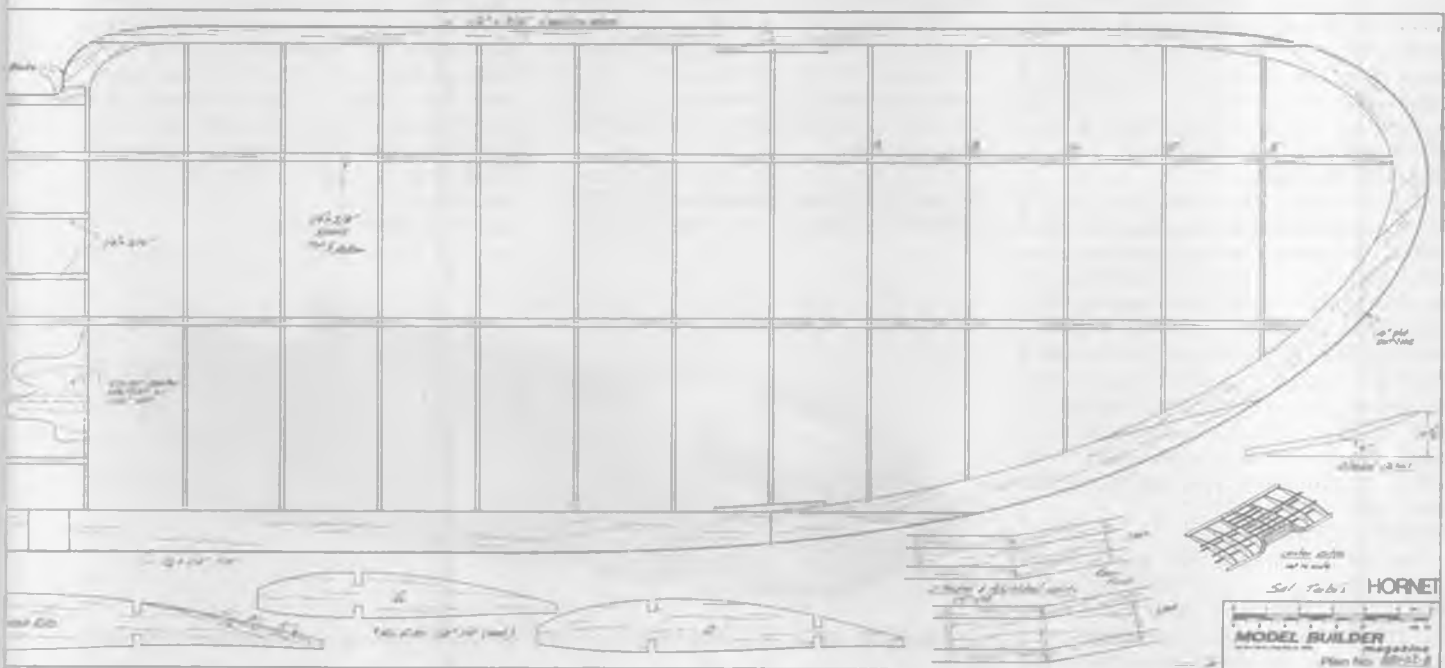


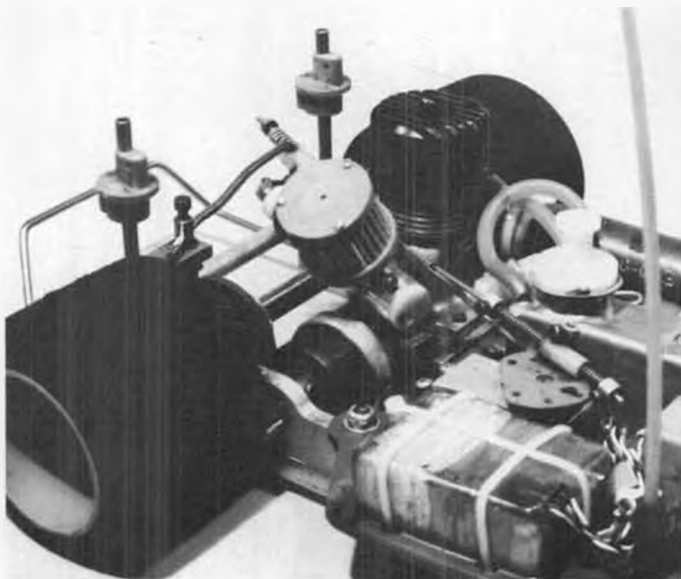
Shot of tail surfaces as modified for R/C. Taibi recommends two-wheel gear for better ground handling, R/C or F/F.





FULL SIZE PLANS AVAILABLE – SEE PAGE 100





Picco .21 with Delta slide-valve carb and air cleaner, mounted in Super J. Crisp throttle response, reliable, good mileage.



New MRP charger prototype. Can charge two packs simultaneously. Production units should be available by now.

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR

• Can't believe that I forgot to mention anything about it previously, but ROAR is hosting the R/C car racing World Champs this year and it is likely that it will be awhile before this traveling show comes back to the U.S. So go this year if you would like to see some 1/8 scale racing conducted on a very high level, indeed. Only trouble, and where the "oops" comes in, is that the W/C's are 'on' you as this is read, June 27 to July 5 and in Indianapolis, Indiana.

Continuing on the same line, can't even rustle up an exact address for the track, but if you call a hobby shop or two, I'll bet they can handle directions. Sorry that I haven't been that much help, especially as this is going to be such a huge race, but a little checking around ought to be worthwhile. . . It will be something worth seeing, even if you don't presently race R/C cars.

THANKS, FUTABA. . .

It is certainly no secret that Futaba radio equipment is absolutely dominant in R/C car racing and has been for years. Very difficult to find anybody using anything else, check transmitter impound at any race. With the W/C's coming, York Daimon and Futaba saw a chance to support a hobby/sport that has been kind to them and kicked in with \$5,000 toward a successful race. Right, five big ones, just like that! What brand of radio did you say would be your next purchase?

TAKIN' A CHANCE. . .

The Dirty Camera has been fixed, plenty of pics shot of the Associated RC12E, but they aren't due back from the printer for another day or so and I just can't wait for them, needing to get

this column off to **RCMB**. So we will just get started and hope the pics come out OK. . .

RC12E SET-UP. . .

A couple of ground rules first. I am pretty good at details, both in car prep and in covering anything and everything in a set-up article like this. So I'll be tellin' ya everything I have done to my latest 12E, just remember that my way is hardly the only way to go and that I have set the car up to compliment my style of driving, along with keeping things pretty stock, just to simplify maintenance, especially if any parts are broken and need replacing. I will also detail all of the pieces used but in most cases, it is hardly necessary to exactly duplicate all of the hardware. What works for you is the only important thing when it comes time to race, but a car like this is an excellent place to start.

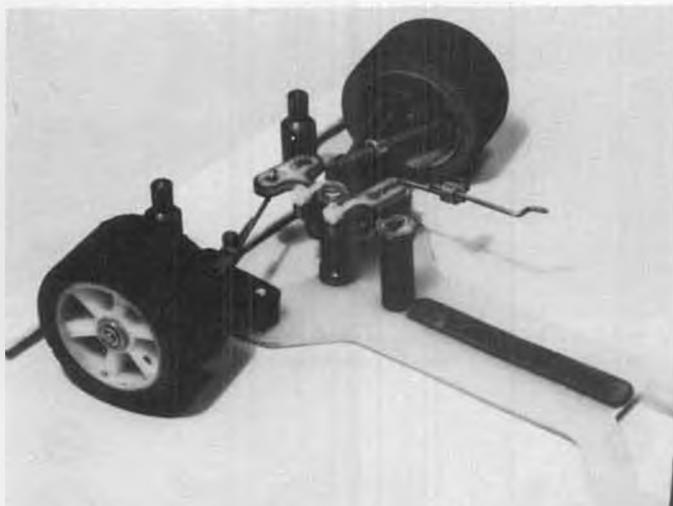
What we are dealing with here is Associated's latest version of the RC12E, I think they like to call it the Team Nats

car, although it is doubtful that all members of Team Associated drive such a stock-appearing car. Mike Lavacot, for instance, is known for cars that are considerably different than the TNC's. Still, Kent Clausen did race just such a car to a win in the super-competitive Modified class at the '80 ROAR Nationals, showing the car to be competitive, even at this level of racing.

If you have bought a TNC in assembled form, first thing to do is to take the thing completely apart. Don't unsolder wires, just mechanical disassembly. If you want to personalize the car a little, all the nylon parts can be tossed in a pan, cover the parts with hot water, add some Rit dye, either powder or liquid variety, bring to a low boil for a few minutes and then let cool. Don't go too heavy on the dye, easy to add more for a darker color, if desired. When the parts look the way you want, even if the water isn't cool yet, rinse everything in clean water. If you just have to do the wheels also, first buy a few spare sets of both fronts and rears, take the rubber off the kit wheels and dye them all at once for a uniform color. Get the rubber off the wheels by tossing them into a large coffee can full of lacquer thinner. In a couple hours (or so) the rubber just slips off.



Another super-clean body from MRP, the Ferrari 308, just the thing for GT racing in 1/12 scale.



Rolling chassis of Associated Team Nats car presently being used for project car. Chassis dampener from 3/32 Kydex.



Typical steering block setup. Note washers used to shim kingpin, more washers to eliminate slop from wheels on front axle.

Just talked to Gene Husting, Mr. Associated himself, and he says that racers are now even getting into dyeing car parts multiple colors, along with using color-coordinated wiring as well as matching servo and receiver cases, just to show you how far this thing can be carried. As for myself, I have always colored 12E parts, partly to readily identify my stuff at the races . . . both cars and parts that have been, uh, "borrowed."

While the parts are getting the treatment, and before you come up with a nasty fiberglass sliver, the edges of the chassis pan should be smoothed. A couple of files do this nicely and sandpaper will finish off the job.

Still with the files, I like to taper the front edge of the chassis pan into the bumper, working from the bottom of the pan up and forward. It is conceivable, though not likely, that the car could hit a track marker or something that would catch the square edge of the pan, but if it is tapered, the car will just skip right on over.

Invariably, Associated fails to finish the countersinking job, preferring (evidently) to keep tolerances on the very safe side. Granted, having the countersinks too deep would mean tossing a pan but still you should pick up a countersinking tool and work with it until all screws common to the underside of the pan are perfectly flush. A drill press is a great help but hardly necessary. Don't let the countersinks get cocked.

If you have picked up any of the other pans Associated sells, just as well rework them at the same time, so they'll be ready later.

An inexpensive little trick is to cut a 3/8 inch wide piece of 3/32 inch Kydex and glue it to the pan, running the chassis dampener from the front radio tray post back until you either run out of chassis or hit the motor. Kydex is about the only thing to use, can be cut from bumper blanks, as many R/C cars use it for bumper material, although the 12E uses nylon bumpers. Plain old contact cement is adequate for the bonding, just

be sure all is clean. This chassis dampener tends to take a little bit of "tramp" out of the chassis, is most effective on tracks that are less than perfectly smooth and tends to keep the tires of the car down on the ground and hooked up. And it works. . .

I like to start bolting stuff together at the back end, so the rear blocks go on and the screws are snugged right up. A perfectly aligned rear end is very important, so I just install the oilite bushings and slip an axle through one bushing to check alignment. The oilites Associated uses are quite long and very intolerant of misalignment, so you'll immediately know if the rear end is squared up or not. Early 12E's always needed some shimming back here but this is not the case with the redesigned blocks. This particular car did not need any shimming, but don't be surprised if yours does. Do take the time to get it all set up right, even if planning on using ball bearings, which admittedly are more

tolerant of misalignment. If using the bushings for Production class, they should be line-bored. Just leave them in the rear blocks, run a .251 reamer through one and then into the other. Test your work with an axle, it should be quite free and perfection is the only acceptable result.

But 99% of us are using ball bearings on the rear axle and if you take the time to get everything perf, as if having to use oilites, the bearings will work just that much better. Notice that two styles of rear bearings are offered. The TNC comes with the heavier, although beefier, type. If you're a weight freak, buy the lighter bearings. But you're wasting the money, as well as heading down the wrong road if all you're concerned about is a super light car. . .

Going to the front end, when assembling the steering blocks, you will probably be able to pick up a little slop in the kingpin, this piece is just a touch

Continued on page 73



Front end on 12E: nylon ties on servo saver increase loads transferred to servo, but also tighten up steering response. Tire is new molded number from Twinn-K.



An F3F-2 of VF-6 warming up for takeoff. Object on top wing is a gun camera.



N-7-F was one of two 2-seater G-32 civilian models. S/N 0447 belongs to a cancelled NAF N3N-1. Crashed recently, total loss.

GRUMMAN F3F-2

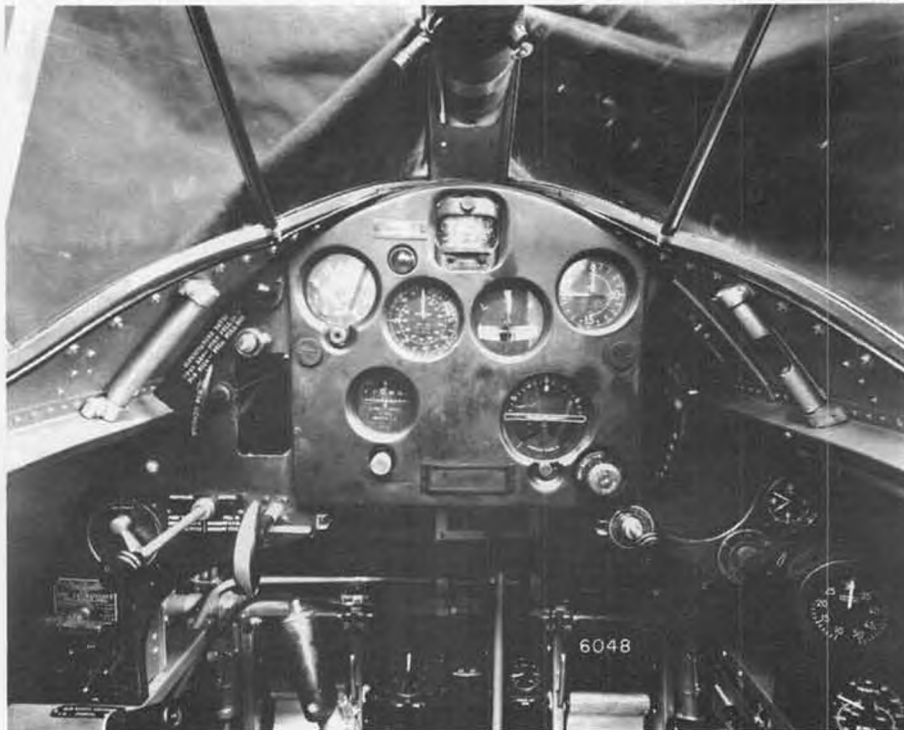
By PETER WESTBURG



A .30 caliber Browning gun was installed on the left side, a .50 caliber on the right. The telescopic sight was primarily for bombing, but also had ring-and-bead sights on the left and right sides.



Sliding canopy changed from flat side at front to curve at aft end. Life raft stowed in tube behind headrest.



Instrument panel of F3F-2 was well equipped. Knob at left of bombsight rotated dustcap on front lens. Instrument below sight is a Cambridge gas analyzer.



Author Larry Fogel's DG-200 at rest. Put together with help of Paul Denson. Kit came from Germany. More info in text.

R/C SOARING

by Dr. LARRY FOGEL

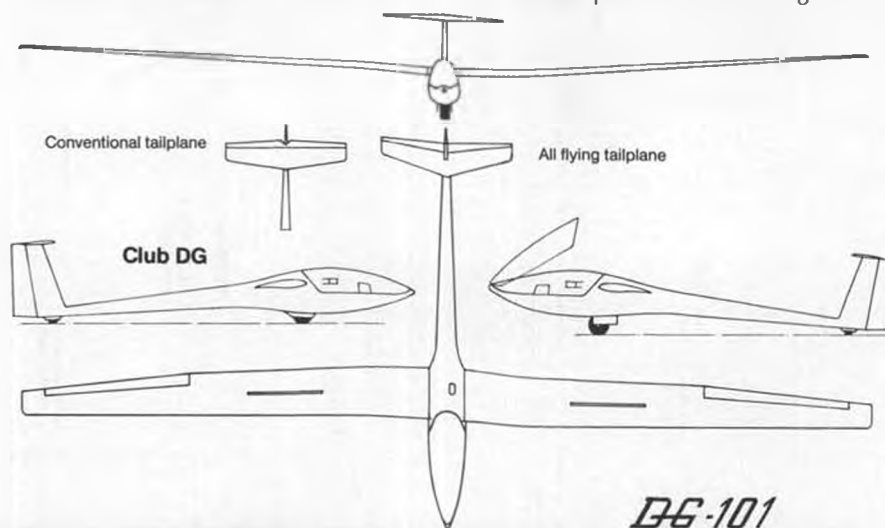
• Last month, I pointed to some special interests in R/C soaring. There are many . . . those who focus on designing sailplanes for particular events, those who would rather devote time to perfecting their flying skill, those who offer kits, and there are those who enjoy experimenting with new construction techniques.

Coulter Watt of Long Island, New York, is one of this last ilk. He's now constructing the Legato, an aerobatic slope ship of balsa, ply, foam, Kevlar and graphite fiber ribbon . . . everything but the kitchen sink. This T-tailed plane spans 63 inches. It has semi-symmetrical wings with a seven to one aspect ratio. The fuselage is 43 inches long and 1.5 inches wide. The wings cover 567 square inches with a 9 inch root chord. The 24 inch long strip ailerons promise a high roll rate. Servos installed in each wing insure tight aileron coupling. The on/off switch is conveniently mounted under the fuselage, suitably placed for last minute turn-on before launch . . . a location that minimizes drag. The T-tail is built-up, the elevator being driven by a Nyrod.

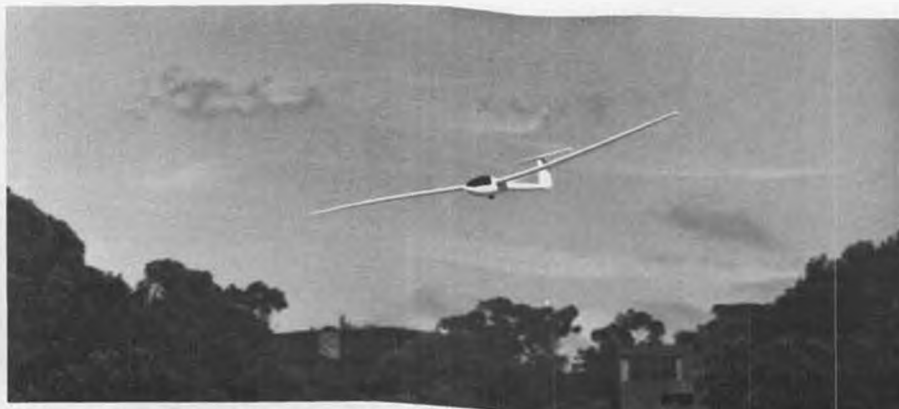
The exciting part is the way the fuselage is constructed. Coulter begins with two horizontal spars. These hold the frame in place. A number of holes in the first frame form epoxy "nails" that firmly secure the nose block in place. Soft foam blocks are inserted between the frame from top and bottom. But first, the inner

portion of each block is carved out with a grapefruit knife. After assembly, the exterior is carved, then sanded to the desired shape, and the fuselage is ready for its "skin."

Kevlar is a lightweight Dupont product of extremely high strength and stiffness. Kevlar 281 weighs only 1.29 grams per cubic centimeter as compared with 1.67 grams for the same amount of fiberglass 181. Its tensile strength is more than 60,000 pounds per square inch (psi) as compared with about 40,000 for glass. Its flexural modulus is 3.16 million pounds per square inch as compared with 2.34 for glass. This



Fogel's DG-200 slope flying over the blue pacific at Torrey Pines.



The DG-200 makes a landing approach, well back from the strong lift at the lip of Torrey Pines' cliffs.

new material has already found wide application in the aerospace industry.

It's important to remember that each fabric has its own "resin demand." Kevlar is translucent, so it's more difficult to visually assess the degree of impregnation . . . a characteristic clearly apparent when using transparent glass fiber material. Epoxy and vinylester resins generally produce better laminate properties than polyester resins when using Kevlar. In particular, Kevlar 120 is probably the most suitable for model sailplane construction. It's the lightest and thinnest such fabric currently available. You can purchase this material and other varieties of Kevlar from Hi-Pro-Form Fabrics, Inc., 962 Devon Dr., Newark, DE 19711. If you care to discuss this matter, their phone number is (302) 368-0405.

According to Coulter, after the first layer of Kevlar is in place, wait for the resin to harden a bit . . . but not to cure. "I then tried to epoxy on the carbon fibers. Things were going great until I got some epoxy on my hands and the fibers started to stick to my fingers. You can guess the rest. Clearly, this process requires two people . . . one to hold and roll the fuselage, the other to feed the carbon fiber ribbon in a flat, even manner . . . with hands free of epoxy!

"Even with these difficulties, my first efforts weren't bad. The fuse came out a bit uneven, but some additional epoxy and micro-balloons filled in the low spots. But, on a positive note, that fuselage is amazingly strong. I've tried to twist it, but it flexes only a tiny amount. I've also tried to bend the fuse, but with negligible results. I wouldn't put that much pressure on any other kind of model. It would surely snap in half with a quarter of the pressure I applied. Carbon fibers are very strong and light. I believe that combining these with Kevlar is the answer to our prayers."

By the way, if you sand the epoxy down to the Kevlar, it may start to fuzz. You may find that you can't cut that fuzz



Jim Ealy, about to launch his Grunau Baby II.

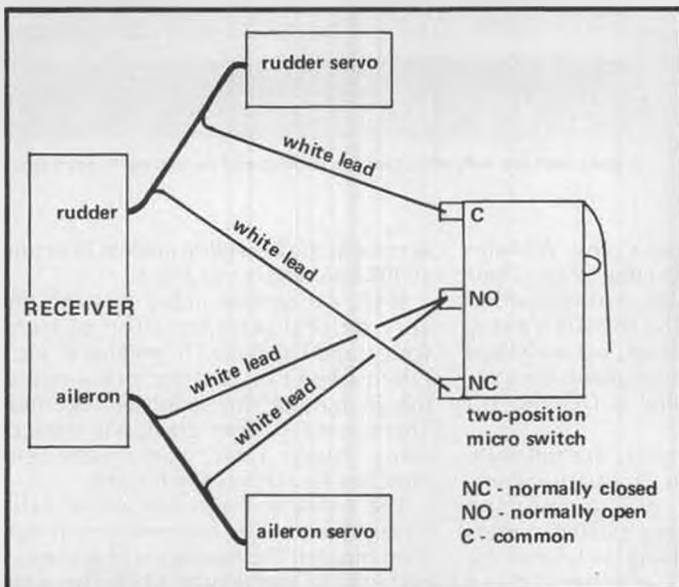


Now Jim Ealy shows off the structure of his SG-38. Plans available for both. See text.

off. Try putting some 'Hot Stuff' on it; then use an X-acto knife . . . but it better be sharp. In any case, you will need a pair of very sharp scissors to cut the Kevlar. If you want to discuss this construction technique with Coulter, call him at (212) 767-6168. It sure looks like a worthwhile approach. I wonder about simply embedding carbon fiber ribbons

in self-skinning foam. Do we really need all the extra strength provided by the Kevlar for thermal sailplane wings and fuselage?

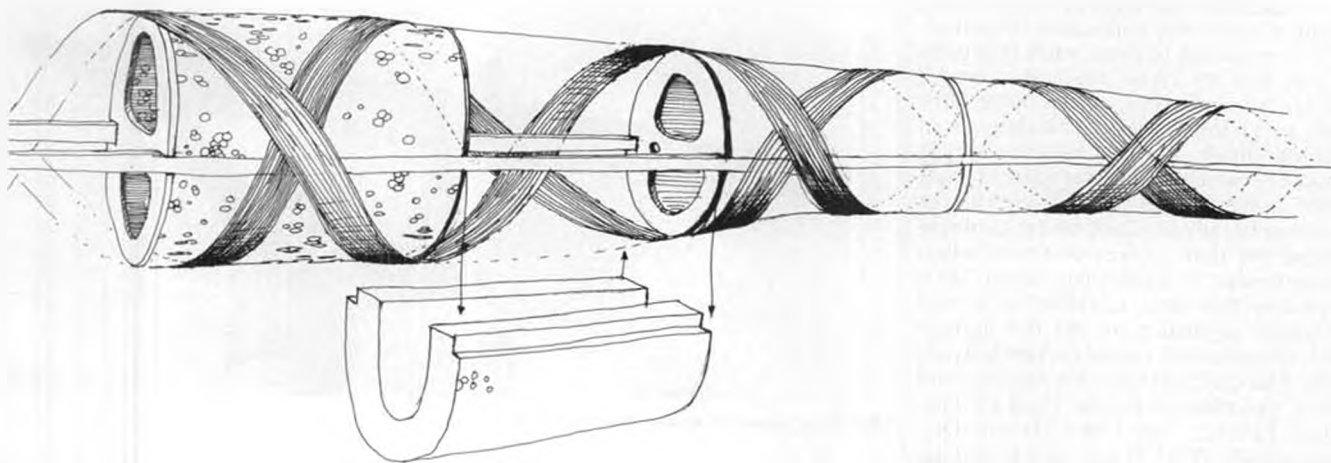
Before we leave Coulter, let me share an idea he found helpful when first learning to fly . . . the Red, Right, Return Rule. "The idea is simple. I painted a red stripe around the left side of my trans-



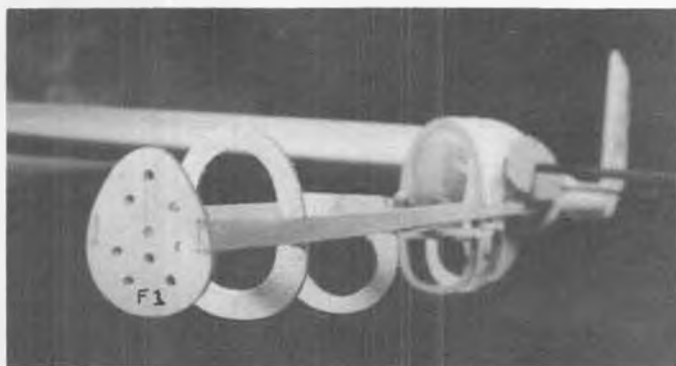
Wiring diagram for Steve Rounds' switching device which couples and uncouples ailerons and rudder.



Switching set-up in Steve's quarter-scale Carrera Mistral-C. Micro switch is mounted directly on extra switching servo.



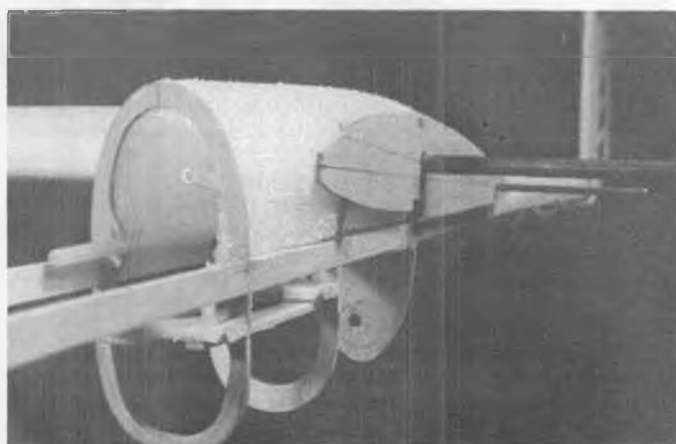
Sketch showing method used by Coulter Watt for wrapping fuselage with carbon fibers to increase strength. Further explained in text.



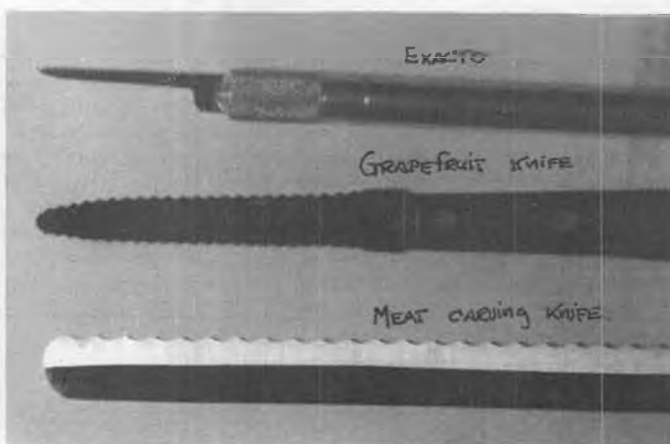
Basic structure to which foam blocks are added. Holes in bulkhead "lock" nose block in place as epoxy is forced through.



Foam blocks are cut for snug fit between bulkheads. Stay in place while being carved to shape.



After exterior is shaped, blocks are removed and hollowed out, using various knives shown at right.



Knives that are very effective for carving and hollowing foam blocks.

mitter rudder control. An image of that red stripe is now strongly in my mind. It relates to the red stripe on my left wing. When the ship is coming toward me and I see the red stripe on the wing, I can very quickly relate to the red on my transmitter and eliminate any confusion about the direction of control. It's great for the beginner. It saved me from many disasters."

While in Germany last year, I greatly admired Georg Martin's quarter-scale Glaser Dirks DG-200 model (built from a kit by Al Schauffler). Glaser Dirks was established in 1973 (a combination of Gerhardt Glaser, the civil engineer and

enthusiastic glider pilot, and Wilhelm Dirks, the aeronautical engineer). Their first plane, the DG-100, had its maiden flight in May, 1974. The DG-200 is a very similar 15-meter sailplane, but with flaps (so the label on Georg's plane is incorrect. He's really flying a DG-100. It's without flaps).

As a matter of interest, this full scale sailplane wing area is 11 square meters. The aspect ratio is 20.5 to one. The fuselage is 7 meters long and 0.81 meters high. With a full-flying tailplane the empty weight is 235 kilograms. It can take 100 kilograms of water ballast, and the minimum sink is .59 meters per

second at the best glide ratio of 39 to one at 105 kilometers per hour.

Well, we corresponded through the very helpful interpretation of Hans Bauer, and I managed to receive a "kit." I then asked Paul Denson for his expertise in putting this sailplane together. There were neither plans nor instructions. Much later, some excellent sketches by Hans really helped.

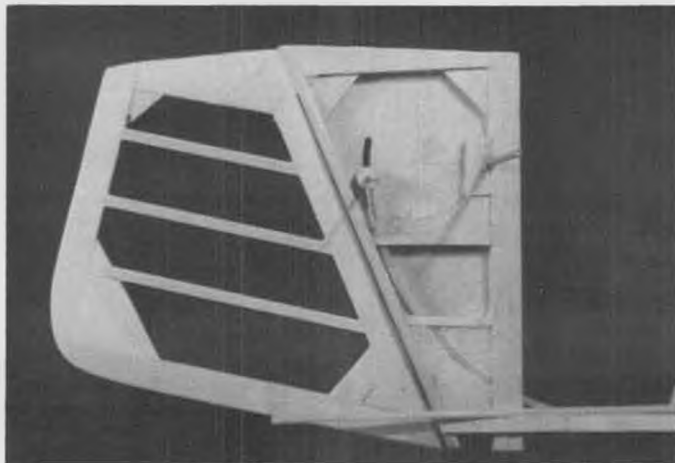
The wings and elevator are of balsa covered foam. The ailerons are cut out, then hinged. The fuselage is fiberglass. A rectangular metal tube holds the wing blades pinched in place by a set screw. The radio gear is installed on a pedestal



After carving to shape and hollowing, blocks are glued into place. Bulge in fuselage profile below wing root is for installation of switch as shown at right.



Exterior "on-off" switch is buried in underside of fuselage. Handy at release.



Fin and rudder of Coulter Watt's "Legato", showing installation of control cable tubing.



Close-up of pivot and control wires for flying stab, before right side covering is added.

between the wings to eliminate the need for bellcranks. I wanted landing gear as an added touch of reality. Paul came through with a neat installation, the wheel being covered to keep dirt from entering the fuselage. All in all, this plane required about 50 hours of top quality construction. It's a real beauty in the sky. Thanks for the fine job, Paul. I've not coupled the rudder and ailerons, but that option might make landing easier . . . less to think about.

Steve Rounds of Los Angeles, has been flying his second quarter-scale Carrera Mistral-C, but with a new switch . . . and that's exactly what I mean. He's added a microswitch that allows him to change from coupled aileron/rudder to the separate functions . . . all this while the plane is in flight. The wiring is simple. Connect everything in the usual way, but the white pulse leads are run through the microswitch. If you prefer not to cut your servo leads, use a modified extension cable. The two-position microswitch costs about \$1 in any electronics supply house. Steve tells me that a friend is also "switched on" in this manner. I might try it in my DG-100.

Jan Noel, lately of France, tells me that in Europe, wing shear webs are installed with horizontal grain. In America, it's always vertical grain. Why the difference? Who's right? What do you think?

If you're also into scale sailplanes, or just want to keep up with what's new, Jim Ealy now offers three-views and

plans for about 240 different scale ships, generally of 1/5 scale. The three-views are \$2.50 each, while the plans range from \$15 to \$20 (usually two sheets of three by five foot blue line). Jim publishes a catalog of these and has recently added some kits and accessories. For example, the kits include the classic Zogling 35/38 in one-third and one-fourth scale, the Granau Baby IIa, the Tandem Tutor, the Jantar I, the Kestrel 19, and the PIK-20. The Monarch C is a 100-inch span scale version of this very unusual 12.8 meter flying wing. You've got to see it to believe it!

In the non-scale category, Jim offers the Petrel, a ship of his design in two, 2.5, and three meter span (without ballast, these operating at about five ounces per square foot). His high starts range in pull (inside diameter and wall thickness of the rubber tubing) from three to five pounds for the two-meter craft, five to seven pounds for standard class ships, seven to 15 pounds for "heavy-duty," 12 to 20 pounds for "super heavy-duty" and 15 to 25 pounds for when you need a "horse choker." Each high start consists of 100 feet of surgical tubing, a plastic reel, 100 yards of 30-pound test monofilament, ball bearing swivels, a plastic stake, a custom-made parachute and split O-rings. All the prices seem reasonable.

The latest addition to his accessories is a "tri-strip" . . . a precision tool machined from 1/2 inch aluminum



Coulter Watt and his new Legato, for FAI competition, described in text and pics.

bar stock with 3/16, 1/4, 5/6, and 3/8 inch square holes. This tool is aligned by a dowel at either end. Two machine screws hold it together, including a blade placed in the proper hole. The operation is very simple. Any length of square balsa is pushed into the side

Continued on page 79



Ron Erickson (nearest) and Ed Fisher racing in A Offshore at Kent Lagoon, April 18. Ed's boat, below, holds both straightaway speed and 10-lap records.



Ed Fisher, Seattle, WA., with his Deep Vee record holder. Hot K&B .21 and NAMBA Kraft radio fill out the equipment. Boat is Prather 31 Deep Vee.

R/C POWER BOATS

By JERRY DUNLAP

NAMBA'S OFFSHORE CLASS CREATES WAVES

Amid what appears to be some amount of confusion and controversy the North American Model Boat Association introduced a new class, Offshore, in the 1981 Rule Book. Actually, the class wasn't introduced in the Rule Book. It was presented to the membership shortly after the 1980 NAMBA Nationals and voted upon last Fall. It was accepted by a vote of the districts by November. Only one of the districts that responded to the proposal voted against it in its entirety. The acceptance of the Offshore Class eliminated the Deep Vee Class from the Rule Book. Certain districts disagreed with the deletion of Deep Vee and a proposal was submitted early this year to have Deep Vee Class re-instated in the rule book beginning in 1982. This proposal was approved and beginning next year the NAMBA Rule Book will have both Offshore Class and Deep Vee Class.

The question is, "Why have two classes that are similar?" Since I was one of the individuals who favored eliminating Deep Vee in favor of Offshore, I will attempt to explain what happened and why. When NAMBA adopted its Deep Vee Class some half dozen years ago, it was intended that the class should consist of boats that resembled craft that raced in offshore events. It was the contention of some of us that the models should have drivers and hatch covers. There's certainly no denying the fact that full size boats have drivers and many of these boats also have covered decks. Unfortunately, the intent was forgotten when some NAMBA members complained that drivers and decks were a deterrent to the class, caused engines to overheat, and generally weren't really needed. The racing activity generally became ten or fifteen minute enduros around a standard oval.

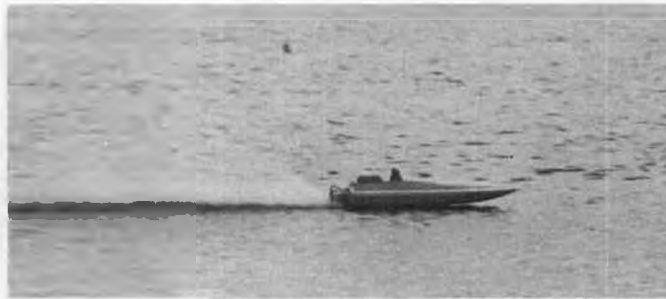
In 1979, Bill Hornell, who is now the

NAMBA Offshore Chairman, proposed a modification of the Deep Vee Class to be raced in District 8. Bill's proposal was actually a revival of the original intent of the class. The boats had to have drivers, an attempt had to be made to paint the boat like a real boat might appear, and the racing event would have two left turns. The event proved to be popular in this area. At the 1980 NAMBA Nationals, the Deep Vee Class raced on the double turn course. Those who had never tried the course expected some initial concerns. However, after two full days of racing, I didn't hear any complaints for the contestants.

During the week of the 1980 NAMBA Nationals, Bill Hornell got together with Herb Stewart, who was then serving as Deep Vee Chairman, and discussed the possibilities of a new event. This event would reflect racing models similar to offshore boats and contain a set of rules that specified what would



The author's Wardcraft 31 pad vee, conforms to NAMBA Offshore Class.



Jerry Dunlap's Wardcraft 31 pad vee won the A Offshore Class race at Kent Lagoon, April 18.

be acceptable and required for participation in the class. After getting input from a number of people, myself included, Bill then wrote up the proposed Offshore Class and submitted it properly to the NAMBA membership for approval or rejection. As mentioned earlier, it was approved.

How is the new Offshore Class different from the Deep Vee Class it replaced? In my mind, there are really only three major items that are different in the two classes. The one that seems to get people the most upset is the requirement of having drivers. Requiring drivers is not something new in NAMBA racing events. They have always been required in the R/C Unlimited Class, the OPC Tunnel Class, and Sport 40. Boats that race in the ocean have drivers. Models of boats that race in the ocean should also have drivers. The second way that Offshore differs from Deep Vee is that any type of boat that races in a real offshore event can be a model in the Offshore Class. That means that tunnels could be entered in this new class since there are tunnel offshore boats currently racing in real offshore events. Modified vee hulls would also be eligible in the Offshore Class since many boats racing in full scale offshore races use pad-vee hull configurations. In the Deep Vee Class, only deep vee hulls are allowed to run. The final major difference I find in the two events, is the method of keeping records. In the Deep Vee Class, there were records for straightaway speed and for oval racing around the .9 mile standard length for oval records. Deep Vee racing records were the same as monoplane and hydroplane classes. In the Offshore Class, records are established by timing how quickly the boat can complete ten laps on the specified course. The Offshore Class also recognizes straightaway speed records.

The one item that some people think is a difference that I didn't mention is the use of hatch covers or completely decked models. This is not a requirement for racing in the Offshore Class. There are many offshore boats, especially in the smaller boat sizes like Sport, Production, or Modified, racing in offshore events that are open cockpit boats. I would also like to dispell the myth that drivers and hatch covers cause the engine to overheat and slow the boat down in speed. With the proper use of airvents and airscoops, a fully covered boat will perform just as well as a boat that has an open cockpit. I know this because I have boats that run just as fast with the hatch covers and drivers attached to the hull as they run with them removed from the boat. Ed Fisher and Frank Ward have proved this when they have set straightaway speed records with completely decked over boats.

As you might guess, I very much favor the Offshore Class concept. However, some people felt the Offshore Class was too restrictive, too much effort, or just a

Continued on page 85



The Wardcraft Offshore 44 is the current NAMBA record holder in C Offshore straightaway. See text for more information.



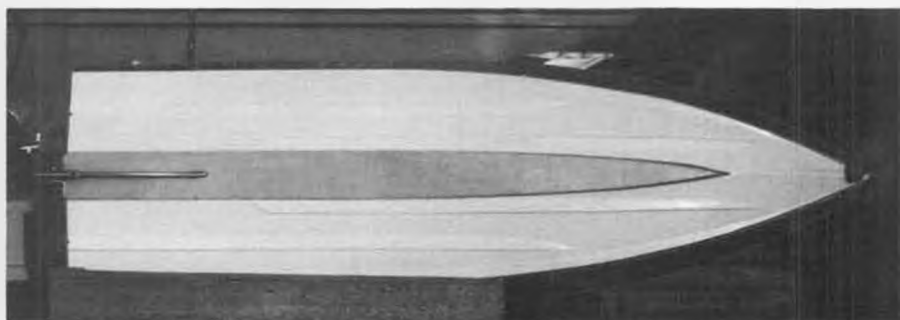
Ron Erickson's Muck Little Straker runs in A Offshore event. He's from Seattle, Washington.



Joe Zinski, Tacoma, Washington, painted his A Offshore like the "Ajac Hawk", a full scale offshore racing boat.



The Stewart Scale Vee 31 won NAMBA Nats A Deep Vee class. With addition of drivers, it would meet NAMBA Offshore Class requirements.

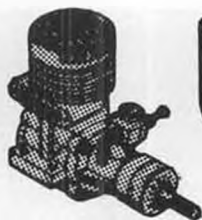


The pad vee bottom on new Wardcraft Offshore boats is proving very successful. Legal for NAMBA, but not legal in IMPBA Deep Vee events.

FUEL LINES

JOE KLAUSE

P.O. Box 2699
Laguna Hills, CA 92653



• A friend and talented writer once gave me some sage advice, "Unless you're pheasant hunting, don't beat around the bush." So be it. The general subject this month is carburetion — the process of mixing fuel and air in proportions suitable for combustion. Our specific subject is the carburetor. Guys, carburetors have been the source of a lot of aggravation for modelers. Frequently, that's because of some misunderstanding about what they do and can't do. This will become clearer as we examine how they operate.

The simplest carburetor consists of a venturi and needle valve assembly. Two are shown in the first photograph. They are often incorrectly referred to as suction carburetors. Here's how they work. As the piston of a two cycle engine moves from the bottom to the top of the cylinder, the volume of the crankcase effectively increases. This rapid change in volume lowers the pressure in the crankcase compared to air pressure outside of the engine. As a result, air is forced, not sucked, through the venturi. As the air travels through the venturi, the bore narrows, the air speeds up and pressure lowers — just as physicist Daniel Bernoulli said it would. At the narrowest bore of the venturi, the pressure is lowest, and it's here where we

find the fuel hole. Since the fuel tank is at higher (atmospheric) pressure, fuel is pushed through the fuel line and needle valve assembly and out that little hole. This rushing air atomizes the fuel, and thus the fuel air mixture enters the crankcase.

With these carburetors, all that we can do is tweak the needle to meter the amount of fuel that is pushed from the tank. The object is to tweak it for the right mixture *when the plane is airborne*. That setting will be slightly rich when the plane is stationary on the ground. The reason for this is that as an airborne model aircraft and its propeller move forward, the angle of attack of the propeller blades effectively decreases. This decreases the load on the engine. The engine response is increased RPM and a need for more fuel. Since we cannot control the mixture of this simple carburetor when it is airborne, we can anticipate it when we set the needle on the ground. That's why you'll see an experienced modeler peak the needle on the ground and then back off, or enrich it, for an ideal airborne setting. Just how much comes with experience, but a good approximation is to back off about a twelfth of a turn.

Now if we had left things alone with this uncomplicated carburetor, life

might have remained simple for the modeler. But no, some innovative clown had to come up with the so-called pressurized fuel system. More than atmospheric pressure in the fuel tank will enable us to squirt more fuel into the carburetor without having to depend upon Dan Bernoulli to lower the pressure in the venturi. We can use a bigger bore and forget about big trumpet shaped venturis. That will give us a bigger chunk of fuel air mixture for more power. Have you ever heard a guy say he wants less power from his engine? So, everybody liked this clown's idea, and you know what? It worked. Everyone switched to pen bladders, pacifiers, and pressure tanks. But there was one small problem. With all that pressure, it became difficult to "needle" the engine. Some guys, who were good at it, made it their specialty. In the control line speed circles, to be known as a "good man on the needle" was the highest possible compliment. However, after a while, more modest pressure became popular together with better needle valves. Pressure became the only way to go.

Fine, except some other innovative individual thought it would be nice if we could throttle the engine — just like real ones. We might even hook it up to a servo . . . And so, the R/C carburetor was developed. Several popular brands are shown in the second photograph. Now take a look at the disassembled Super Tigre R/C carburetor in the third photograph. Obviously it's more complex than either one in the first photo.

No one unnecessarily complicates things, so there must be a reason why there are so many more parts to an R/C carburetor. What it amounts to, is that

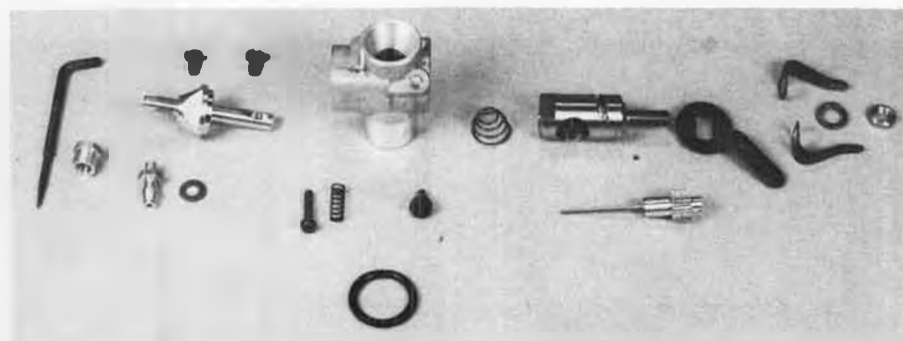
Continued on page 75



Cox .09 and .049/.051 carburetors. Simple venturis with custom needle valve assemblies.



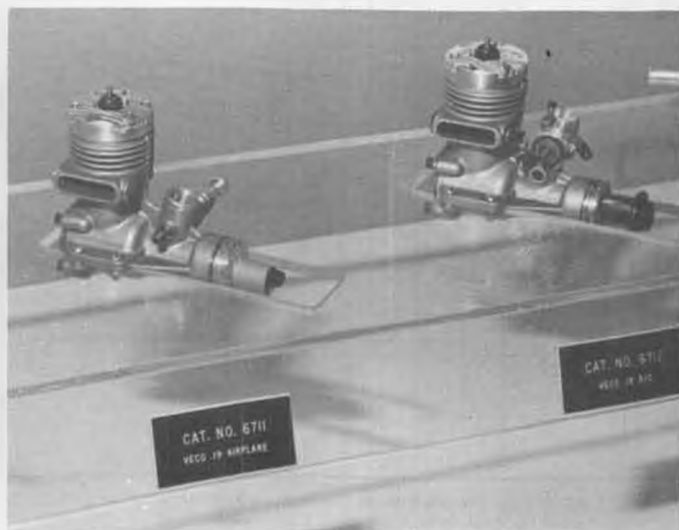
Three popular R/C carbs (l to r): Perry, Super Tigre, and O.S. Max.



A disassembled Super Tigre R/C carburetor.



(Joe) Martin Enterprises new variable Venturi R/C carb. To be subject of future review.



The smaller Veco 19, plain or R/C, is still in current production at K & B.



The ready-to-fly Cox Piper Arrow is a sharp performer when powered with a Tee Dee rather than the stock reed valve engine.

Sport SCENE

By LARRY RINGER

DAVIS DIESEL REVISITED

A couple of years ago, Bob Davis sent me samples of his diesel conversions for Cox engines. As an old fan of diesels, I was intrigued and experienced with



The Cox .19 BB Prototype, as seen at the IMS show in Pasadena.

them. My results at that time were acceptable, but less than spectacular. I broke a few crankshafts on Babe Bees and Tee Dees, but the heads worked as advertised. You could run your engine as a diesel if you were careful. Well, I have recently looked into the subject again, and things are looking up. As regular readers know, I no longer work for Cox, so a broken crank now costs me the same as it does you, and is just as hard to find! Bob, however has put together a much more comprehensive package of products now and has produced a completed kit which will turn your mild mannered Babe Bee, Golden Bee, QRC, or Black Widow into a stump-pulling terror.

Bob now markets not only his unique teflon lined variable compression heads, but a very well made extra-strength crankshaft, crankcase/tank gaskets, teflon reed valves, and a complete "reed valve overhaul kit." When you go the whole route on your QRC, as I did, you

end up with an engine with reduced crankcase volume (good stuff for better pressure when transferring the fuel/air mix through the bypass ports), a STRONG crank, no sub-piston induction (even Cox doesn't recommend that any more), twin bypasses, a reed valve that won't gum up, stick, or fatigue fracture, ability to run for five minutes at full rpm (double the stock amount) and able to swing a ridiculously large propeller without complaint. I took my trusty S-Tee, which now has a three channel setup (Novak Bantam Midget servos, and a Royal/Dorffler receiver punched out to 4 ch), and substituted the Davisized bottom and top ends. The result was a somewhat slower model with a 6x4 Tornado three blade prop than I had before with a Cox 6x3 two blade. But!! The climb was much better. You might almost say out-of-sight with out any advertising "artists license." I have never come close to getting that model that high with any other combination, including a drilled venturi Black Widow on 30% Nitro with a 5x3 Cox prop. Mind you, it would never be

Continued on page 84



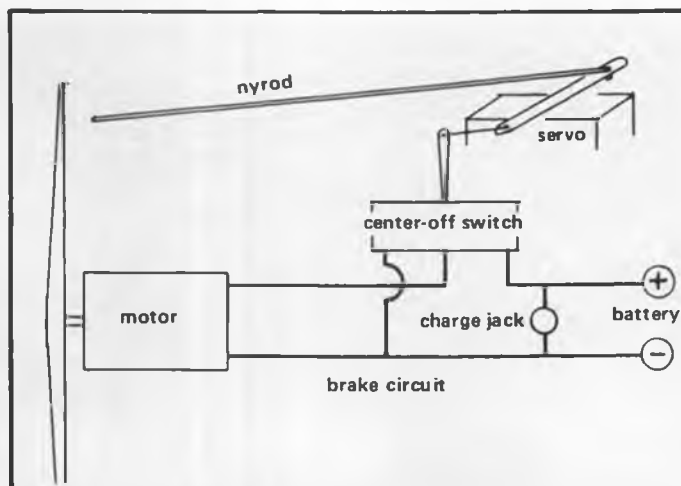
The "Fake G", a pseudo-scale model by Carlo Godel, for O.S. 10 and 4-channel radio. Sounds like the Bostonian naming game is invading R/C!



Inexpensive, handy source for small flight packs. See text for more info.



Heinz Koerner's 4-motor Astro 020 ship; 52 oz., 61-inch span. Heinz's Astro Flight Partenavia in background.



Bob Kopski's motor shaft saver stops prop in horizontal position. Uses motor control servo.

ELECTRIC POWER

By MITCH POLING

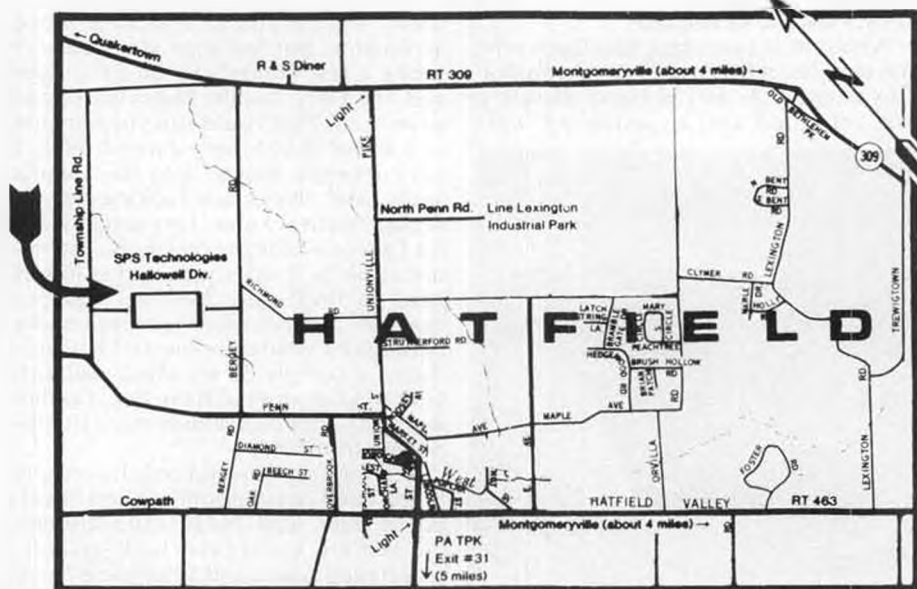
• The KRC Electric Fly will be on Sunday, Sept. 20 (rain date: Sunday, Sept. 27), at Hatfield, Pennsylvania. The meet was a big success last year, so now it is an annual event. Best of all, in my opinion, is the "Electric Fly Clinic" offered this year at the meet. Technical assistance will be available to everyone, if you have an electric problem or just questions, need simple repairs or spare parts, come by and the KRC members will do their best to help. They should know how, they fly more than 20 electrics! This is an offer hardly anyone can refuse! One of the biggest hurdles in electric flying is finding someone to help on those first flights, charging details, installation, troubleshooting, and on and on. The situation is like when the first model engines came on the scene, the experts are few and far between. So here is a bunch of them willing to help! My hat is off to the KRC club. . .

Once your plane is all set up and ready to go, there are awards for the best looking plane, the longest flight time, the most aerobatic, and some surprise

events! The KRC members do not give any awards to themselves, so your chances are good.

Heinz Koerner, a KRC member, sent some photos of last years lineup and of

Continued on page 86



Last year's lineup at the KRC Electric meet. Bob Kopski's "Euphoria I" in foreground, with stars on tail.



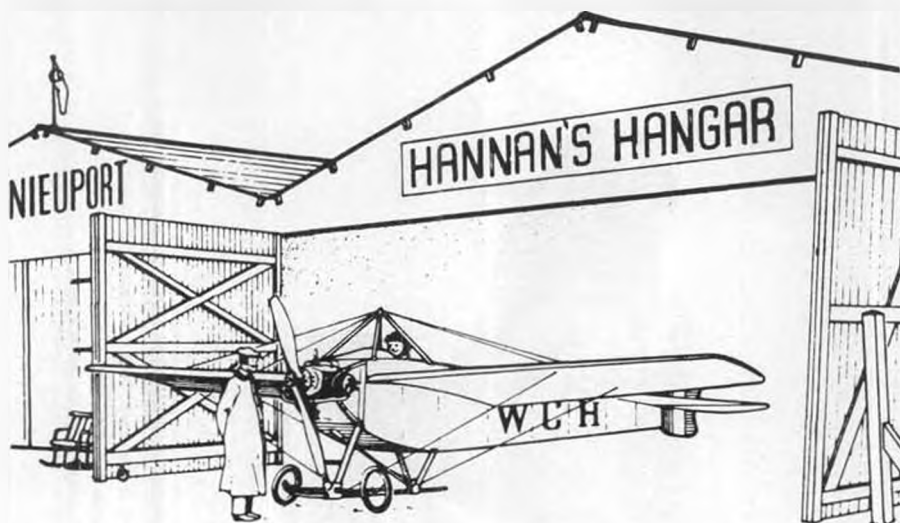
Heinz Koerner's aerobatic 075 ship in flight. Note spectators not looking up as ship passes low overhead. Silent electric!

FREE FLIGHT AND CONTROL LINE

HANNAN'S HANGAR	48
PEANUT POTTIER	49
CONTROL LINE	54
SEVERSKY P-35 PLAN	56
INDOOR	57
FREE FLIGHT SCALE	60
"PROFESSOR BACKWARDS"	63
FREE FLIGHT	64



Nice photo of a Standard Oil Company of California Ford 4-AT-B trimotor. Partly hidden by the Ford's tail is a "Long Wing" Alexander Eaglerock, and farther back, a Travel Air 2000.



"Great projects can only be achieved under pressure."

• Our lead-in line this month, via the late Doug Gillies, is anonymous, but certainly apt for our first topic:

"SPACE TRUCK" SUCCESS

Congratulations to NASA upon completion of their premier Space Shuttle mission. Certainly they were subject to many political, financial, and technical pressures until the very last moment. We well recall the first glide-testing of this machine, since it occurred during the California Nationals, back in 1977, and the many pessimistic predictions published since. But what a satisfying conclusion! Now if only someone clever (perhaps a model builder?) can come up with a better glue for those pesky tiles!

GOSSAMER GROSSER

It would be difficult to imagine a more radical contrast to the Space Shuttle than the pedal-powered Gossamer Albatross. Yet, both were constructed and flown against seemingly long odds for achieving their goals. Dr. Morton Grosser's eagerly-awaited book, *Gossamer Odyssey, the Triumph of Human-Powered Flight*, has recently been published by the Houghton Mifflin Company, 2 Park St., Boston, MA 02107.

Dr. Grosser, a member of the Albartross team, has done a truly magnificent job of tracing the progress of people-powered planes from the pioneering 1912 Peugeot Prize entries through Bryan Allen's heroic English Channel crossing during 1979. Along the way are documented the remarkable and sometimes bizarre string of factors which have linked the various experiments down through the years . . . occurrences that are difficult to shrug off as mere "coincidences." As a minor example, Gabriel Poulain, winner of the 1921 Peugeot Prize, employed a Nieuport factory constructed winged bicycle equipped with a device to increase wing incidence to 6 degrees, just prior to take-off. Almost 60 years later, the optimum incidence angle on the Gossamer Albatross was determined to be 6 degrees!

Grosser, himself a model builder, assigns generous credit to the importance of modeling experience in the background of so many human-powered aircraft designers and builders. (Note *HUMAN*-powered, rather than *MAN*-powered terminology . . . totally correct since females have flown such



John O'Donnell proxy-flew Frank Monts' Coupe D'Hiver model to 1st place in Aero-modeller International. Other model? It's Jean Galston. Photo by O'Donnell.

craft on several occasions.) Dr. Paul MacCready, driving force behind the Gossamer Condor and Gossamer Albatross projects is fairly typical: "Paul's first models were built from the kits he brought home from the ten-cent store. They actually did cost ten cents; long flat boxes labeled Comet, Megow, Peerless, Scientific; a complete Sopwith Camel or Caudrom Racer for a dime."

By the age of 15 years, MacCready had established six national Junior records: Outdoor Autogiro, Helicopter, Ornithopter, Indoor Autogiro, Class D Stick, and R.O.W. He was named Junior National Champion at the 1941 Chicago Nats, having won Flying Scale, Outdoor Stick and several indoor events.

Needless to say, many if not most of MacCready's human-powered aircraft constructors were also devoted modelers. As one team-member put it "...if we were to add up all the balsa wood consumed by all of us since childhood, we would probably be sued by the Sierra Club."

And, concerning the ability to produce under the pressure of apparently

Continued on page 76



Doug Hunt "winding in the rain" . . . with help. Woodvale (England) 1980 scale contest. Piper Peanut placed 2nd. Photo by O'Donnell.



From the Sultanate of Oman comes photo of Pete Redhead's Keilkraft "Competitor". Pete builds R/C, microfilm, model railroads.



POTTIER P 100 TS

By WALT MOONEY . . . This French homebuilt design has excellent attributes for a fine performing Peanut model. The one drawback, a trike gear that limits propeller size, can be overcome. Walt explains.

• A short time ago, Alain Parmentier of Montreuil, France, sent a three view of the Pottier P 100 TS to Bill Hannan. Bill sent me a copy and that was all the urging needed for this model. It has all the attributes of an excellent Peanut design with one exception, the tricycle landing gear tends to limit the size of the propeller. Of course, if the contests you attend allow hand launching, and many do, then a large propeller and short landing gear presents no problem at all.

Another approach that has worked well for people, is to make the model very clean and light so that a small diameter prop is capable of providing satisfactory flight times with a relatively low powered rubber motor. This model was designed using this approach and has been very satisfying.

To keep the model as lightweight as possible, make sure that all sheet wood selected is as light as possible. This is especially true in the case of the block balsa used to shape the nose and for the

optional wheel pants. The original airplane was flown without either wheel pants or spinner, so that is the way the model in the photos was depicted. A non-existent part is the lightest one available! Black tissue was used to depict the side windows and this is generally much lighter than clear plastic. Balsa wheels rather than hardwood or plastic are also a must.

Why does this model have a plastic propeller with all this emphasis on light weight? Well, it shouldn't, and if you do a better job at weight control than I did, especially at the back end, you can carve a light balsa propeller and still have the model balance correctly.

Two changes are made on the plan from the way the model was built as construction improvements. First, an aft rib was added at each side of the fuselage where the wing dihedral break occurs. I tried to do without it, but it's not as structurally sound without it. A bond paper fairing was used to fair the

top of the wing into the fuselage but two little balsa triangles at the longeron and all tissue covering will look better.

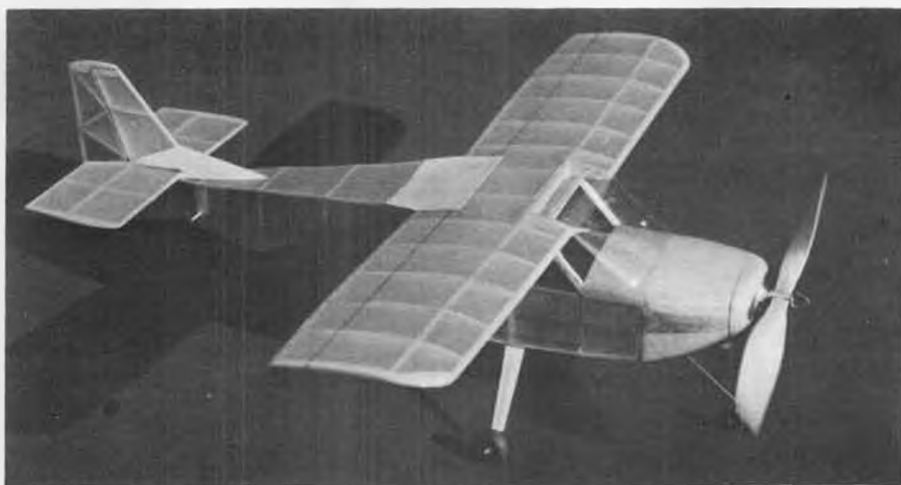
The model should balance just forward of the main wheels.

Fairly standard building techniques are used for this model so a comprehensive instruction article is not required, however, some specific points will be noted.

For instance, the nose plug, which is cemented on the back of the nose block is shown one-quarter of an inch thick. Over the years there have been literally hundreds of models built with plugs of lesser thickness. Thrust adjustments are limited to the thickness of the plug or less. Therefore if you use 1/16th sheet for a plug and you find you need that much downthrust, you will also find that when the motor runs down, the nose block and propeller will fall out of the nose.

The fin on the Pottier is quite thick, and highly tapered. Cut the vertical tail spar out first and then make the ribs out of sheet to the proper width at the place where they attach. The leading and trailing edges of the vertical tail then have to be centered on the ribs so that they line up with the centerline of the spar, as shown on the pattern. Note that the root ribs must be shaped to allow the horizontal tail to slip through. When this assembly has dried completely, it should be sanded to the airfoil sections shown. The dorsal fairing is made of bond paper and is fitted by the cut and try method after the model is covered and assembled.

The main wing ribs are all cut from 1/32nd sheet balsa to the shape shown on the side view of the fuselage. The tip shape is shown just to the right of the wing. Note that the tip of the wing has considerable washout. The rib nearest

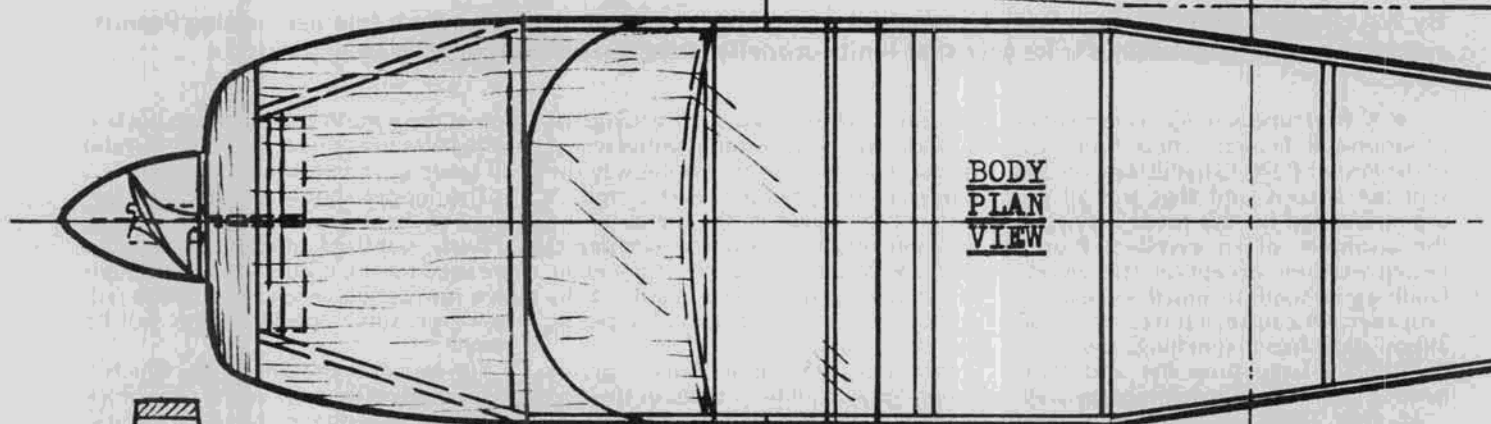
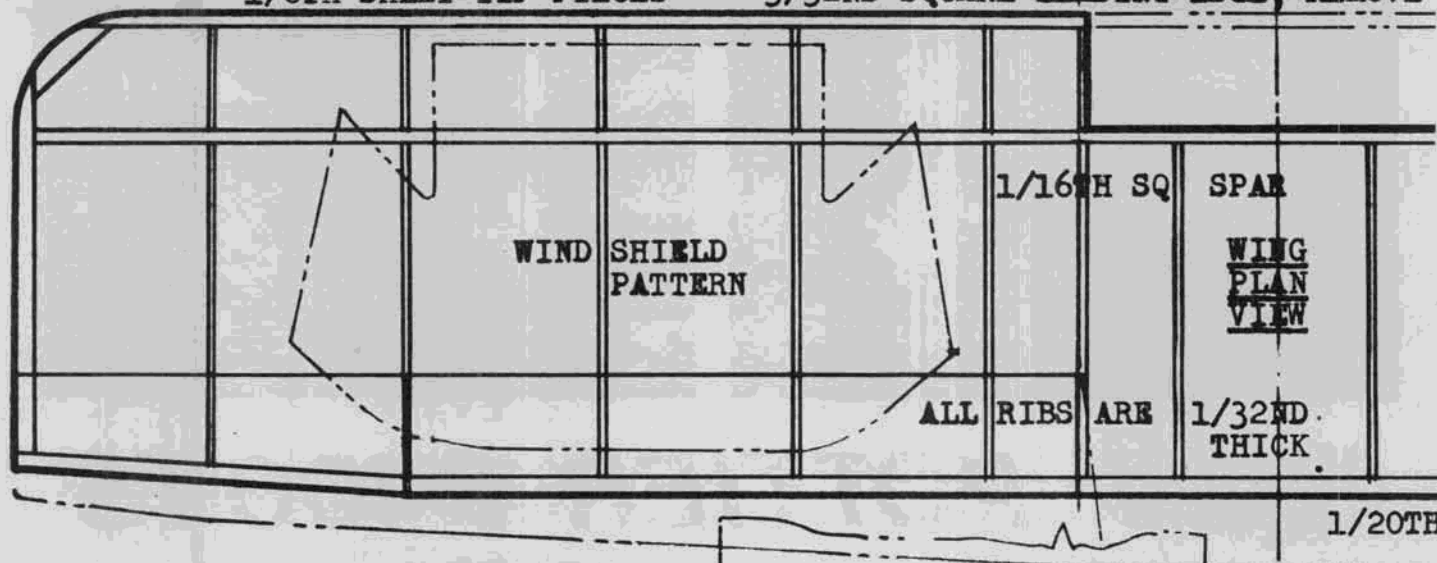


This little bull-nosed ship has a long fuselage that permits an extended motor run. Trike gear prohibits use of large prop. Promote hand launch!

Continued on page 90

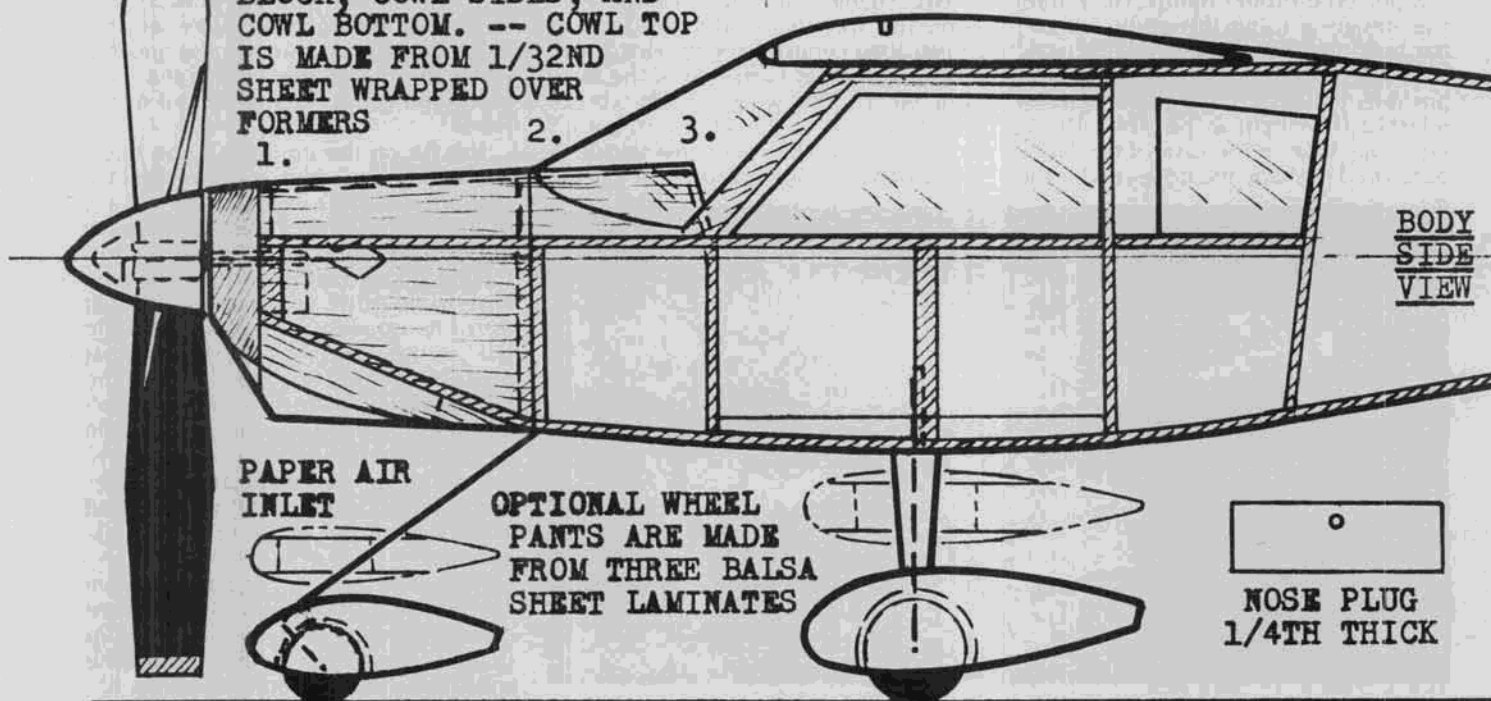
1/8TH SHEET TIP PIECES

3/32ND SQUARE LEADING EDGE, REMOVE

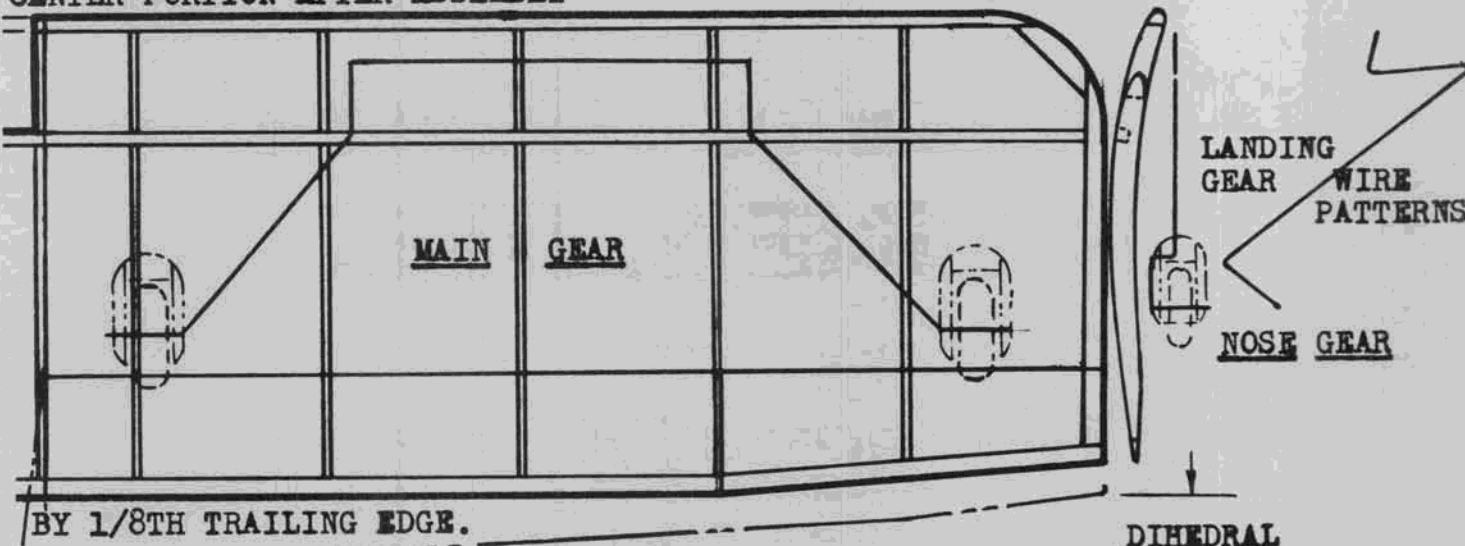


USE 1/4TH THICK BLOCK Balsa pieces for nose block, cowl sides, and cowl bottom. -- cowl top is made from 1/32ND sheet wrapped over formers

ALL LONGERONS AND MOST UPRIGHTS AND CROSS PIECES ARE 1/20TH SQUARE FIRM Balsa sticks.



CENTER PORTION AFTER ASSEMBLY



ALUMINUM TUBE REAR
MOTOR PEG

TYPICAL HORIZONTAL TAIL
RIB

VERTICAL TAIL AIRFOILS
BOND PAPER DORSAL FAIRING

SPAR
PATTERN

1.

3.

2.

POTTIER P100TS A FRENCH HOMEBUILT PEANUT
BY *Walt Mooney* 05-15-81

THE NEW KRAFT K-LINE SERIES

...2 & 4 Channel R/C Systems

Kraft Quality
...to fit your budget

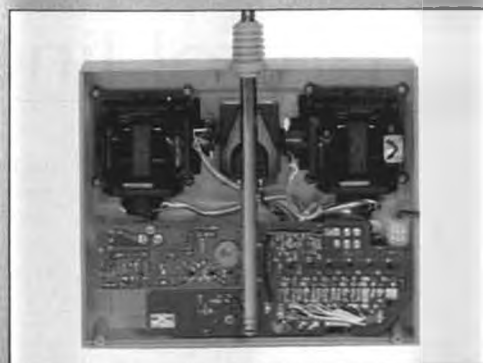
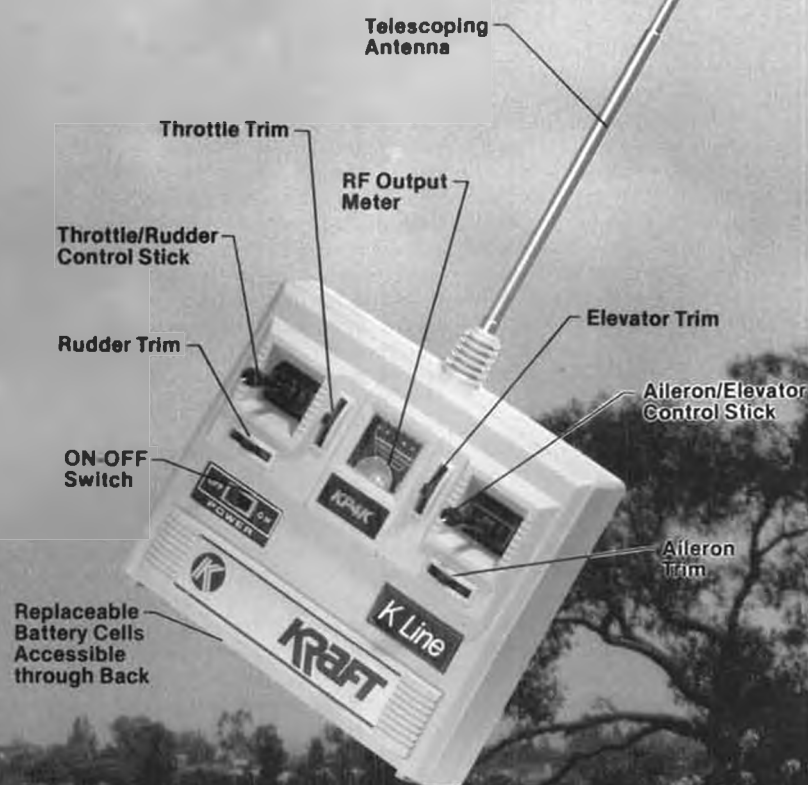
If you've always wanted a Kraft R/C System — or just wanted to get off the ground in this fast growing hobby with the best — but thought your budget wouldn't handle it, the new Kraft K-Line duo is for you. These new inexpensive 2-channel (KP-2K) and 4-channel (KP-4K) systems put you in control with advanced features, backed by Kraft's years of R/C experience and service reputation.



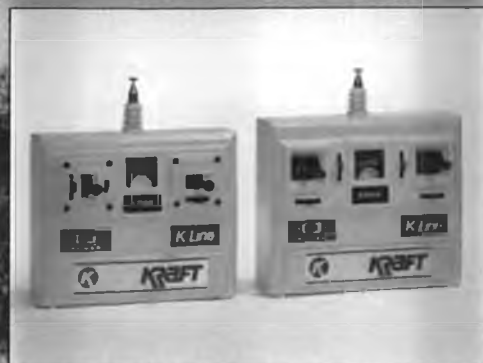
450 W. California Avenue, P.O. Box 1268, Vista, CA 92083/(714) 724-7146/TWX: 910-322-1471

Although low cost, KP-2K and KP-4K models are not stripped down systems. Each comes complete with transmitter, receiver, servos, switch harness and accessories...for operation within the 72-75 MHz band. The KP-4K transmitter and receiver are supplied with rechargeable NiCad batteries and AC charger.

Check out these new K-Line R/C Systems at your neighborhood Kraft dealer. You'll be pleasantly surprised at how much Kraft quality and dependability your budget can afford.



Advanced electronic circuitry assures continuous operating reliability



2-Channel KP-2K...4-Channel KP-4K



KRAFT

A Subsidiary of Carlisle Corporation Since 1972



Secret of getting plane in fast after shutdown is good balance. Len Ascher moved engine back on plane at left.



Call it Bill's Buckeye Benefit. He took four out of five racing events. Rat, Slow Rat, Goodyear, and Big Goodyear.

C

ontrol line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

• As I sit here, ready to pound out another CL column for good ol' **MB**, I have in mind absolutely nothing to write about. But just to show a strange ability, call it the gift of gab if you will, to always be able to find something to talk (or write) about, let's just see what happens as we go to the well one more time. . . **ATTENTION, ALL DOPERS. . .**

Hey, lots of things I could do with that lead-in, will pass, however. But all of you guys who are heavy into dope, as in painting trick finishes on model aeroplanes, should know that Pactra has

decided to discontinue several sizes of Aero-Gloss. Notice I said sizes, not whole color lines. In half pint, pint and quart sizes *only*, there will be no more silver, orange, Fokker red, green, gray, Curtiss blue, Corsair blue, Bonanza blue, black, purple or metallic blue. Most of these colors, in these sizes at least, won't be missed, but many of the Stunt fliers like to buy silver in large quantities, as it makes a super base coat for other colors. So check over the list above, if you commonly use these colors, best truck on down to your local hobby shop and hoard up on a few cans. If kept sealed, the paint will store satisfactorily for years.

HERE WE GO AGAIN. . .

Just about the time the large flap about this magazine's name change to **R/C Model Builder** was dying down nicely, all of us simply referring to **MB** as, uh, **MB**, of course, wcn decides to go into rethink on the whole idea, announcing this in the July issue. Sneaky way to get contributions for the "Three If By Air. . ." column me thinks. (Yes! wcn)

I could care less. **Model Builder** will always be the "name" to me, even if officially changed to something like Toys For Big Boys, magazine. Still, I am reminded of a couple of things when the subject comes up. First, is a joke most recently told by George Carlin, something about him wanting to go into Military Intelligence when in the service, and that he would have but the title itself seemed contradictory. Think about it. . .

Second, and amazingly similar, is the comment that Steve Helmick had about

the "new" name of **R/C Model Builder**. If you're paying attention you already have guessed that Steve found the title contradictory in much the same way that Military Intelligence is.

Even though funny in itself, the comment cannot be applied very widely, even though being brutally accurate when picking on one or two R/C guys at a time, and I can think of many individuals who could certainly never be called R/C model builders. Still, in really thinking about it, I have met and enjoyed knowing many exceptional model builders and in roughly calculating the who-does-what factor would have to say that the majority of these people presently fly R/C. Yes, many of them developed their considerable skills when flying CL and/or FF, and, yes again, there are many more R/C guys than there are in FF and CL, so simple power of numbers would almost mandate encountering more skilled model builders in the R/C ranks, even if the percentages are seemingly lower there than in FF and CL.

And let's admit that hackers are easily found in any modeling pursuit, R/C certainly has no monopoly when it comes to attracting the butchers. I can still recall a fellow Combat flyer telling and showing me all about his new Dremel Moto-tool, back when I didn't have one yet. Sometime during his colorful description of the power tool and it's magical properties, he pulled out of the case one of those itty-bitty sanding discs; not the handy-dandy sanding drum, the disc, the one that seems to have no known useful purpose at all. In displaying this piece that is obviously a waste of time when mounted



Paul Smith, about to down a Yard-of-Ale at World Champs. The real competition at all World Champs is beer drinking!

in a high rpm hand grinder, he says, "Look at this, no more hours spent hand-sanding profile fuselages on Slow Combat models." His next model was about as bad as you would suspect, because he actually did sand the fuse with that disc whirling at a speed his combat motors never would attain. Even our hero could see things weren't coming out as well as envisioned, and from the way his motors started to mysteriously go bad, suspect that Dremel was put to work "tricking up" porting and timing.

Yup, a real hacker. Never flew anything but CL. Read and enjoyed **Model Builder** from the first issues. When I started doing the **MB** CL column, he would even call me up and laugh out loud at some of the pokes I have been known to take at the R/C guys.

It always bothered me some that he never realized how funny to me it was that he laughed at what I was writing. Something about not seeing the forest 'cause all those trees are in the way. Anyway, he has left the hobby now, was last seen driving around in, of all things, a four-wheel drive Ford van. There are only a very few things more useless than a dirt-digging van and it seemed highly appropriate that he was on his second such animal, having broken the first one while trying to keep a modified Jeep in sight. I tried and tried to tell him there was no way to keep up with our small-block powered (Chevy 327) CJ-2 and he probably still doesn't believe it. . . (You can lead a horse to water. . . wcn)

Another factor not easily recognized is that certain modeling persuasions demand very different approaches, if max enjoyment of said discipline is to be realized. In FF, the guys themselves aren't simply born with the ability to build light, they are actually forced to develop this skill if they expect to enjoy FF. In precision aerobatics, where unbelievably beautiful models are as common as plastic finishes are in R/C, the modelers don't start off with such fantastic finishes, they develop the technique over years of practice and many, many, models. And don't ever

forget that they are prodded along, not just by the fact that it is the thing to do, but AMA rules that award extra flight points for Super Paint. In all other countries, the Stunt people very rarely produce a model that would not be a total embarrassment at any U.S. contest and a garbage-can-contest candidate at the AMA Nationals. It is no coincidence that their rules (FAI) do not award Super Paint points.

You remember that super-light S-Tee I built and told you all about? The model was built, not to go out and fly the be-jeezus out of, but just for the building only. I would say that of the total amount of enjoyment I will ever get out of that model, at least 80% had been realized upon final assembly, partly because enjoyment of building was the only goal in the first place. In the second place, it isn't that practical as a kick-about R/C model; somewhat fragile, too touchy to teach rookies to fly on, yet not wild and radical enough to be scare-'em-into-their-cars exciting.

So in R/C, if you are out to get max pleasure, you are, in many instances, precluded from using "traditional" modeling techniques so honored by many, myself included.

This is particularly true in an R/C splinter activity like R/C cars, where absolutely none of the usual modeling skills are worth a damn. As you may have noticed, **MB** has some base nose-picker doing an R/C car column now, and it seems that the only kind of hand-work demanding accuracy is the truing of tires. Everything else is simply buy-it, bolt-it-on stuff. Modeling? Not to my mind. Great fun? Yes, most definitely, but demanding, for success, an approach that is paralleled only in R/C boating, except for the fact that **MB** has a real nose-picker contributing highly suspect copy for that section. (I have never been known for giving friends an even break. . . Hi, Jerry!)

After a few minutes pause for thought, something this column could use more of, and a fresh brew, which I could use less of, I suppose the magazine can be named most anything, even Toys For Big



Larry Miller, from Corpus Cristi, Texas, with his Slow Rat. Uses exhaust primer. Note Gee Bee tail assembly.

Boys is acceptable, though just plain ol' "**Model Builder**" suits me fine. The important thing, the overall philosophy behind **MB** is what I don't want to see changed. Ever. You guys, well, many of you anyway, are probably just like me, reading most all of the modeling mags and it is obvious that **MB** is generally more fun to read, has more editorial content, and covers a much wider range of modeling activities than any others.

That **MB** also offers this slightly off-center CL column may be regarded as something less than positive, your choice. (Who said life was easy? wcn)

POWER TOOLS. . .

When starting out in CL flying, very few jump in with a fully equipped shop. In fact, part of CL's attractiveness is probably the fact that a few simple hand tools, many already household items, plus a couple kinds of glue are just about all that is necessary to complete and fly almost any kind of CL model.

To those modelers who are trying to save a few bucks toward a high-zoot, trick looking power tool, thinking that their models will be so much easier to build and better looking to boot, I say that you are fooling yourself and that

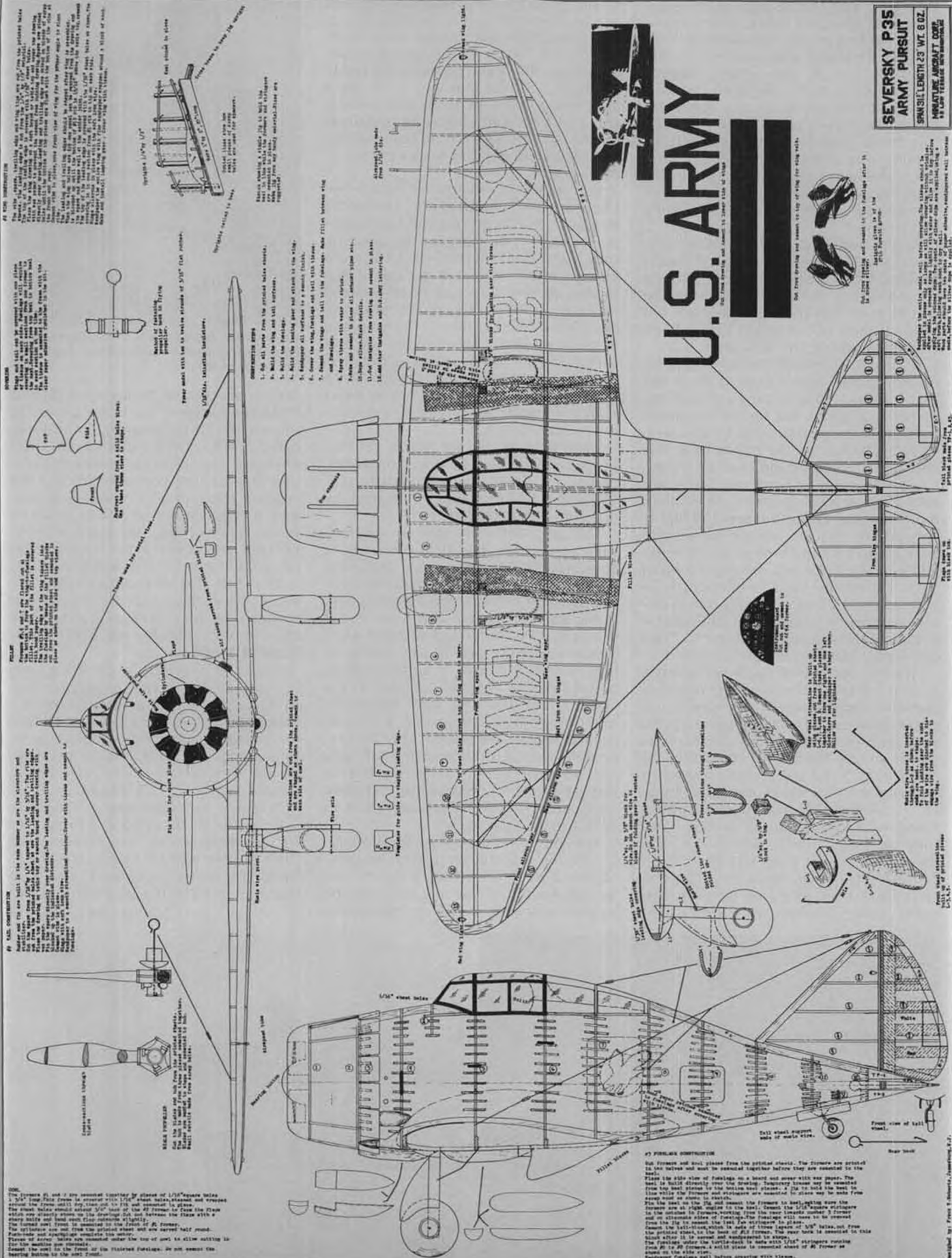
Continued on page 81



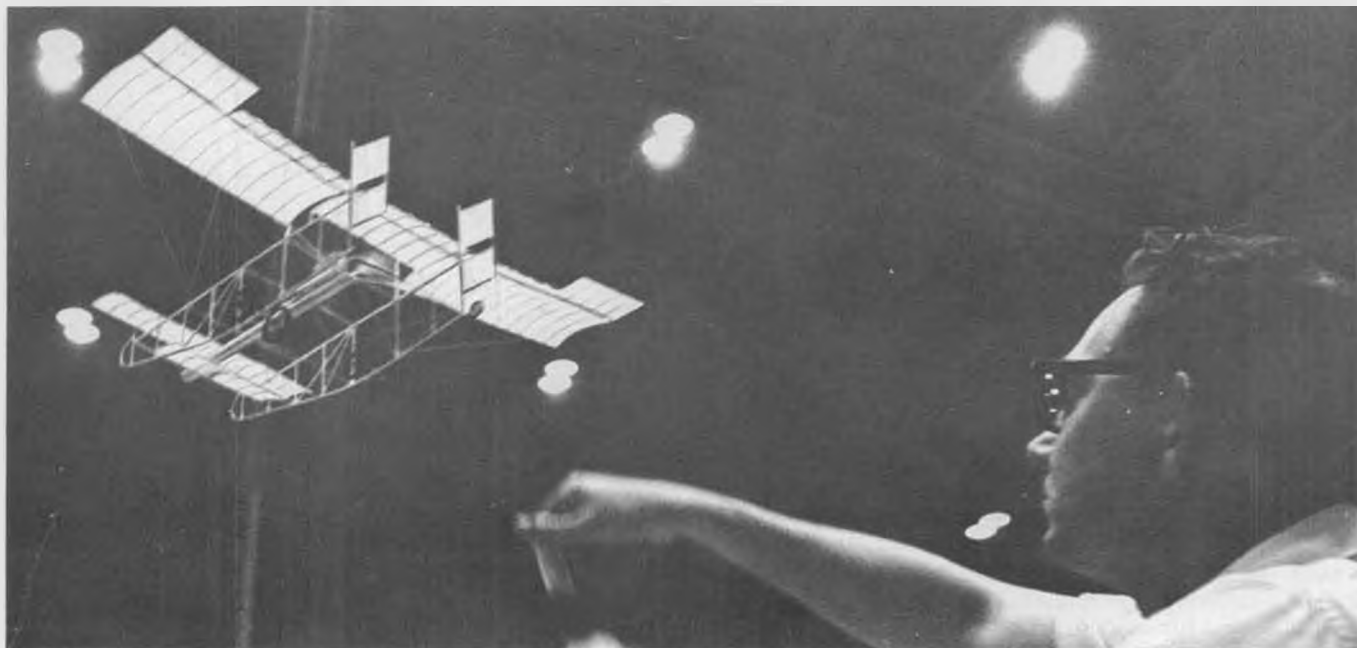
Old Rats just don't hold up like they used to. Goodbye and good luck, old Paint.



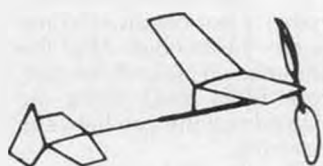
Gary Crawford does commercial for Sheldon's Fuel during recent meet in Merced.



E. L. Haley, Littleton, Colorado, sent us the plans and printwood for this gem from Miniature Aircraft Corp. Brings back memories of that great movie, "Test Pilot", in which Clark Gable, Spencer Tracy, and Myrna Loy were the stars. Though not shown here, the full size plans include clear prints of all the printwood parts.



Indoor flying in Pittsburgh, PA, at Pitt Fieldhouse. This canard is the ASL Valkyrie-1, an early 1911 British effort.



INDOOR

By KEN JOHNSON

COVERING INDOOR MODELS WITH MICROLITE PLASTIC

Microlite is a very light and very thin covering material. It is offered to indoor modelers by Micro-X Products, P.O. Box 1063-A, Lorain, OH 44055. It is sold in 1 yard rolls for about \$3.50 per yard. It can also be found in some hobby shops.

Microlite can be used to cover various types of indoor models such as autogiros, ornithopters, helicopters, Easy B models and even an occasional scale subject. The scale model that easily comes to mind is Gossamer Condor or

Albatross.

The biggest benefit to covering your model with this plastic is the weight factor. Microlite measures out to about half the weight of standard condenser paper. And this means that your airplane is going to fly longer. If the airframe weight is kept light too, that is!

My goal in building indoor duration models is to build lighter and lighter until the structure begins to buckle. Then I know the ultimate flight time will be achieved.

Although most Microlite being used is the transparent kind, it is also available

in silver color. The silver has a dull and a shiny side and is just slightly heavier than the transparent type. Models of aluminum skinned airplanes, like the Ryan PT-22, are ideal subjects for silver Microlite covering.

There are 3 negatives to using Microlite. You will want to be aware of these before you decide to cover your model.

The first, is the static electricity that is present in the plastic when you unroll it from its paper cover. It will try to stick to your hands. This makes handling quite difficult.

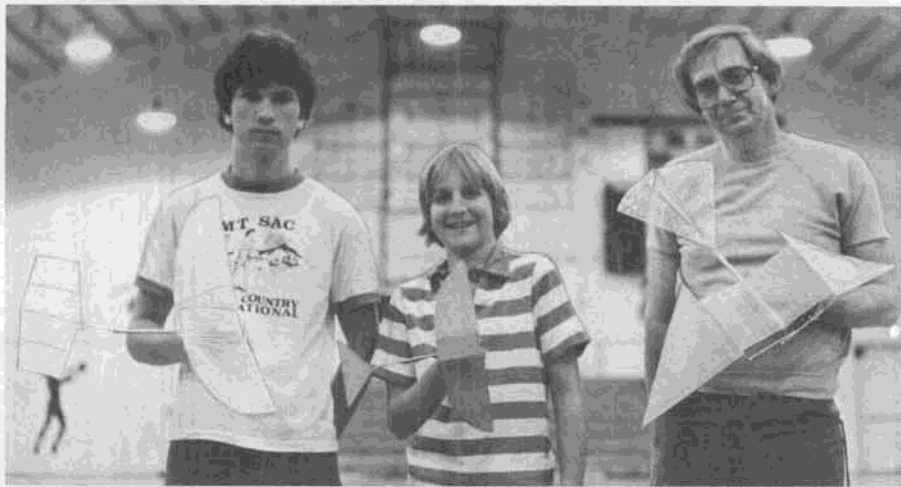
The second problem is the narrow ribbing pattern in this material. This ribbing gives the Microlite an almost grain-like character. It has great strength across the grain (ribbing), but little strength along the length of the grain. As a result, it tends to tear along the grain as you trim the excess plastic, while covering.



Joe Bailey, Hawthorne, CA, and his outdoor/indoor Nesmith Cougar Peanut Scale model.



Gab Mora and his two scale models. At left is strutless Limberger biplane peanut.



Ornithopter fliers at recent Burbank, CA. record trials (l to r): Bill Malo, "Flapping Flyer", 24.1 secs; Dean Bayer, 31.4 secs; Ken Johnson, with No. 93! Photo by Tony Naccarato.

Next, the Microlite cannot be shrunk after the covering is complete. I have tried placing a hot soldering iron near the plastic to tighten it. It shrunk severely, which resulted in a badly warped structure.

One more problem worth mentioning, is the difficulty in patching a hole or tear in the Microlite. It is almost impossible to keep the patch from showing.

Before becoming completely turned off to this covering, I want to state that most of my better flying ornithopters are covered with it. Several of my autogiros and a few of my scale ships are also adorned with Microlite. In my opinion, the longer flight times I get using Microlite outweigh the problems encountered while working with it.

There are several ways to beat the static electricity problem. Try wadding the sheet of plastic into a small ball. Then carefully undoing the ball and flattening the sheet out smooth again. A shallow

wrinkling pattern will remain, but the electricity problem is gone.

I have tried taping the 4 corners of the Microlite down to smooth white illustration board (from the art store) and laying the predoped wing upside down onto the plastic. This works well. Or you might try doping a sheet of covering to a 1/4 sq. wood frame and laying the predoped wing onto this.

Solving the tearing problem is next. I believe the Gillette double edge Thin Blades are the best for trimming the plastic away from the model parts. Each blade comes wrapped in paper. Before opening this paper wrapper, cut through the middle lengthwise with scissors and cut diagonally near the end of each half blade. Remove the paper and the blade half is ready to use.

Cover the model part with the Microlite grain running lengthwise to the part. A hard, smooth surface (such as illustration board) should be under the part



Author launches butterfly that will be featured in next column. All 6 built have flown well. Glen Sunderland photo.

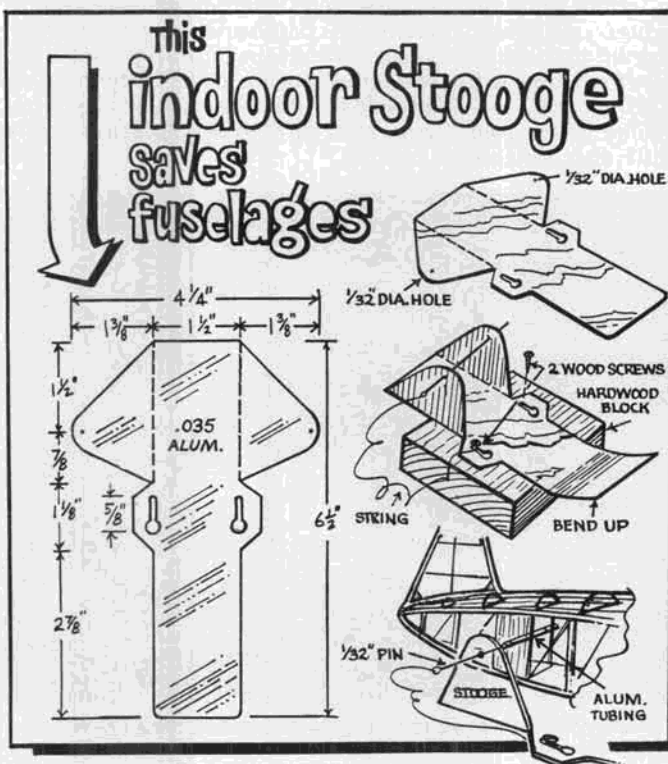
being covered. Press down on the part slightly with one hand while trimming away the excess covering with the Thin Blade in the other hand. Cut carefully and slowly so that you do not tear the Microlite as the blade crosses the ribbing of the grain. If a tear begins, stop and begin with a new blade edge. After the material is trimmed all around the part, run your dope filled brush along the trimmed area and seal the gap between wood and covering.

As the wood and covering are joined, work the plastic toward the outer edges of the part to make the Microlite as taut as possible.

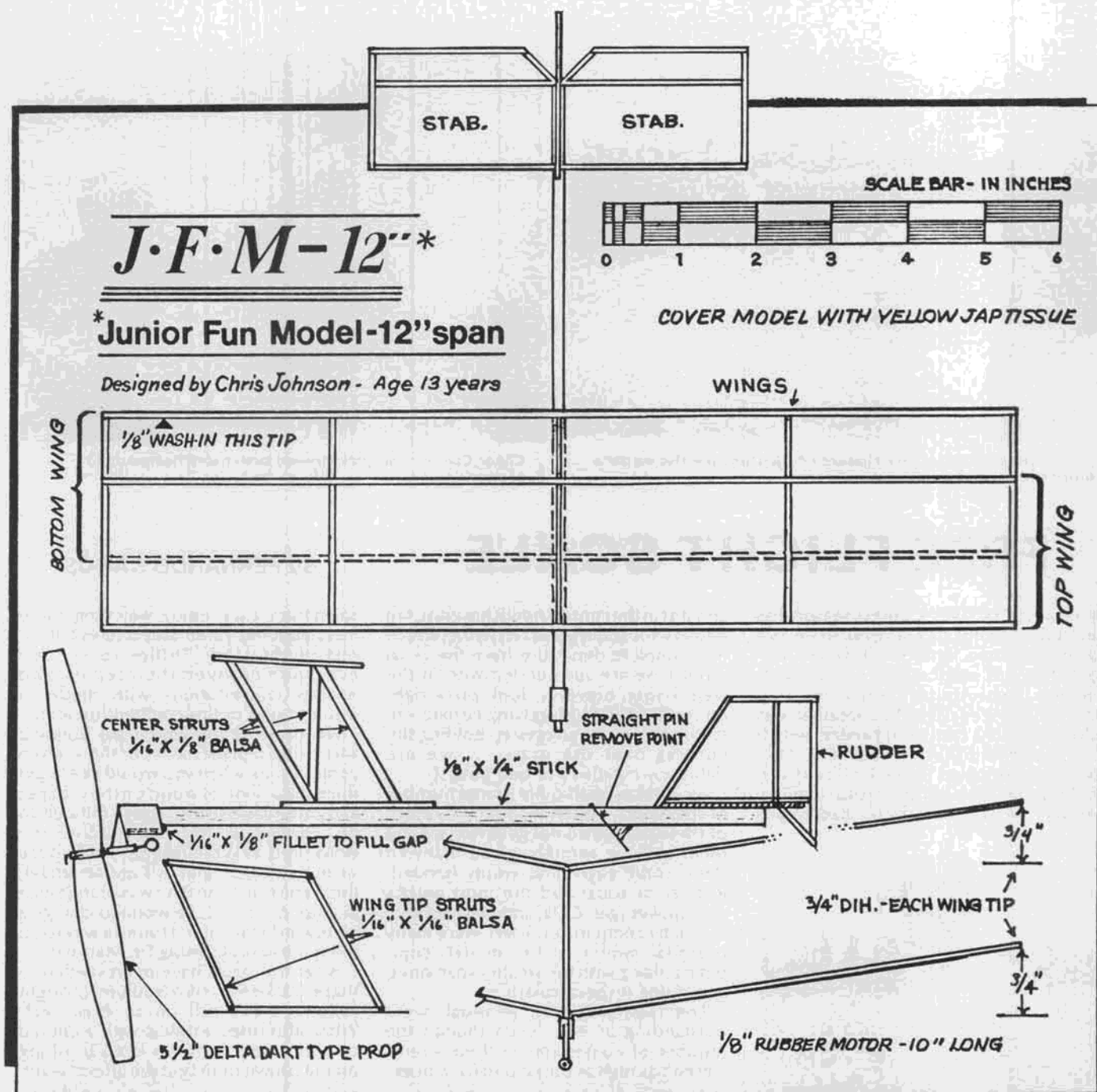
Patch holes and tears carefully, running dope under the patch as it is being applied.

The covering doesn't have to be drum tight.

Another covering adhesive I've used



Brothers Frank and John Godel built "Flapping Flyers" from new Lew Gitlow kits. Papa Carlo is Flightmasters Scale Newsletter editor.



with success is Spray Mount (another art store item). The part is LIGHTLY SPRAYED at about 6 inch distance and allowed to dry. Then the part is laid onto the covering and the excess is trimmed away after pressing the two materials together slightly along the outline. The Microlite can be lifted away from the part and repositioned if so desired. CAUTION! Spray Mount is flammable. Avoid breathing the spray vapors.

Once you have mastered the technique of covering with Microlite you can reap the benefits of using this super light material. Good Luck.

FLYING FOR AMA INDOOR RECORDS

Have you tried flying against the AMA indoor records yet? What is an AMA record? How do you go about flying for a record?

The Academy of Model Aeronautics is the governing body for model aircraft

activities in the United States. Along with its other functions, the AMA keeps records on the most outstanding performances with model airplanes. These are called AMA National Records. Included in these performances, are the highest recorded flight times for indoor model airplanes.

Each year or two, every AMA member receives a rules book with all the pertinent information on the types of airplanes he builds and flies. All the official classes and specifications for indoor models are explained fully in this book.

The current record performances are not listed here. These high times are printed every few months in the AMA magazine, *Model Aviation*.

The upcoming contests, where you may fly against the record times, are also



Super light Easy B built by Ted Buxton, Burbank, CA. Was first in EZB over Addie Mae Naccarato, who used mic covered EZB.

Continued on page 80



Loren Williams admires Dick Howard's P-38. Dick flew this machine during the big war!



Chuck Conover and Dick Howard launch simultaneously in competition.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Finally! The 1981 Contest season has started. It seems like forever since I've attended some kind of F/F Scale Contest. May 3rd was the date of the Flightmasters Semi-Annual, which featured the Flying Aces rules. The weather was cloudy with a continual breeze, which fortunately didn't affect the flying. Mile Square park never looked as good as it did this day. The old triangular auxiliary military airstrip has always had weeds

and dirt in the center; now it has grass, tall enough for some good test flying, which is a complete departure from the usual asphalt we are surrounded with in the area. Flying, however, took place right on the hard and unforgiving tarmac. I'm surprised no one suggested holding the contest over the grass... we are definitely creatures of bad habits!

As usual, we had quite a large number of spectators. I often wonder why more of these people do not get involved and build a flying something. So many of them come each time empty handed. Rubber as usual had the most entries with power (gas, CO₂, and electric) very scarce by comparison. There were many beautiful jumbo rubber models competing along with the smaller span ones, and doing it spectacularly.

The mass launches, as usual, were outstanding as ever, even though the number of contestants in these events weren't as high as they could have been.

Spectators truly enjoy watching these mass launches. I'll let the pictures tell the rest of the story. Suffice to say that everyone enjoyed themselves, and endless conversations with modelers was also part of this competition scene.

For those of you who enjoy building and flying biplanes as I do, there often comes a time when you would like to get the natural look of wood on the cabanes and interplane struts. This is difficult to do, particularly with balsa. More pre WWI and WWII biplanes had these struts varnished, and as I understand it, the varnish in those days was orange-like in color or caused the wood to change a bit toward that color. I found a way to do this quite easily by using Dr. Martin dyes.

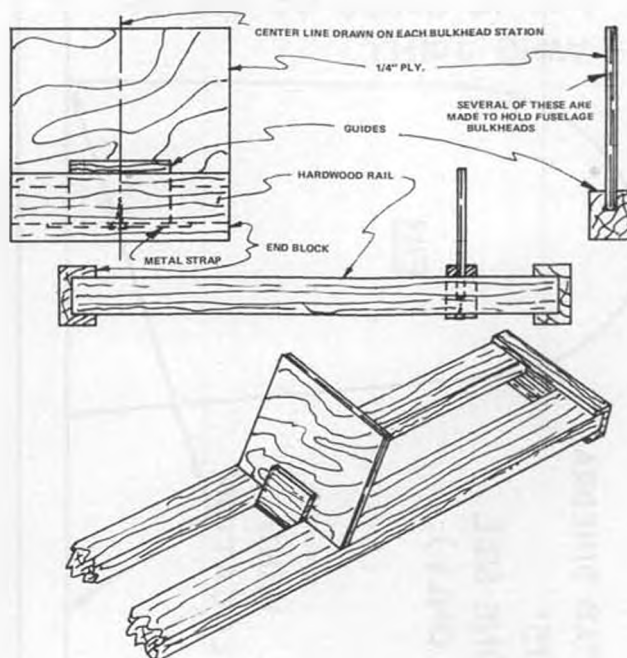
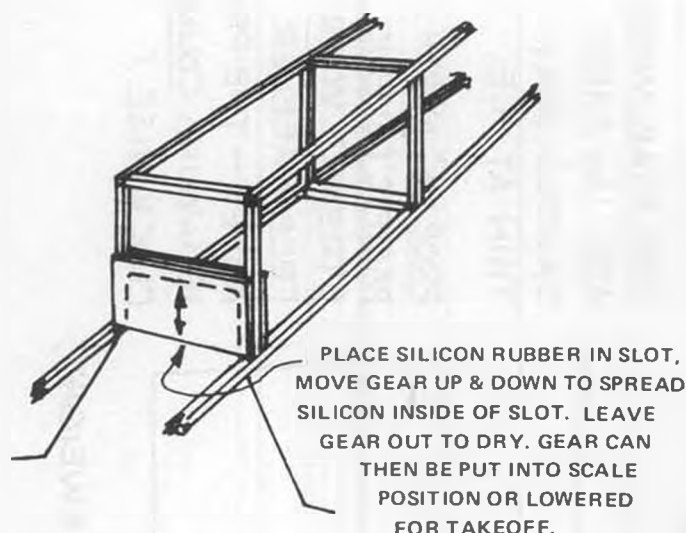
After the struts have been sanded to shape, I take the color 'cadmium' (a bright yellow), and brush on an even coat. When this dries, I follow with a diluted coat of saddle brown. I keep brushing on the brown until I get the affect I want.



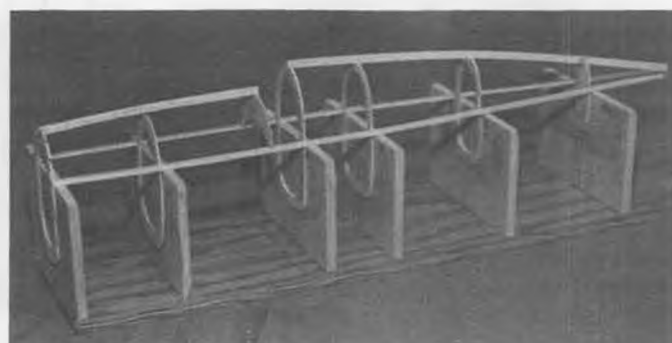
Bill Warner and his rebuilt electric powered Desoutter.



Joe Tchirgi's Floh has to be the fattest, shortest coupled biplane ever built. Looks more like comic cartoon than real airplane!



George James' Defiant, an Earl Stahl design that fits Jumbo rules.



Fuselage building jig described in earlier issue. One in sketch above is adjustable for various bulkhead locations.

Clear dope finishes it off with the results being very gratifying. Dr. Martin dyes are found in any good art store. If you can't find any around your town, try a college campus store. They usually have this product on hand for their students. There is no address on the small bottles except Hollywood, Florida. They come very concentrated and have to be diluted with water, unless full strength is desired.

One of the many rewarding aspects of doing this column is having contact with so many talented people who are willing to share their ideas with others. The following is an example of this. Ken Smith has a very clever way of "cheating" for R.O.G. requirements on one of his models; it has a prop whose diameter is too long to permit it to R.O.G. He made a clever provision in the model to slide the gear up and down inside the fuselage. If he wants to hand launch, the gear is in the "scale" position. If R.O.G. is required, he slides the gear down providing enough prop clearance and without making the model look out of place (see illustration). This is nothing more than sandwiching the gear between two balsa plates, but what's unique is that Ken coats the part of the

gear that is actually sandwiched with silicon rubber. He then inserts the gear in the balsa slot and slides it up and down a couple of times and leaves the gear out until the silicon rubber has dried. This coating creates a snug fit, yet enables easy adjustment of the gear length.

Several years ago I showed how I made a fixture for building half shell type fuselage. For the sake of new readers, I'll briefly mention this fixture with an alternative for making another one. Over the years, building fuselages by the half shell method ala Earl Stahl or Guillow has always been frustrating to me. I could never keep all of the bulkheads aligned or keep the stringers flowing in a straight line. I developed a simple jig to help alleviate this problem. This consisted of nothing more than a fixture which held the bulkheads vertically and in line with each other (see illustration). The bulkhead stations were glued onto the base, and each time a different model was constructed, I had to make a new fixture or disassemble the old one.

This led to an adjustable jig where the vertical stations could be moved and aligned easily each time a new model

was started. My system worked well, but Ken Smith has come up with a variation of it that I want to pass along. It does require access to a table or radial arm saw, but believe me it will be worth the effort spent (see illustration)! The key to this fixture is that the two rails must be made from hard wood. This is necessary to assure straightness all around. The small blocks which hold the vertical supports can be made from pine and the supports from 1/4 plywood. A sharp plywood blade should be used here to get a crisp, sharp edge. The metals straps



"Sidewinder" rubber winder being marketed by John Morrill. See text for info.

Professor Backwards

AN ALL-SHEET, SUPER-SIMPLE, CANARD-PUSHER STICK JOB BY MARK FINEMAN.

L.E.

STAB DIHEDRAL
1.75"
(ONE SIDE
ONLY)

STAB HALF

THE STAB PEDESTAL IS 1/16 Balsa GLUED TO A 1/64 PLYWOOD REINFORCER... 1/16 SQ. STRIPS ARE ADDED TO BOTH SIDES, TOP AND BOTTOM.

WING
LOCATION

12"

M.W. RUBBER HOOK

STICK - 1/8 X 1/4 FIRM

WING DIHEDRAL
2.5" (ONE SIDE
ONLY)

(LEADING EDGE)

WING HALF

(NOTE: A 1/16 FORMER MAY BE ADDED TO THE UNDERSIDE OF EACH WING HALF AT THE ROOT TO IMPART SOME UNDER-CAMBER):

THE ORIGINAL 'PROFESSOR BACKWARDS' FLEW OUT-OF-SIGHT AFTER MORE THAN TWO MINUTES. IT REQUIRES SMALL NOSEWEIGHT, FLIES LEFT UNDER POWER. POWER - 1 LOOP 1/8 FAI.

FIN IS GLUED TO TOP OF
WING JOINT

FIN

FIN, STAB, WING
ARE 1/20 SHEET,
SANDED VERY
THIN AT T.E.

PROP: 6" NORTH
PACIFIC (SLEEK
STREAK) WITH
FREEWHEELER
ADDED - THE PROP
IS WOUND COUNTER-
CLOCKWISE!

on the bottom which secure each station can easily be made from scrap aluminum or iron. Size will be dependent on the size models you like to build. I have a very large one four feet in length for jumbo type models and another that is about 3' long, I use for all other size models. If you are into building 18-24 inch models only, then maybe the easiest way to go is to use the permanent type. Regardless, I think you'll find this to be an easy way to build multi-stringer

type fuselages.

There are several new products to report on this month. The first is a couple of new kits from a brand new company called Hunt Models of P.O. Box 21B, Dassel, MN 55325. Their first two efforts are the Bowers Flybaby 1-B, the biplane version of the famous Flybaby, and the other is the venerable 1933 Longster. The Flybaby has a 21 inch span, while the Longster's span is 24 inches. Both models are built for CO₂ gas

power, and come complete with beautiful machine cut parts including nose cowl and Trexler wheels. The Flybaby sells for \$14.50 and the Longster goes for \$12.50. I've started the Flybaby and should have a complete report soon. CO₂ fans will enjoy these two fine kits.

I just received Flyline's latest beautiful kit, the "Spirit of Saint Louis." Typical of the fine reputation of the company, this kit is no exception. For

Continued on page 89

PROFESSOR BACKWARDS

Mark Fineman
73 Charlton Hill
Hamden, Connecticut 06518

Many of the modelers who build rubber powered airplanes have yet to discover the simplicity, charm, and exhilarating performance of "stick jobs," small airplanes of spartan construction whose fuselage is a stick of balsa. I was introduced to stick jobs when I started flying regularly with the fellows of the Flying Aces Club here in Connecticut. In fact, we have an ongoing contest among ourselves to see who can put up the best time with a stick job. The rules are simplicity itself: The planes cannot exceed 20 inches in span, and the person with the highest time holds the stick trophy until bested by someone else. There are two qualifications, however: If someone turns in a time in excess of five minutes he can only hold the trophy for 30 days, after which the contest begins anew; and the slate is wiped clean once a year on November 11 at 11:00 (Armistice Day)!

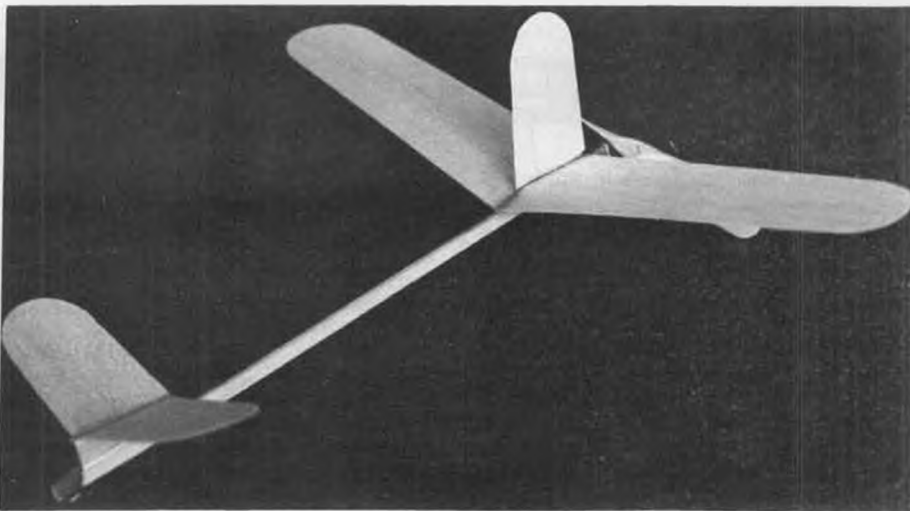
The stick trophy recently came into my possession when a plane of my own design clocked a time of 8 minutes and 37 seconds before flying out of sight. As luck would have it, the plane had been photographed just two days before and the plans carefully set down since two identical ships had been lost in earlier months. *Professor Backwards*, as the model has been dubbed, is a classic pusher-canard that can be built in little more than two evenings (including carving a prop). A six inch hand carved prop seemed to give somewhat better performance than a plastic North Pacific type and if properly carved will allow you to wind in the customary clockwise direction. Remember that when using a plastic propeller in the pusher configuration, the concave side faces the rear of the plane, just as with a tractor model, and that the prop must be wound in a counter-clockwise direction. The ramp style freewheeler must be cut off and a substitute freewheeler constructed on the other side. This can be as simple as a split-ring washer epoxied to the rear of the prop hub.

It's easy to become frustrated with a stick job if you use a prefabricated prop hanger, like the ones found on toy store stick planes. An adjustable prop hanger that allows the flier to easily make thrust adjustments is much better and easy to make. The one sketched here was in-

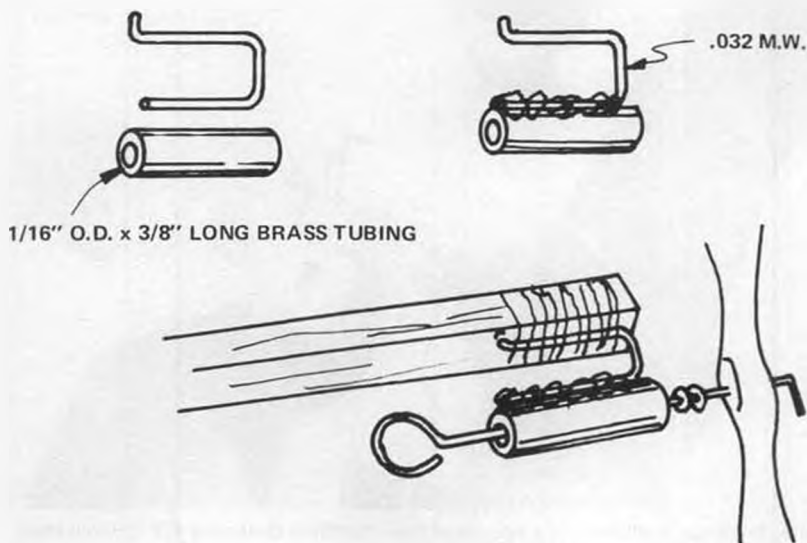
vented by Dave Stott and is so simple, one wonders why nobody had thought of it earlier. An angular U-shaped piece of .032 steel wire is soldered to a short length of brass tubing (1/16 o.d.). Once the wire end has been wrapped with thread to the stick and given several coatings of glue, thrust adjustments can be effected by holding the hanger at the bend of the "U" with needle nosed pliers and twisting the tube (now containing the shaft and propeller assembly) in the desired direction. Thrust adjustments with a pusher are a bit different

than for a tractor, except for down-thrust, so work slowly on such adjustments until you understand them.

Trimming *Professor Backwards* should be accomplished methodically, gradually incorporating thrust and rudder adjustments until a good pattern is obtained. The model has flown equally well to the right or left under power and when properly trimmed should ascend in a fairly tight spiral, slightly nose high. Full turns should only be incorporated after the model flies reliably under low power.



This all balsa pusher/canard is an excellent beginner project and club contest design. Carve a left-hand prop or learn how to wind backwards!





Joe Macay of Detroit Balsa Bugs ready to grab a timer for his Mulvihill. Linstrum pic.



Paul Lagan of New Zealand, at World F/F Championships in Taft, California. Photo by Will Nakashima, noted cartoonist.

FREE FLIGHT by TOM HUTCHINSON

PHOTOS BY AUTHOR

Tom Hutchinson's new address:
20518 S.W. Leeds Ct.
Aloha, OR 97005

• Spring is here, and with it, the beginning of the *real* building season. Yeah, I know you're supposed to hit the workbench during the cold winter months, but I can never work myself up to the heights of masochism required to trek out to the Arctic reaches of my garage at that time of year. Just a glimmer of sunshine, however, and most of the delayed projects of the winter are started in the spring. This year, the approach of the contest season and a decision to return to my roots and

attend the Nats has given an additional impetus to the whole activity. (With our Oregon weather, you don't decide to go flying on a specific weekend — you get everything ready, then rise each weekend morning looking to see if this is going to be THE day. So it's best to get the building out of the way first, well ahead of any future contest date.)

One way to maximize your flying time for every hour spent at the bench is to make a few hand-launched gliders. Once built, they're ready to go on a

moment's notice (in my case, when the youngest son announces that it's time to go flying, I grab the gliders and the son and mosey down to the schoolyard for some trimming and practice). As I've said before, you probably get more flying time per dollar per hour with a HLG than any other kind of model. So, let's start this month out with a glider that's just right for those among us who've delayed their building season until the start of the flying season . . . Paul Lagan's PAPANUI TAVERN (this month's 3-view).

(FROM South Island News, New Zealand)

"The Papanui Tavern goes back a few years now to the days when keen Christchurch FF'ers gathered in the 'local' (the Papanui Tavern, of course) to tear the FF world apart over an ale or two. Since then, the bull sessions have faded away, but the Glider lingers on. I have always had a Tavern or two ready to fly at local or National level contest. It really is complementary to a thermal HL glider like the Zingara, which can be large, stable, equipped with all the necessary DT gear, and which normally does not have a great still-air performance. The Papanui Tavern is used at times when a Zingara-type glider is of no use . . . times when there is little thermal activity, or when it is raining or where it is necessary to get extreme altitudes to fly above local low-level turbulence. As a consequence, the PT is not fitted with a DT, it is easy and quick to build, it is cheap in that 2 models can be made from one good



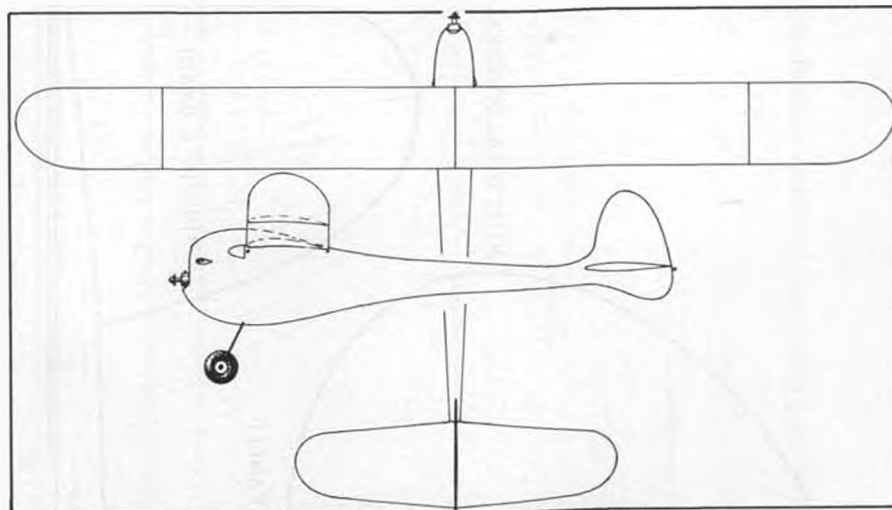
Ray Smith, Stockton, California, is a two-fisted flier. Northern California F/F Council Meet, Sacramento, Sept. '80. Photo by Will Nakashima.

piece of wing wood, and it can be thrown by virtually anyone from raw novice to Olympic javelin champion. It is small and will go out of sight quickly, but as it is so easy to replace, it generally isn't worth chasing when in lift!

Like any good chuck glider, it is necessary to select the wing wood wisely to have any chance of success. Try and buy a sheet of near quarter grain 3/16 that is about 6 lb/cu. ft. density. If you can weigh the wood, then a sheet around 1-1/4 oz. (36 grams) will be great. Use very light quarter grain 1/16 for the tail surfaces and sand them to taper to about .020" at the tips. Pick a sheet of very hard 3/16 or a strip of 3/16 x 3/4 balsa for the fuselage. Make sure that the wing and tail mounts are each set at zero degrees, then taper and carve the fuselage to shape so that it is about 3/32 to 1/8 wide at the L.E. of the tail. Glue the tail to the fuselage so there is a small amount of tail tilt (left side up when viewed from the back), then glue the fin on top of fuse. At this stage, I generally dope the completed fuselage and tail assembly and the wing blank which has yet been cut to dihedral. It is easiest to control wing warps by doping at this early stage, as the wing can be pinned down if you doubt its ability to withstand the pull of the dope. Give the wing about 5 coats and the tail two. The fuselage should get enough to make it waterproof.

When dope is dry, tweak the trailing edge of the wing down about 1/32 at the left tip joint, add throw tabs and fillet glue around the wing/fuselage joint. Put a small piece of lead in the nose, so the model balances where shown and go fly!!

To trim, I use 'weak' throws from the shoulder like a dart, with a bit of left bank. When the model climbs without looping or without behaving like an arrow (adjusted by bending the tail trailing edge), I add or subtract nose weight to get a good glide angle, then bend the rudder and the wing trailing edges at that left tip joint to get the glide turn. Then is the time for the hard throws and fine trimming. I can usually get a PT trimmed in around 6 'shoulder' throws and 3 full power throws. If the model is clean (no blobs of nose weight sticking out and a reasonable surface finish) and if it is around the 3/4 oz. (21 grams) weight, then it will go as high as your arm strength allows ... typically about 100 feet. From there in good trim,



AUGUST MYSTERY MODEL

it will glide for around 45 seconds without help. A really good arm and fine trim will get you into the 60 second region, but for the average man, 40 to 50 seconds is more realistic.

I can build 4 PT's from 2 sheets of wing wood, 1 of fuselage wood and 1 of tail wood. The 4 models can be completed in one 3 to 5 hour building session. Son John can build one in a 3 hour session. Build one (or 2, or more) this weekend! **DARNED GOOD AIRFOIL**

"GERONIMO" A/2

This month's DGA is a rarity in that an actual model wing built with this airfoil was tested in a low-speed wind tunnel at a Reynolds number comparable to those of actual flight. The project was reported by Ferdinand Hendricks in the 1974 NFFS Symposium, where the results of these tests at the Technological University of Delft were presented. The tests showed that the section took kindly to the use of an electric cord turbulator, particularly at large angles of attack. (Turbulator was mounted 7.4% ahead of wing leading edge.)

As a practical matter, the front of this airfoil is thick enough to permit a stout D-box to be built for maximum torsional rigidity. The "Geronimo" A/2 design has quite a good contest record also, in the Netherlands.

MYSTERY MODEL

This month's MM belongs to that "in-between" era of free flights; too new to qualify for Old Timer status, but a bit old-fashioned for Nostalgia types. Designed by one of our more notable

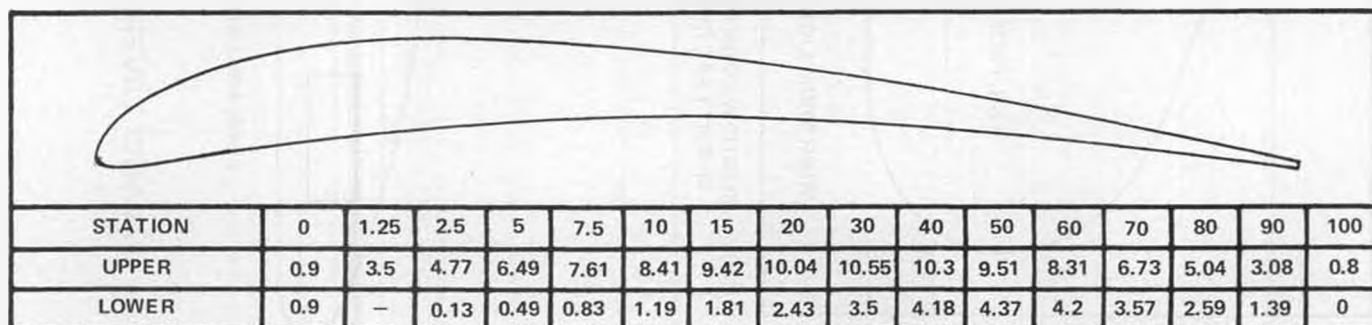


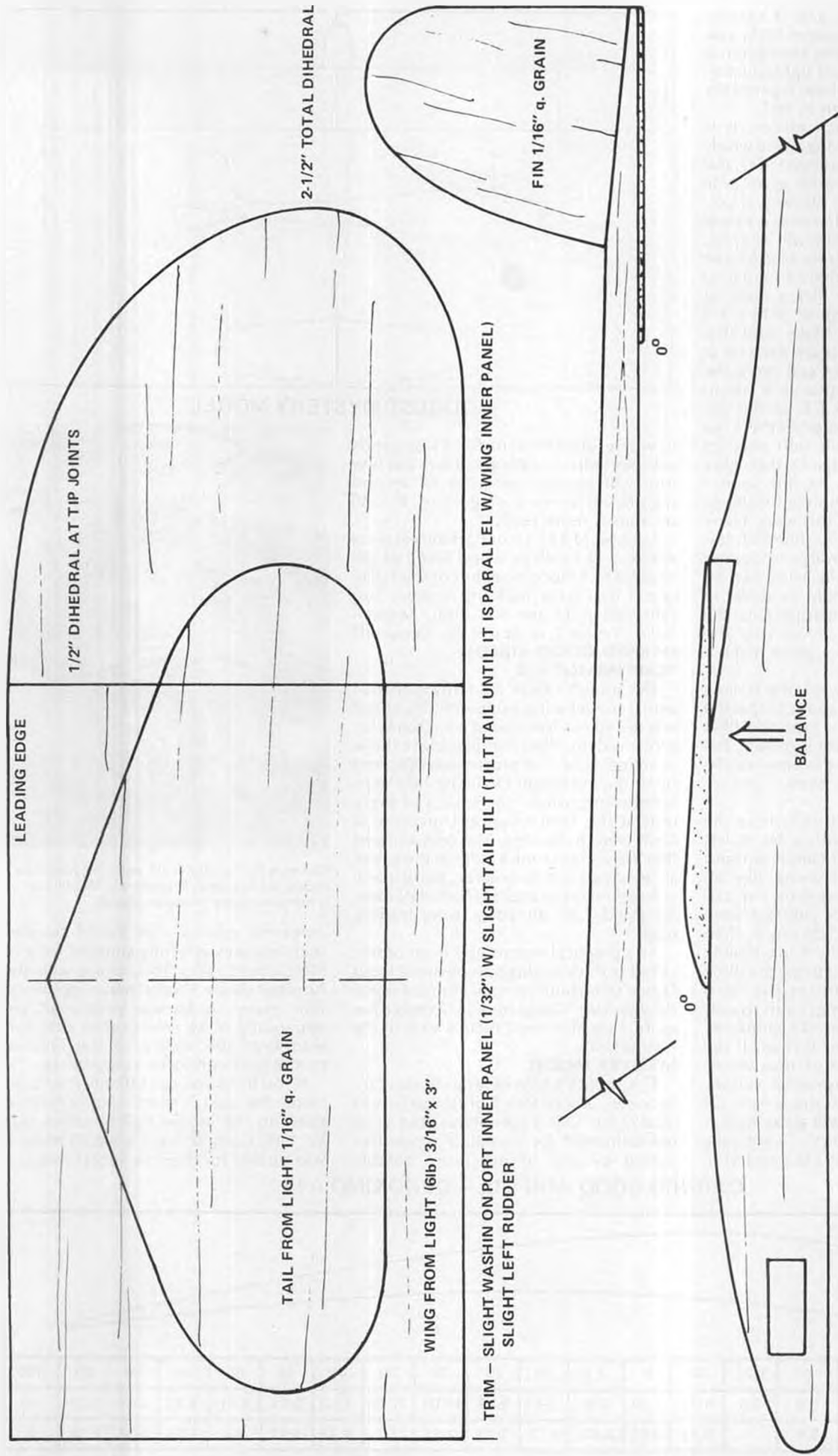
Clarence Bull with his .02 powered Nostalgia model, a Civy Boy. Transparent Monokote is modern touch to ageless design.

magazine editors, this model boasted such features as a fully-sheeted wing of high aspect ratio. This, along with the fuselage shape, should make identification easier. A kit was produced, but apparently balsa selection in that version kept the weight of the finished model too high to be competitive.

If you think you can identify this "blast from the past," send your informed guess to the *Model Builder* office (621 W. 19th, Costa Mesa, CA 92627) to see if you qualify for the free subscription.

DARNED GOOD AIRFOIL – GERONIMO A12





TRIM - SLIGHT WASHIN ON PORT INNER PANEL (1/32") W/ SLIGHT TAIL TILT (TILT TAIL UNTIL IT IS PARALLEL W/ WING INNER PANEL)
SLIGHT LEFT RUDDER

LEAD ARALDITED INTO NOSE FOR BALANCE

WEIGHT ABOUT 3/4oz. READY TO GO

'PAPANUI TAVERN' -ANECONOMY CONTEST CHUCK GLIDER- BY: PAUL LAGAN

MAKING FUSELAGES GO STRAIGHT

The typical gas model fuselage is now made either of a built-up profile (like the *Starduster*), or box style with sheet-balsa sides, top and bottom. The first version is easy to build (pinned flat to your board), but can bend when finished, either from aerodynamic loads or from auto-surface or DT lines running to the rear. If built stiff enough to resist sideways bending forces, the rear end of the fuselage becomes too heavy. Another disadvantage of the profile style fuselage is that it's more difficult to install the pylon as the last stage of construction, to insure proper CG location.

The built-up sheet box can be made lighter and stiffer, but is more difficult to build straight. Here's an article by Ed Bellinger, reprinted from the Utah State Aeromodellers *Dope Sheet*, which was originally done for the NFFS digest:

"Awhile back, at one of our club meetings, I was once again reminded of the problem inexperienced modelers have in constructing a straight fuselage. In this era of small, hot models, accuracy assumes great importance, as a slightly warped fuselage just about guarantees failure. I have been using a pretty good construction method for so long now that I assumed everyone built that way. In all truth, I was really surprised to discover that the majority of my club members had never heard of this method of building . . . The system I am about to outline is fast, simple, and jig-built without a jig.

First, cut the bottom sheet to the proper length, but leave it the full 3-inch width. Draw a centerline on the bottom sheet, and pin it down along the outer edges. Glue the firewall, the front (constant-width) formers, and the rear former or former block in place on the centerline. Place a straight-edge on each side in contact with the rearmost of the front formers, and in contact with the rear former. (Extruded aluminum angle makes ideal straight edges.) Cut all other formers to approximate size and glue between the straight edges. Remove straight edges, and when glue is dry, glue on the fuselage sides. When dry, sand top edge with long sanding block, and glue on top sheet. NOTE: During this whole procedure, the bottom sheet has been left the full 3-inch width and pinned down. When dry, remove pins, trim bottom and top sheeting, and sand. . . . Presto! A straight fuselage!!!

If you desire to use fuselage longerons, it is easiest if you glue them to the fuselage sides, with uprights at each former station (this eliminates notching each corner of the former — th), prior to gluing the formers for the longerons."

Ed's method is very similar to the way I build fuselages, too. With quick glues, it really takes very little time to make a fuselage in this manner. You might want to run your pins down the inside of the fuselage bottom, so they won't interfere with the straight-edges — just be sure to remove them and re-pin outside before



"Why don't I give it my best shot? Whadyah think I've been doing!?"

you glue the top on! If you use aluminum angles for straight-edges, they are very handy for holding the fuselage sides in place while glue is drying.

SOME GEMS FOR YOUR MODELING BOOKSHELF: ON THE TECHNICAL SIDE

If all this talk about building for the coming season has tired you out, perhaps it's time to retire to your favorite chair for some deep reading, so that your future models are at least scientifically thought out. This month, I'd like to point out a few titles in a technical vein. Some are written especially for modelers, while a couple of others are written from the full-scale viewpoint, but will be equally valid.

By far the best technical treatment of the special aerodynamics problems of models is Martin Simons excellent *Model Aircraft Aerodynamics* (published by Argus Books/Model & Allied Publications, England, about \$18). I've mentioned this one before, as being the best modern compilation on the subject, one which should be on every shelf.

A couple of other useful books are published privately by Eric Lister (410 Regina Drive, Clarksburg, MD 20734). His *Sailplane Designer's Handbook* and *Drag Reduction and Structures Handbook* are oriented to RC application, but his sections on creating airfoils by

combining a variety of mean cambers and thickness distributions are quite easy to apply. The structures section has application to free flight, also. Each book sells for \$6, directly from the author.

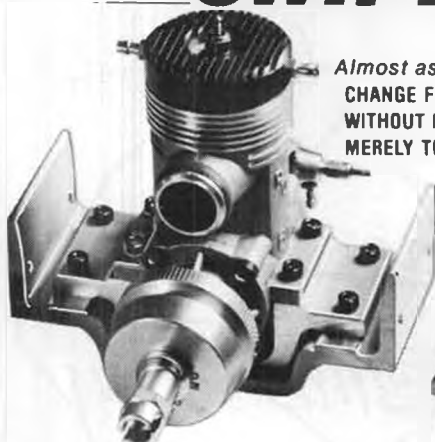
There are also a few full-scale books that make excellent additions to the technical section of your modeling library. One such gem is O.G. Sutton's *The Science of Flight* (by Penguin Books, England). This inexpensive (though perhaps out of print by now) paperback is a straightforward account of the development of the science of aerodynamics, in an extremely readable, but technically correct form. (None of the usual folderol of a wing's lift arising from Bernoulli's theorem — Sutton tells about circulation and vortices, too!)

Another small paperback you should have is Von Karman's *Aerodynamics* (McGraw-Hill Paperback), which also treats the historical development of flight from a science of flight. Both Sutton's and Von Karman's works are not overly mathematical, but deal directly with the heart of the matter. Unfortunately, they both may be out of print, but worth searching for in second-hand bookstores.

All of this discussion assumes, of course, that you've taken my previous advice and acquired as many of the NFFS

PRESENTING THE OCTURA

SWIFT SWITCH MOTOR MOUNT



Almost as quickly as you can say: "Swift-Switch"
CHANGE FROM A .60 TO A .45 ENGINE OR VICE VERSA
WITHOUT REMOVING THE ENTIRE MOUNT FROM HULL—
MERELY THE INSERT ON WHICH ENGINE IS MOUNTED!!!



(Engines
not
included)

Features a minimum of parts. Strong, light, extruded aluminum one-piece base and one-piece insert. 5" wide. Interchanges with Octura 5-55 and 5-60 Motor Mounts. Ideally suited for deep-vee hulls. Insert is deep enough to accommodate .65 engines.

Price: \$15.50 per assembly (incl. one insert). Additional inserts: \$5.50 ea. Inserts sized, drilled and tapped for the more popular marine engines: \$7.50 ea.

Order directly only if not available at your local hobby dealer —
add 10% for postage: Illinois residents add additional 6% for sales tax.

Send 50¢ for catalog
and price list to:

OCTURA MODELS, INC.

7351 N. Hamlin Ave • Skokie, IL 60076

Symposia and Zaic Yearbooks you could afford.

PROXY YOUR MULVI IN BLIGHTY!!

At least, that's the title of the announcement I received from Dave Hipperson this past month. Noted English rubber flyer Hipperson is looking for US participation in his 3rd OPEN RUBBER TROPHY competition to be held October 18, 1981. This contest is flown to SMAE truly unlimited rules: the motor must be enclosed in the fuselage. That's it! No tiddly little restrictions on area, weight, rubber, etc.

The format of the contest is a 4-rounder, flown to increasing maxes (3, 4, 5, and 6 minutes), though these may be altered to suit the conditions. All flyers who max out proceed to a flyoff, which may be to a specified max, or unlimited, depending on the weather.

Entry fee for US competitors is 3 pounds sterling (about \$6.00), which includes up-to-the-minute info prior to the contest, arrangements for proxy flying, and complete results. Further information may be obtained from either: Bernie Crowe, 32922 Buccaneer, Dana Point, CA 92629 or Dave Hipperson, 35 Anthony Road, Boreham Wood, Herts., ENGLAND. All models should be sent to Dave at the above address, along with the name or preferred proxy flyers where appropriate; or directly to your own proxy, if you already have one.

NFFS HALL OF FAME SELECTIONS MADE

Tony Italiano, on behalf of the Society,

has just announced the recipients of the Free Flight Hall of Fame Award for 1981. These noted individuals have contributed to the development and continuity of free flight activities throughout the USA and the world abroad. This year, the envelopes have been opened to honor the following distinguished free fliers:

Maxwell Bassett: first to successfully compete with gas engines.

William L. Effinger: Developer and manufacturer of the Berkeley line of famous kits.

Duke Fox: Manufacturer of engines within the reach of all.

Joe Lucas (deceased): An expert/teacher/writer on model airplanes during the 1920s in the Chicago area.

Joe Ott: Probably the best-known aeronautical "expert" of the 30's and 40's by the youth of America.

Awards will be made by the NFFS at the Seguin, Texas, Nationals, August 6, 1981 at 7:30 p.m. •

Plug Sparks . . Continued from page 31

hydro contests. Most all members participated and Frank was no exception flying his Swoose with the tried-and-true three float setup.

Parmenter, who can be reached at P.O. Box 523, Friendship, TX 77546, is still an active flyer, recently having represented the United States team in FAI

Power.

FREE PLUG DEPT.

Photo No. 6 depicts the latest development in winders for rubber motors. Called the "Sidewinder," this custom made winder will go up to 100 in. ounces of torque before one encounters problems in turning. John Morrill (Simplex Miniature Engines) states you won't damage the winder by overstressing it. After all, you only have so much strength! See F/F Scale column for details!

Of interest is the Linberg Hornet project being undertaken by John Morrill. In a letter to this columnist, John reports the prototype is just about finished. For the present, 100 engines are scheduled for production. Those wishing to get a Lindberg Hornet reproduction should immediately contact John as to the availability.

While we are at it, we might as well show off a Simplex 25 (manufactured by Morrill) in a Cleveland Cloudster. Photo No. 7 shows the combination with John at the Salt Lake SAM Champs in 1979. Contact John at 143 Richmond St., El Segundo, CA 90245.

SAM NEWS

As picked up for the Society of Antique Modelers Newsletter 'SAM Speaks,' as edited by Jim Adams, a list of new old timers as accepted by the SAM Board of Directors appears. Among those listed was the "Feather Merchant."

Photo No. 8 depicts the designer, Fred Lehmborg, 2646 Bolker Dr., Port Hueneme, CA 93041 with the Class C version of the Feather Merchant. Unfortunately, (either way you look at it) field conditions have prevented Fred from making the model full free flight. Instead, he has had to harness that Ohlsson 60 from flying away by putting a radio control receiver in the model. Fred reports the model flies just about the same as when he had the original back in 1941.

Plans are not available yet, but if things work out, we may publish this model in *Model Builder* (Northrop will have to decide whether he wants the Class A/B version or the Class C).

Also noted is the announcement by SAM President John Pond that the 1982 SAM Champs will be sponsored by the Yankee Clipper Club, SAM 7, while the 1983 SAM Champs will be hosted by the Model Museum Club, SAM 1, in Denver at their newly acquired field.

According to George Armstead of SAM 7, the SAM Champs will probably be held over the July 4 weekend where they can get three days to stage the O/T Nationals. Probable site is Westover AFB in Chicopee, Massachusetts; however, the Weymouth NAS is also under consideration. We'll have more after the SAM Annual Business Meeting.

SAM 3 (SCIFS)

The Southern California Ignition Flyers (SCIFS) newsletter, "The Flight Plug," as ably edited by Ken Sykora, reports the SCIF Kickoff Annual held at Taft over the March 14-15 weekend was simply great from a weather standpoint.

TOP FLITE

The Props of Champs

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

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

R/C Master Pattern Op. — Dave Brown (Ohio) — 1st
 R/C Quarter Midget Op. — Wayne Yeager (Michigan) — 1st
 R/C Quarter Midget Jr. — David Cohen (Michigan) — 1st
 R/C Precision Scale Op. — Bob Wischer (Wisconsin) — 1st
 C/L Precision Scale Op. — Mike Gretz (Iowa) — 1st
 C/L Precision Scale Jr. — Matt Bauer (Illinois) — 1st
 C/L Sport Scale Jr. — Matt Bauer (Illinois) — 1st
 C/L B-Proto Speed Op. — Wisniewski Team (California) — 1st
 C/L B-Proto Speed Jr. — Quay J. Barber (Ohio) — 1st
 C/L FAI Speed Op. — Akeshi Kusumoto (Japan) — 1st
 C/L FAI Combat Sr. — Tom Fluker (Texas) — 1st
 C/L Slow Combat Op. — Marvin Denny (Kansas) — 1st
 F/F D-Gas Sr. — Charles E. Carney (Florida) — 1st
 F/F Outdoor Scale Op. — Larry F. Kruse (Kansas) — 1st
 F/F A-Gas Jr. — Draycott Hooke (Pennsylvania) — 1st

**OVER A HUNDRED
DIFFERENT PROPS
TO CHOOSE FROM!**

A size for every flying requirement!

PYLON RACING PROPS

Diam.	Pitch
7"	5N, 5W, 6N, 6W
8½"	6½, 6¾, 7, 7¼, 7½, 8, 8½, 9
9"	7, 7½, 8, 8½, 9
9½"	8, 8½, 9

SUPER-M POWER PROPS

Diam.	Pitch	Large	Diameter
5¼"	3, 4	15"	6, 8, 10, 11
6"	3, 4	16"	4, 6, 10
7"	4, 4½, 5, 6	18"	6, 8, 10
8"	4, 5, 6	20"	6, 8, 10, 11
9"	4, 6, 7, 8	22"	8, 10, 11
10"	6, 7, 8		
11"	4, 6, 7, 7½, 7¾, 8		
12"	4, 5, 6, 8		

SUPER-M TOP FLITE PROPS

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

NYLON PROPS

Diam.	Pitch
5¼"	3, 4
6"	3, 4
7"	4, 6
8"	4, 6
9"	4, 6
10"	3½, 6
11"	4, 6, 7, 8

SPEED PROPS

Diam.	Pitch
6"	7, 7½, 8
7"	7½, 8, 9½, 10, 10½
8"	7½, 8, 8½, 9
9"	7, 12½, 13, 13½
10"	8, 8½, 9

Each prop is precision carved, balanced and fuel-proof finished for superior performance.



Top Flite Models, Inc.
 1901 N. Narragansett Avenue
 Chicago, Illinois 60639

For our latest catalog and prop chart, send request with 50 cents to Top Flite.

If BIG is BEAUTIFUL Sterling has them

Build a . . . Stearman PT-17, (Kit FS20), 65½"; Piper Super Cruiser, (Kit FS6), 72"; or a Schweizer 1-34, (Kit FS26), 98½" . . . or any of the other 20 Model Kits for R/C.



STERLING MODELS BUILDING

3820 "G" Street Philadelphia, Pa. 19134

☐ Catalog of entire line of airplane control line model kits R/C scale and Trainer kits boat model kits, accessories, etc. 50¢ enclosed

Name _____
Address _____
City _____ State _____ Zip _____

Twelve events were staged with a total of 79 entries.

As Ken reported the weather was strange at times with just enough lift good enough for max flights. Ken sez he timed two that had 12 and 13 minute flights (dethermalizer on Korda Struck both times!) that landed between 600 and 800 feet away! What a day for flying!

Also worth noting was the new O/T Hand Launched Glider Event. Bob Larsh has been promoting this activity in Indiana. For starters, the event had seven entries. Looks like the fun is starting all over again!

We won't list all the results as most everyone is familiar with the old faces,

but it appears the F/F version of 1/2A Texaco is getting some pretty long flights. Sal Taibi won with 42:47 followed by Bill Cohen at 35:37 and Rudy Calvo at 26:11. That's a lot of chasing!

Our 1981 SAM Champs Contest Manager, Al Hellman, won the R.J. Brickner perpetual trophy for sweepstakes. Al did pretty good winning second in Class B Cabin, first in Class C Cabin, 2nd in Class A Pylon, and first in 30 Sec. Antique. That's a busy two days for anyone!

SAM 4

Karl Spielmaker of the Michigan Antique Modelers reports the SAM "Mini-Champs" are coming along just great. First contestant to register was

Bruno Markiewicz (who else?). A new addition to the meet will be trophies to third place for the Juniors. Let's hope this brings out the competitors. As Krazy Karl says, "Pray that we don't have too much rain at Three Rivers for our Mini-Champs."

SAM 7

Out here in California, we don't know how lucky we are with our big fields until one reads of the proposed Nostalgia Event to be held by SAM 7 in their Summer Outing, July 5. Motor runs (hand launch) look like this:

Original ignition	16 seconds
Glo Converted Ign.	12 seconds
Glow or diesel	9 seconds

We'll carry reports of how they made out with this handicap system.

SAM 13 (SCAMPS)

Bud McNorgan reports in his newsletter, "Gas Lines," the 36 inch wingspan commercial rubber event has taken hold better than he hoped for. Photo No. 9 shows a typical 36 inch model eligible under the rules. This "1-1/2" has been quite successful for Bill Crovella. The designer, George Dela Mater, made everything on 1 and 1/2 inch spacing (ribs, fuselage uprights, etc.) which accounts for the name of "1-1/2." The SCAMPS are to be congratulated on their pioneer work in successfully promoting new old timer events. The most outstanding that come to mind are (1) the Annual Texaco Meet, (2) The .020 Replica (originally started as .020, 36 inch wingspan), (3) 36 inch max wingspan rubber cabin event and now (4) the 1/2A Texaco Event. No loafing allowed 'round that club!

SAM 21

This is going to kill the die-hard old timers, but this report by Ted Kafer, past president of SAM 21, gave an excellent writeup on the new Top Flite "Fabrikote." Kafer writes as follows:

"One of the prime considerations in building old timer models for competition is trying to reach that seemingly eight ounces per square foot wing loading rule of SAM for R/C Assist.

"Having built several overweight 'turkeys,' I decided pre-planning was definitely in order. Looking over the covering materials, the new Fabrikote by

SOCIETY OF ANTIQUE MODELERS MEMBERSHIP APPLICATION

I hereby make application for individual membership in the Society of Antique Modelers.

DATE REC'D. _____

NO. _____
DO NOT WRITE IN THIS SPACE

NAME _____ BIRTH DATE _____ YEARS MODELING _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

Please check if you belong to any of the following:

A. M. A. _____ NO. _____

M. E. C. A. _____ NO. _____

S. A. M. CHAPTER _____ NO. _____

Note: Membership includes 15% discount on one year MODEL BUILDER Magazine subscription. Give S. A. M. No. when subscribing.

Enclose Membership Dues of \$10.00 and send to:
Society of Antique Modelers
1947 Superior Avenue
Whiting, Indiana 46394

In making this application for membership to the Society of Antique Modelers, I agree to abide by the rules set by the Society and realize that the goals of S. A. M. and the Old Timers movement are to encourage participation above competition and is dedicated to the preservation and reproduction of vintage model aircraft.

Signed _____

Top Flite appeared to be another choice.

"Eyeing the Fabrikote in the hobby shop, I noted only one color available (yellow) with the 12 ft. roll seeming to be a lighter shade than the 3 ft. roll. Noting a difference of \$1.75 between regular Fabrikote and Fabrikote-Lite, I weighed each roll. Surprise! No difference in weight! I tried them on a gram scale (much more accurate) and still got the same answer. No difference!

"Besides the light weight factor of Fabrikote, I was delighted to discover several other important features while covering my new Flamingo. First off, no matter how bad the wrinkles are, they will shrink out with just an iron, no heat gun necessary. Best part is that the material does not get iron scratches. Fabrikote shrinks down very tightly (tighter than monokote), and goes around compound curves with ease.

"Fabrikote comes off the roll with a stiff feel to it but it is easier to position the material on the framework. Fabrikote-Lite does not appear to stick to itself very well finding it necessary to 'hot stuff' the lap seams. On the other hand, regular Fabrikote stuck to itself or Fabrikote-Lite very tenaciously (that means it don't come apart!)."

Summarizing my findings on these excellent new coverings here are the weight comparisons:

Fabrikote (Red)	.0018807 oz./sq.in.
Fabrikote-Lite (Yellow)	.0018807 oz./sq.in.
Monokote (White)	.0018004 oz./sq.in.
Super Coverite (Antique)	.0025195 oz./sq.in.

SAM 26

Monti Ferrell is coming out real early with his announcements on the Pond Commemorative for 1981. This year the date has been moved up from October 15 to September 26 and 27. Of course, the Commemorative will be held by SAM 26 with Monti Ferrell running things at the Cal Poly State University Airport.

Events will be Class A/B, Class C, and Antique on Saturday followed by Texaco and 1/2A Texaco on Sunday. This is a great meet, so plan on making it. For those wanting contest packages, write to Monti Ferrell, P.O. Box 1261, San Luis Obispo, CA 93406. Due out in mid-August!

SAM 30

Just a bit of humor by Nick Nicholau, newsletter editor of "The Fabulous Thirties," who comments on certain contests with the schneurle engine ban: "I don't mind playing in the other guy's ball park as long as he don't keep changing the number of outs." Good man!

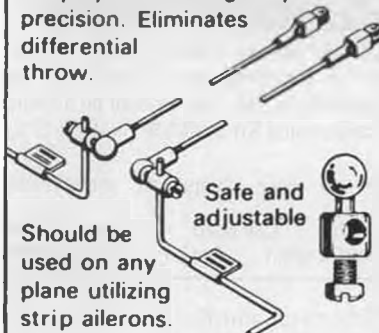
SAM 32

Didn't receive a report on the AMPS Bowl this year so we don't know who the "lucky" recipient was of the not-so-coveted trophy. (Trophy features a water closet.) However, we are fortunate in having a picture of Fred Emmert, a SAM 32 stalwart, taken by Harold Johnson.

DU-BRO BALL LINKS

STRIP AILERON BALL LINK LINKAGE HOOK-UP

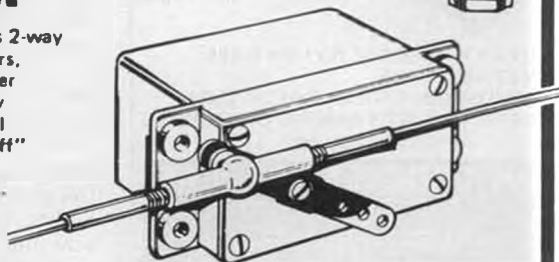
Fully adjustable 16 pc. aileron hook-up complete as shown. No play, no binding, super precision. Eliminates differential throw.



No. 186 \$2.95

DUAL TAKE-OFF BALL LINK

5-Piece set (No. 183) includes 2-way nylon link, 2 threaded couplers, 1 steel ball with pin and washer for peening assembly securely onto servo arm. For fast equal trim adjustments just "snap-off" nylon link, twist in desired direction and "snap" back on. EASY! Also great for rudder, nosewheel and elevator-brake hook-ups. Only \$1.00



1/16" THREADED BALL LINK

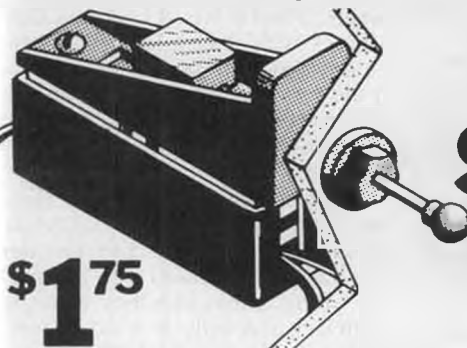


This new 4 piece threaded ball link set fits perfectly in servo arm holes, bellcranks, nylon horns and throttle arms. Strong and easy to hook up - Just bolt it on! No. 190 85¢



THREADED LINK

5-Piece ball link set (No. 181) is excellent for off-set steering, throttle and servo hookups. Includes steel ball assembly with 2-56 thread, washer, nut, threaded coupler and nylon ball link. Easily adjustable. Only 85¢



\$1.75

KWIK-SWITCH MOUNT

The simplest, fastest and easiest way to mount your battery switch! This complete switch mounting set enables you to install your battery switch in minutes, anywhere in the fuselage, by drilling one, 3/16" hole!!! Excellent for use in planes, helicopters, boats and cars. Designed to fit any wall thickness up to 3/8"

Cat. No. 203



DU-BRO PRODUCTS INCORPORATED

480 Bonner Road Wauconda, Illinois 60084 U.S.A.



CURACAO MODELBOUW

presents:

the "HEGI" HOVERCRAFT

Length: 39" - Width: 20" - Height: 10 1/2" - Weight: 7 lbs., 2 kilogram



This model HOVERCRAFT is powered with two electro motors, each driving a propeller. One for propulsion and the other for the aircushion. Steering by two Airrudders. On calm water able to reach a relatively high speed. Can be used on all kinds of not to rough surfaces. Easy to build, fully operational kit available for US\$ 175,- (Price includes airparcelpostage).

The kit will be sent to you on receipt of your cheque or moneyorder.

CURACAO MODELBOUW - P.O. Box 470 - Curacao - Neth. Antilles
Mail orders - Retail - Wholesale - Import and Export - Design - Custom Built.

MARK V HAND DRILL/WINDER



\$28.00

Plus Freight

- * HEAVY DIE-CAST NYLON CASE
- * METAL GEARS
- * ADJUSTABLE GEAR TOLERANCE
- * BALL THRUST-BEARING ON SPINDLE

Catalog - \$1.00

JIM CROCKET REPLICAS

P.O. BOX 12600

FRESNO, CA 93778

Photo No. 10 shows Fred preparing to wind his Toft Stout International Trophy Winner. With almost a 50% lifting tail, when you can get this model sorted out, the Toft model is a real winner. Cliff McBain claims it is the best duration model he has ever built!

SAM 31

Known as the "Cactus Club," SAM 31 recently held a R/C Assist O/T Contest. Unfortunately, the writer was unable to attend as he was late in getting the contest date on the Pond social calendar. Mama had already scheduled a dinner party! You know what takes preference there? (Right! wcn)

Russ Oliver reported the meet, although not breaking any attendance records, was well attended by many new people attracted to this form of old timer flying. Another feature was the flying by SAM rules which was something new to many of the sport flyers.

Results showed Class C Gas was the most popular with Barney Lorenz winning with an Enya .35 powered Playboy Sr. with two Buzzard Bombshells by Brad

Robertson and Russ Oliver placing 2nd and 3rd respectively.

1/2A Texaco also enjoyed good participation with Don Cross using a Playboy Jr. to win first followed by Russ Oliver with an Answer and Barney Lorenz with a Strato Streak.

To wrap things up, Tom Morrison won the Antique Event with a Turner Special and Barney Lorenz copped Class A/B with a K&B 29 powered Playboy Sr. Russ sez next year these events will be more heavily contested as we can't let the boys get off that easy!

A new event, Nostalgia R/C (Post War designs up to 1956 only) failed to get off the ground as no one posted any official flights. Oliver further reports a season schedule should be forthcoming. We'll carry this when finished.

To show they do have activity in all forms, Photo No. 11 shows Damon Adcock with a slick looking Spook 72. Model flies quite good. Photo was taken at the VAMPS Annual at Henderson Dry Lake outside of Las Vegas. The Ohlsson 60 hauls the models up at a good rate.

SAM 39

Ralph Turner, SAM 39 Prexy, reports a very enterprising contest schedule for the club in 1981. Spotted on the calendar was five distinct meets with two more in the offing. Looks like they won't suffer from lack of activity! If this club ever gets their own flying field, look out!

Another interesting fact gleaned from their pages is if you are having trouble with the ignition system bothering the radio receiver (and you have tried every cure you can think of), try removing the old spark plug and put a fresh clean one in. Ralph claims it eliminates a lot of your trouble.

SAM 41

George Wagner, newsletter editor of the "San Diego Aeroners" (SAM 41) reports they are continuing to have their

monthly contests. Their meets feature practically everything from 1/2A Texaco to O/T Rubber. Something for everybody!

Those O/T enthusiasts in the San Diego area who are looking for someone to fly with should contact George Wagner at 2879 Marathon Dr., San Diego, CA 92123. You don't have to be competitive to just get out and fly!

SAM 49

We are indebted to Nick Nicholau for the results of the SAM 49 Texaco meet. Originally staged by John Pond and SAM 21 for the past 8 years, the meet was turned over to Otto Bernhardt whose club was looking for another date and contest in their own backyard, namely, Taft.

As usual, Otto along with his wife, Marge, put on an excellent meet. Truly a shame there was some rules dispute which held attendance down on this first ever, west coast O/T R/C Annual. Regardless, those who attended had a good time. Results:

TEXACO

- | | |
|------------------|-------|
| 1. Norm Burnham | 30:10 |
| 2. Nick Nicholau | 29:19 |
| 3. Ernie Payne | 24:32 |

1/2A TEXACO

- | | |
|-------------------|-------|
| 1. C.W. Patterson | 40:24 |
| 2. Monti Ferrell | 33:15 |
| 3. Ron Doig | 20:29 |

CLASS C

- | | |
|-------------------|-------|
| 1. Ross Thomas | 21:00 |
| 2. Skip Ruff | 17:27 |
| 3. C.W. Patterson | 11:35 |

CLASS AB

- | | |
|-------------------|-------|
| 1. Ross Thomas | 17:42 |
| 2. C.W. Patterson | 15:44 |
| 3. Maxine Thomas | 10:36 |

ANTIQUE

- | | |
|--------------------|-------|
| 1. C.W. Patterson | 23:21 |
| 2. Ron Doig | 23:10 |
| 3. Ray VandeWalker | 22:28 |

Just to show you, we weren't kidding about Maxine Thomas, Photo No. 12 shows Maxine with the model she was able to score with. With hubby, Ross, coaching her, the men are in for a heap of trouble!

SAFFS

The Sierra Antique Free Flight Society is steadily increasing its membership and modeling activity according to Phil McCary. Photo No. 13 is a shot of Phyllis Harmer holding the model by hubby, Bill, at their excellent flying site, the Stagecoach Dry Lake, about 20 miles east of Carson City, Nevada.

Phil reports this field is twice the size of Henderson Dry Lake at Las Vegas (now that's big!). If interests continues to grow, the SAFFS Club hopes to host the 1985 SAM Champs when they again come to the West Coast.

Photo No. 14 was taken at the 1980 SAM Champs at Wright-Patterson AFB by Harold Johnson, our unofficial SAM photographer. This shot of Marion Knight and his beautiful Jeffrey Streamline Cyclone is one of the models that is rarely seen.

Featured on the back pages of the 1938 Jasco Year Book, this model has

turned out to be a real beauty for O/T R/C Assist Events. Although he didn't win, Knight will be a threat this year to cop a trophy or two!

LAST WORD

Bill Baker of Norman, Oklahoma, says the best laugh he has had in a long time occurred when he received a telephone call from Ed Lidgard. Ed stated he was building one of his designs, a "Hi-Ho," but couldn't remember where the center of gravity was and further stated the plans didn't show it!

Baker replied, "Yeah, why is it you guys never put the C.G. on the plans?", to which Ed Lidgard replied, "I don't know." Haw-w-w! Baker told Ed the c.g. and other trimming data. We'll run that stuff in the next issue. Have a ball this year with the old timers!

R/C Cars . . . Continued from page 35

too long for the outboard end of the suspension arms. And there will be just discernible slop of the steering block itself in the arms. I prefer to have all this stuff set up as closely as possible, yet still retaining free action . . . I cannot say that it helps much, just that it certainly won't hurt anything. To shim this extra clearance out, you need to find some thin, 1/8 inside diameter washers. I buy mine from a hobby shop specializing in model railroading, they are .010 thick, .126 I.D., .187 O.D. and are evidently used in shimming drive motors and shafts in model locomotives. A company called Northwest Short Line packages the ones I use and their products are nationally available, even though not likely to be found in any but the most comprehensive R/R hobby shop. The very same thing is also available at many slot car centers, commonly used to shim armatures in slot car motors. Good luck. . .

On this car I used one of these washers between the lower side of each steering block and the upper surface of each lower arm. Now that the car has some time on it, another washer or two could be added here. The kingpin is inserted fully, any extra length on the upper arm and this is shimmed out with the washers. This took five of the .010 washers at each kingpin.

The suspension pieces are now bolted in place and, again, careful alignment is needed. One or the other, maybe both, of these arms will frequently be cocked slightly, resulting in the front axle(s) being off, which gives positive or negative camber to the front tires. Far as I know, we don't want any camber here, at least I always set the front end so the tires are running flat when in the straight ahead position.

A readily available source for the shim stock needed here is the K&S rack at local hobby. You will, sooner or later, be using .005, .010 and .020 shims, so just buy a small strip of each. This car took a 1/8 wide piece of .005 shim, located between the top of the pan and the outboard side of the left suspension

When you think retracts...

THINK ROM AIR

★ STANDARD MAINS
Reversible-Inboard or outboard cylinders

★ FLAT MOUNTED
NOSE GEAR

COLOR CODED HOOK UP TUBING

HAND VALVE

OTHER MODELS AVAILABLE:
*F.A.I. MAINS Cylinder Outboard - Not Reversible
MAINS for PLATT FW 190-D9 - with 3/16" Preformed Wire
90 ROTATION MAINS for P-40 Tomhawk or F4U Corsair
*HEAVY 3/16" STRUTS on special order only.



ROM AIR-CHOICE OF CHAMPIONS

ROM PRODUCTS MANUFACTURING CORP.

924 65th Street, Brooklyn, New York 11219

piece only, the right hand was OK. Just loosen the screws on the offending suspension arm, slip the shim in until it hits the shank of the screws and tighten it all back up. If you like, this can be measured with some exotic instruments but eyeballing it in is satisfactory. A better way is to mill the bottom side of the suspension arms but not many have access to this kind of tool. Or you can sand the parts to correct any misalignment, an operation that you will probably find to be not as easy as it looks.

Just to make it a "roller," the front wheels can be installed now, although if you have a lathe, or access to one (drill press will work well, also) the front and rear tires ought to be at least checked for

being equal diameter and that they are ground flat. Nobody manufactures perfect glued-and-trued tire/wheel assemblies, so as matter of course I always take a pass or two on new tires. In Associated's case, the rear tires usually have a high spot in the middle, preventing full tire contact, although this does wear off in just a couple of runs. But the real reason I always mount tires that are for-sure equally sized is that initial tweak is already hard enough to do without odd-size tires mucking things up.

Associated chose to market the TNC's with only oilites for the front wheels, and there may be a message there someplace, but if you can afford it, pop for ball bearings. Those used on this car

Charlie's R/C SPORT CARS

(213) 764-1490

Charlie's R/C GOODIES

P.O. BOX 192 • VAN NUYS, CA. 91408



PORSCHE 917K

11-1/2 in. lg.
Reg. \$64.95

SPEC. \$42.95



PORSCHE 935

15-3/4 in.
Reg. \$79.95

SPEC. \$52.95



BMW-M1

15-3/4 in.
Reg. \$82.95

SPEC. \$54.95



CHARGER 2-CH. TX
\$9.95

CHARLIE'S NEW 1/12 SCALE R/C CARS COME ASSEMBLED, READY TO RUN, COMPLETE WITH 2-CH. TRANSMITTER, AND WITH RECEIVER AND SERVOS INSTALLED. 27 MHZ ONLY. BATTERIES NOT INCLUDED. DECALS ARE FURNISHED.

ALL CARS FEATURE FULLY PROPORTIONAL STEERING WITH AUTOMATIC NEUTRAL PLUS VARIABLE SPEED CONTROL, BOTH FORWARD AND REVERSE. PORSCHE 935 AND BMW-M1 ALSO HAVE OPERATING R/L TURN SIGNALS PLUS STOP LIGHTS. LOW POWER TRANSMITTER (BELOW 100 MW) REQUIRES NO LICENSE. FUN FOR THE WHOLE FAMILY!

CATALOG - 60¢ (\$1.70 Foreign) SHIPPING - \$4.00 (U.S.A.) CALIF. RESIDENTS ADD SALES TAX.

FLYING SCALE MODELS



SPARROW HAWK F9C-2 (3 sheets)	\$11.50
1-3/4" scale C/L, 44-1/2" span	
GRUMMAN J2F-6 "DUCK" (4 sheets)	\$19.50
1-1/2" scale R/C, 56" span	
VOUGHT OS2U-1 & 3 KINGFISHER (4 sheets)	\$19.50
1-3/4" scale, 63" span	
GRUMMAN "GUARDIAN" AF-2S (3 sheets)	\$17.50
1-1/4" scale, 75" span	

Add \$1.50 handling & postage
Brochure 50¢

SMITH PLANS
9422 N. Fairway Blvd., Sun Lakes, AZ 85224

came from JoMac and have a single shield on the flanged side of the bearing. The idea here is that the shield keeps crud out of the bearing, while it can also be cleaned easily from the non-shielded side. This "open" side of the bearing only sees the inside of the bearing pocket in the wheel, and, of course it is sealed at the other end by another bearing, so junk really shouldn't be a problem in what looks like a vulnerable bearing. Your choice, Associated sells front bearings that are double shielded, as do several other manufacturers. In any case, take good care of these expensive things and remember that a dirty bearing is not an improvement over a clean and oiled oilite bushing.

Those .010 washers mentioned previously are used again to get the front wheels mounted on the axles with as close a tolerance as possible, still having a small amount of play. I put the extra washers up against the steering blocks, sometimes it takes as many as five or six of them, then use one on the very end of the axle, followed by the standard "e"

ring. With that, we'll leave off until next month, as I'm running out of room for this column and don't find this "construction article" type of writing much fun at all, anyway. . .

BIG NEWS FROM DELTA. . .

When Delta released its ball-type diffs for the 1/8 scale Super J, it made an already very good car even better and has to be looked back upon as a significant step forward in the development of 1/8 cars. The Delta diff I am racing is the same one I started out with, have not had to replace a single part, the thing is effective and absolutely bulletproof, even after all the track time it has accumulated.

With the diff making the car easy to drive, the only area seemingly in need of improvement is carburetion, primarily in terms of efficiency as well as eliminating that little belch of the engine as it came on full throttle at the exits of corners (the belch was there because at that time all carbs had to be set on the rich side at idle to avoid flame-outs at the end of long straights). And engine reliability needed some work, as in offering an engine that wouldn't throw up every once in awhile.

Delta has solved the carb problem, simple as that. I have been using the SVC800 series of carbs on both my car as well as the wife's (Clean Cheri) with results that probably cannot be improved upon. The carb is a slide-valve number, all machined and close fitting, and designed to stay that way with a bellows effectively sealing the slide from dirt! One of the best features of this carb is that easily changeable inserts can be used to dial the right amount of power and mileage for each track. The inserts are nylon and available in .100, .125, .187, .250 and .312 bores, with the wide-open throat being a huge .375. I invariably use a .187 insert while we have further fine-

tuned Cheri's carb with an insert drilled to .142. In case you're not aware, the stock carb on a K&B .21 is .200 bore, so I am using a carb that is even smaller. . . But I'll guarantee that I never hurt for power.

And part of that is related to the fact that last season I switched to a Picco .21, a motor that I personally regard as the best R/C car motor presently available. In stock, out-of-the-box condition that Picco will run with any motor around, even those that have been heavily breathed on and are running right up against their design limits, sometimes over, as can be seen by all the blown motors at big races. What the limits of the Picco are, is not really known, the engine just seems to be willing to do anything you ask of it. You can gear it super low, run a huge carb and just let it howl without waiting for the sound of a grenading motor.

I ran my Picco for nearly all of last year and this winter it was starting to get ready for a new rod, which I installed, but that was it, the motor was fresh as could be, partly due to the effective air cleaner that Delta designed to go along with the new carb.

Back when I first went to a Picco, the only negative aspect was price, some \$200 or so, although I find it doubtful that anybody actually bought one for that amount of money, even if advertised that way. Still, a good argument could be made then that two hundred wasn't too much, as the power is so good and reliability even better.

Now the argument is a moot point, as Delta is importing the Picco .21, selling the ready-to-race engine for only \$135, complete with Picco carb and heat sink head. But there is a better way to buy. For \$130 you can get, for want of a better word, a "kit" motor that is unassembled but including a very reliable phenolic retainer bearing but no head or carb. The idea here is that racers always tear a motor down anyway, so why buy it assembled and as long as it has to be put together, the better bearing should be used. For a carb, the Delta SVC800 can't be beat and they also have their own heat sink head for the Picco, available separately. Or if you prefer, as I do, to run homemade full-compliment rear bearings, you can get a "kit" Picco for \$120, again no carb or head.

Even the best of motors will sometimes need parts, Delta is stocking all of them, even has made up overhaul kits consisting of rod, piston/sleeve set, wristpin and wristpin clips.

Even though it may sound as if I am overly enthusiastic about the Delta carb/Picco .21 engine combination, that is only because you have to yet to see what a super racing combination it really is. And I have never been known to be overly enthusiastic about any hobby product, ask anybody who has read my stuff for the last few years. . .



Super tough glass filled engine mounts

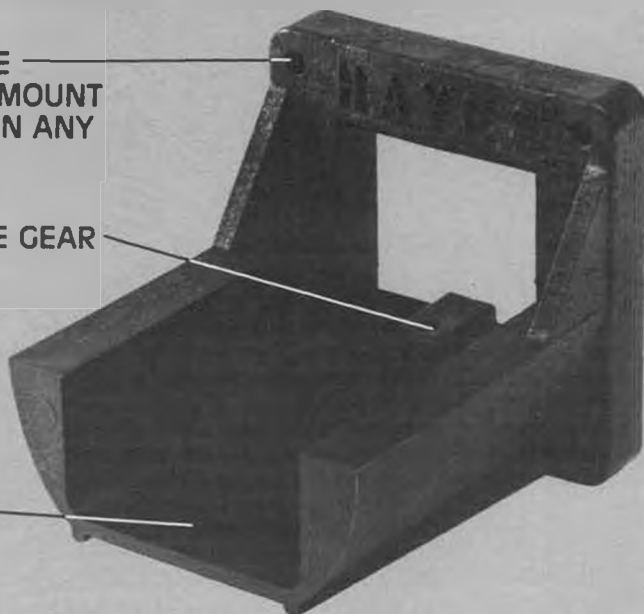


Built in nose bracket saves mounting hardware, which means less weight and less cost!

SYMETRICAL HOLE
PATTERN MEANS MOUNT
CAN BE TURNED IN ANY
DIRECTION

PREDRILLED NOSE GEAR
BRACKET

UNIQUE BOTTOM DESIGN
GIVES THE STRENGTH
OF ALUMINUM AT LESS
THAN HALF THE WEIGHT



HAYES
products

1558 Osage Street
San Marcos, CA 92069
714/744-8546

CALL OR WRITE FOR MORE INFORMATION.

...now available in 21 sizes to fit all popular engines from .049 to .91 at retail prices from \$2.25 to \$6.95.

Fuel Lines . . . Continued from page 44

the exact requirements for both fuel and air will vary considerably throughout the entire range from idle to full throttle. Thus, the R/C carburetor becomes complex. Unfortunately a great one has yet to be manufactured. They all have their individual problems. The usual complaints are: unreliable mid-range and idle. Manufacturers are well aware of the problems. The really difficult part of solutions to the problems is keeping manufacturing costs within reason. At the recent Toledo Trade Show, a fresh approach to the R/C carburetor was presented by Martin Enterprises: the M&H variable venturi carburetor. Take a look at a sample in photo number four. In the near future, we'll have a product review on the M&H for you.

In the meantime, let's review how an R/C carburetor works. Well, it really works on the same principles as outlined above. The throttling action is accomplished by effectively changing the bore; be it with rotating barrel, slide bar or what have you. There's usually an adjustable stop on the barrel type for low RPM. It's often referred to as an idle RPM adjustment. At full throttle fuel is metered by a needle valve — the same as with the simplest carburetor. As the bore is decreased, less fuel is needed. On the better carburetors, this is controlled by a second sliding needle that

modulates the fuel at the spray hole without changing the high speed needle setting. This second needle is frequently designed to also be an idle mixture adjustment. In recent years yet another control has been added to some R/C carburetors — the high speed mixture control. It requires the use of an additional servo. The purpose of this control is to enable the modeler to adjust the mixture in flight at full throttle. This is a particularly desirable feature for all tuned pipe operations. Whenever a tuned pipe goes into resonance, more fuel is needed, and this is a very nice way to meet that requirement. Otherwise, the out of resonance mixture setting will be almost blubbery rich. Naturally, there are variations of the controls from one brand to another, but the basic principles remain the same — including the use of a pressure fuel system.

So, why all the fuss and so called aggravation? Well, if your engine quit every time you retarded or advanced the throttle, I'm sure you'd become aggravated in short order. What can you do about it? Two things: First, be absolutely sure your carburetor and fuel system are clean (including fresh fuel). Second, properly adjust your carburetor.

If you decide that your carburetor may need a thorough cleaning, begin by carefully disassembling it. Space will not permit step-by-step disassembly instructions for all the carburetors on the market. However, here are a few tips

that should be helpful if you've never done it before.

1. Assemble your tools and include a pad of paper and pencil.
2. Thoroughly examine your carburetor until you're confident about where all the pieces belong.
3. Unscrew only one bolt or nut at a time. It's also a good idea to count the number of turns on both the high speed and idle adjustments. Make a note about them.
4. Make a rough sketch of where each part goes and its exact orientation to other parts. This is essential on parts such as spray bars.
5. As you disassemble the parts, lay them in an appropriate pattern on another sheet of paper.

You're now ready to clean the parts. Use warm water, a good detergent and tooth brush. Metal parts can also be soaked in acetone for five or ten minutes to help loosen up crud. Do not use acetone on plastic parts or seals. It may also be necessary to use pieces of fine wire to unclog fuel passages. This is most important, for example, on the Perry carburetor idle adjustment wheel. The very fine interior slit must be completely free of all foreign matter. When a part is clean, blow dry it, coat it with WD-40, and place it in its exact spot on the paper pattern. When all the parts have been cleaned, reassemble the carburetor. Your notes and part pattern will be helpful if you've never previously

**NEW
6th EDITION**

Owning The RADIO CONTROL BUYERS GUIDE Is Like Having The Information in 260 Manufacturers' Catalogs

The Guide has illustrations, descriptions and prices for more than 2,400 radio control items. The information in this industry master catalog is organized, indexed and cross-indexed for easy reference.

Included are the latest model cars, sailboats, power boats, aircraft, radio systems, tools, books, building materials, engines, and accessories.

The New 6th Edition has 280 8½" x 11" pages of information. It is a must for every serious modeler.

Suggested Retail \$9.95

**At Better
Hobby
Shops or
Direct.**



Yes, rush me my copy of the new 6th edition of The Radio Control Buyers Guide.

Please check one:

☐ Enclosed is \$11.00 (\$9.95 retail plus \$1.05 postage)
(U.S. and Canada Only — Canadians send U.S. Funds)

☐ Charge my ☐ Mastercharge ☐ Visa

Charge no. _____ Exp. Date. _____

Name: _____

Street: _____

City, State, Zip: _____

Return to: R/C Buyers Guide, 6 Clifton House, Clifton, VA 22024

overhauled one. Finish up by reinstalling the carburetor in the engine.

OK guys, we're down to the last task — carburetor adjustments. One or two paragraphs won't be enough to adequately cover the subject. But wait, it's already been covered in some depth. Just go to your library of *Model Builder* magazines, dig out the April 1980 issue, and page through to the Fuel Lines column. My portion of that column was dedicated to carburetor adjustments. It begins on page 82. After digesting that and applying it to your reconditioned carburetor, all those aggravations will be a thing of the past. Every flight will have a perfect engine run... and I know where to buy prime land for five dollars a acre.

Now if for some strange reason everything doesn't turn out quite so perfectly, you still have one other option. Dirty Dan would probably have recommended it instead of reading this column. Simply, buy another brand of carburetor. See you next month... •

Hannan Continued from page 48

unrealistic time deadlines: "Airplane model builders are used to finishing things in a short time; a number of national championships have been won with a plane built overnight by a bleary-eyed flier who had crashed his best ship the day before." Grosser points out the

resemblance of HPAs to microfilm models and even parallels the conditions under which the delicate types are flown: "in fact, people seldom raise their voices at the HPA trials — they behave rather as though they were in a library."

Aside from the historical significance and sheer fascination of this book, we appreciated the humorous anecdotes sprinkled throughout. For instance, when B.S. Shenstone, an English prime-mover in the HPA movement was asked by the British Air Ministry about possible military applications of these aircraft, he replied: "It has immediate military value as a more dangerous method training commandoes." Or, consider this kidding-on-the-square analysis by an Albatross member during the more frantic moments of construction: "Organization is in chaos."

The importance of prizes as motivational factors is also examined, along with the backgrounds of some of their donors. While commercialism and publicity seeking have been factors in some cases, others defy such easy explanation. In the instance of Henry Kramer, foremost source of HPA monetary inducements, it turns out he has had previous connections with aviation, having been involved in the production of plywood for the WW II de Havilland Mosquitos, and really does have a sound appreciation for aircraft and aviators. A similar case concerns J.G. Weir, of Scotland, who had been an early and largely unsung financial backer of Cierva's Autogiros, and again came through by donating HPA funds.

We highly recommend this book, not only for Dr. Grosser's masterful text, but also for the excellent photographs, fine technical drawings, including 3-views (some from Aeromodeller and one by Janet Grosser). Model builders will enjoy the frequent and flattering recognition of their favorite hobby and gain a fresh application for the efforts involved in solving the problems of human-powered flight, perhaps best summarized in the book by "...the confluence of a great many talented people connected by a flexible social structure and a good communications network."

FOUND IS FOUND

It pays to advertise! Our small mention of Walt Mooney's missing *Found* Peanut yielded a prompt response; no skulduggery was involved, and the model is again safe at home.

PEANUTS WELCOMED BY R/C CLUB

Walt Mooney also received a nice letter recently from Dale Lemmons, concerning a Peanut contest sponsored by the Omahawks R/C club, from which the following:

"We had hoped for 35 entries and would have been happy with 25. Instead, 57 planes were entered; we were amazed. With interest like this, we should be able to expand this in the summer and next winter.

Entrants came from as far as 150 miles and brought some excellent airplanes.

Flying was much better than expected. Despite a low ceiling with hanging lights, several flights exceeded 1 minute."

THE KIT CONNECTION

Phil Oestricher's nostalgic appreciation of the old model kits brought forth additional commentaries from readers.

Ed Toner, now an airplane pilot, had this reaction: "I recall my first successes, still. Some sort of Continental endurance type was the first to fly; a Comet Cessna was the first scale model to fly; a Scientific "Wizard" was the first to R.O.G.; an Ace Whitman "Albatross" was my first out-of-sight (during war-time, with the last of the rubber, good balsa, tissue, etc. and it was a great loss)."

"We actually had P-39 and P-40 clubs. Small fist fights would break out between the two factions. You were either for one or the other, and I could never figure out why."

Scale modeler Vern Clements had these recollections: "When I was about a 12-year-old (farm kid) in Colorado, I built a Joe Ott P-39 as a display model for a banker. He hung it up in his bank, and it was my donation to him for my first airplane ride... in a side-by-side Taylorcraft. Exciting, yet after a ride of about half an hour, it (the P-39) seemed like a big payment. Had a lot of work in that model. Learned by myself, the hard way, as no one else around that area built models that I knew of."

AMEN!

Terry Mrakava, reflecting upon his latest indoor model project: "I've created 10 pounds of mess to build 4 grams of airplane — must change my building habits!"

ONE GRAM FLYING MACHINES

We were pleased to note recognition of indoor flying models extended by the prestigious American Institute of Aeronautics and Astronautics, who featured as guest speaker Cezar Banks, President of the San Diego Orbiters. Banks lectured on the subject of microfilm models and gave a demonstration to the group.

FAREWELL PAUL

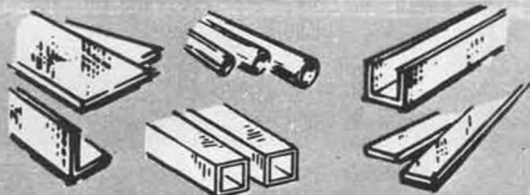
Another modeler has left us. Jean Paul Steele, a member of the San Diego Scale Staffel died recently in an accident at his Newport Beach home. Paul had been an active sky-diver and kite-flyer as well as a model builder who specialized in off-beat designs. He was noted as a humorist and raconteur who had the rare ability to see the funny side of even tragic happenings. Although he dabbled in various phases of model building, rubber-powered sport types seemed to be his favorite and he was a familiar figure at the Mile Square flying field. We will miss you Paul!

SOME VIEWS FROM ENGLAND

John O'Donnell, long-time competitor, photographer (including R/C MB covers) and former Aeromodeler columnist, favored us with a letter from which the following:

"At Woodvale 1980, the free flight scale event was split up as to separate models into power (gas), CO2 and

K&S FOR TUBING



OUR CAREFULLY ENGINEERED LINE OF METAL PRODUCTS HAS UNLIMITED USES IN THE DEVELOPMENT OF ALL TYPES OF PROJECTS. ALL OF YOUR METAL NEEDS AVAILABLE IN ONE PLACE.

ALUMINUM TUBE (12")		
STOCK NO.	SIZE	PRICE EACH
100	1/16	.25
101	3/32	.30
102	1/8	.30
103	5/32	.35
104	3/16	.40
105	7/32	.45
106	1/4	.50
107	9/32	.55

ROUND BRASS TUBE (12")		
STOCK NO.	SIZE	PRICE EACH
125	1/16	.30
126	3/32	.30
127	1/8	.30
128	5/32	.35
129	3/16	.45
130	7/32	.50
131	1/4	.55
132	9/32	.60
133	5/16	.65
134	11/32	.70
135	3/8	.75
136	13/32	.85
137	7/16	.90
138	15/32	.95
139	1/2	1.00
140	17/32	1.05
141	9/16	1.10
142	19/32	1.20
143	5/8	1.25
144	21/32	1.40

COPPER TUBE (12")		
STOCK NO.	SIZE	PRICE EACH
117	1/16	.25
118	3/32	.30
119	5/32	.40
120	1/8	.30

SOFT BRASS FUEL TUBING (12")		
STOCK NO.	SIZE	PRICE EACH
121	1/8	.40

RECTANGULAR BRASS TUBE (12")		
STOCK NO.	SIZE	PRICE EACH
262	3/32x3/16	1.10
264	1/8x1/4	1.20
266	5/32x5/16	1.30
268	3/16x3/8	1.40

BRASS STRIPS (12")		
STOCK NO.	SIZE	PRICE EACH
230	.016x1/4	.20
231	.016x1/2	.30
232	.016x1	.50
233	.016x3/4	.40
234	.016x2	.90
235	.025x1/4	.25
236	.025x1/2	.40
237	.025x1	.70
238	.025x3/4	.55
239	.025x2	1.30
240	.032x1/4	.30
241	.032x1/2	.50
242	.032x1	.85
243	.032x3/4	.65
244	.032x2	1.60
245	.064x1/4	.60
246	.064x1/2	1.00
247	.064x3/4	1.25
248	.064x1	1.70
249	.064x2	3.00

SQUARE BRASS TUBE (12")		
STOCK NO.	SIZE	PRICE EACH
149	1/16 Sq.	.45
150	3/32 Sq.	.50
151	1/8 Sq.	.55
152	5/32 Sq.	.65
153	3/16 Sq.	.75
154	7/32 Sq.	.85
155	1/4 Sq.	.95

BRASS STREAMLINE TUBE 12"		
STOCK NO.	SIZE	PRICE EACH
122	Small	.75

SHEET METAL (4" x 10")		
STOCK NO.	SIZE	PRICE EACH
250	.005 Brass	.70
251	.010 Brass	1.10
252	.015 Brass	1.50
253	.032 Brass	2.70
254	.008 Tin	.50
255	.016 Alum.	.50
256	.032 Alum.	.80
257	.064 Alum.	1.35
258	Asst. Brass	1.30
259	.025 Copp.	2.60

BRASS ANGLE (12")		
STOCK NO.	SIZE	PRICE EACH
171	1/8x1/8	.40
172	5/32x5/32	.45
173	3/16x3/16	.50
174	7/32x7/32	.55
175	1/4x1/4	.65

BRASS CHANNEL (12")		
STOCK NO.	SIZE	PRICE EACH
181	1/8	.50
182	5/32	.55
183	3/16	.60
184	7/32	.65
185	1/4	.75

SOLID BRASS ROD (12")		
STOCK NO.	SIZE	PRICE EACH
159	.020	.08
160	1/32	.08
161	3/64	.12
162	1/16	.20
163	3/32	.25
164	1/8	.40
165	5/32	.50

ROUND PLATED SPRING WIRE (12")		
STOCK NO.	SIZE	PRICE EACH
192	.032	.08
195	.047	.08
197	.055	.08
199	.063	.08



ENGINEERING

6917 West 59th St., Chicago, Ill. 60638

rubber classifications. This made for more equitable competition and the rubber event was well supported compared with the others. Dave Yates improved upon his previous (proxy-flying) efforts with Bill Warner's "McDonald S 21" and flew it to a comfortable win in the rubber event. Conditions were calm, but wet initially, as can be seen in the photo of Doug Hunt winding his "Piper Cub" Peanut, good enough for the runner-up position.

The power event was the usual "battle" of ancient (in every sense) W.W.I biplanes, and saw Terry Manley edge out Eric Coates by a few points. To the outside onlooker (like myself) this event has been dominated by "regulars,"

abandoned by the majority and is unlikely to change! CO2 has simply not "caught on," maybe the motors are too marginal in power... Or is it the excess emphasis on scale detail?"

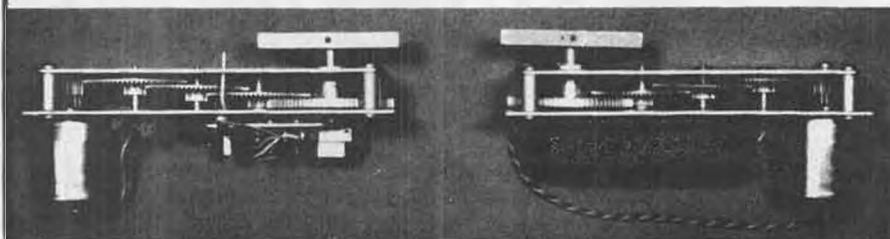
John is searching for several American magazines to complete his collection, and offers to swap early issues of *Aeromodeler* in exchange for:

MODEL BUILDER: October, 1971; September, October, November, 1972; January, 1973.

AIR TRAILS MODEL ANNUALS: 1953, any prior to 1951 (if extant); front cover for 1954.

John may be addressed at: 36 Marina Drive, Marple, Stockport, Cheshire SK6 6JL ENGLAND.

SAIL CONTROL WINCHES



W-1 . . . \$69.00

W-2 . . . \$139.00

• Custom R/C design for all boat sizes • Power - 40 in. lbs. • Travel time - 5 seconds • Voltage - 4.8-6 (W-1) • Size - 2 x 2 x 5 inches.

The Probar W-1 is mechanically operated by a separate, neutralizing servo. The Probar Propo W-2 is designed to plug directly into the receiver, and requires no extra batteries. Specify Kraft, Futaba, or no connector. Both winches are fully assembled and tested, ready to install. All mounting hardware, switch pushrod (W-1 only), and winch arm blank are supplied.

STAINLESS STEEL HARDWARE:

Turnbuckles, Chainplates, Goosenecks, Boom vang pivots, Pad eyes, Tangs, Deck cleats, Boom cleats, Rigging wire.

MISCELLANEOUS ITEMS:

Sheet exit guides, Bowsie, Rudder posts, Mast head fitting, Dacron sheet line.

Dealer inquiries invited.

PROBAR DESIGN

P.O. BOX 639 ESCONDIDO, CA. 92025

EMS SR-1 SERVO REVERSER

Price - \$10.95
(Include \$1.00 per order, for shipping and handling.)



Plugs into your system between the Receiver and Servo and reverses the direction of that servo with relation to the Transmitter Stick motion. Available for all popular positive or negative pulse systems with connectors installed. An extremely handy device when installing your system in a new airplane.

Master Charge and VISA
Dealer Inquiries Invited

ELECTRONIC MODEL SYSTEMS
6175 Palo Alto Dr., Anaheim, CA 92807

MEETING OF THE MINDS

Steve Allen's popular series is again being featured on PBS television. The concept of this unique format is a "time-warp talk-show," with host Steve Allen interviewing famous (and infamous) characters from history (with unusually talented actors playing the guest roles). A recent broadcast starred Louis Turenne, Robert Rudie and Harris Yulin as, respectively, Poet-mystic-artist William Blake, violinist-composer Niccolò Paganini and the 15th-century genius Leonardo da Vinci.

The highlight of the show for us was when a rather bored Leonardo nonchalantly reached over to the table, picked up a little French ornithopter he had brought with him, and sent it flapping merrily across the room! The reaction of the studio audience suggested that they were startled, amazed and amused by the antics of the tiny machine. As we've said before, the show-biz aspects of this hobby deserve greater exploitation.

SIGN-OFF

Richard Miller contributed this quote from a former bomber pilot: "I like trams because their landing gear is always down."

Counter . . . Continued from page 9

during the 1931 Cleveland National Air Races, the "Z" was also the direct fore-runner of the famous Gee Bee R-1 and R-2. The Williams' Brothers kit features two different cowlings, two types of wheels (hard and flexible tires), a detailed cockpit interior, and nylon monofilament rigging. Suggested for experienced model builders, the Gee Bee "Z" retails for \$7. Other racers available in the series include the Gee Bee R-1, Wedell-Williams, and the French Caudron. Williams Brothers, Inc., 181 Pawnee, San Marcos, CA 92069.

From W.E. Technical Services, Inc., comes the Astro-Hog "20," a 3/4-size model of Fred Dunns three-times Nats winner. In this slightly smaller size, utilizing a .20 engine and with today's smaller R/C systems, it becomes an excellent trainer. Plan set No. RCT-1, consists of complete plans, sub-assembly drawings and detailed parts list for \$9.95, add \$2 if you prefer rolled plans shipped in a mailing tube. Send \$1 for brochure, refundable against your first order. W.E. Technical Services, Inc., P.O. Box 76884-MB, Atlanta, GA 30328.

Byron Originals Complete Kit Concepts, "We build up to a standard, not down to a price," is quite evident with its recent entry into the .60 powered, no special drive required, marketplace. The authentic 1/6-scale Beechcraft Series consists of five outstanding Beech designs, starting with the V-35B Bonanza,

F-33A, A-36, T-34B, and the T-34C. Super scale features include molded, louvered inspection panel detail, wheel doors, cowl flaps, scale nose gear strut, and formed skin detailing for the stabs and control surfaces, as an example. A scale detailed, fiberglass fuselage, and injection molded, foam wing, tail group, and control surfaces, highlight this new series, plus all necessary hardware and die-cut materials to complete the models are included. Byron Originals, P.O. Box 279, Ida Grove, IA 51445; (712) 364-3165.

Top Flite Models is now distributing an improved line of rock-hard maple Super-M and Top Flite props, featuring refined accuracy in pitch and balance, excellent workmanship in sanding and an improved high luster, fuel-proof finish, all of which adds up to increased flying performance. For additional convenience for retailer and modeler alike, the complete line of Top Flite props are now packaged in color coded, clear plastic 'hang up' bags for easy display and identification. For their latest catalog, prop chart, and free samples of Monokote and new Fabrikote, send 50 cents with your request to: Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

The Eldon J. Lind Co. announces the world's first adjustable hand sanding tool, the "Duplicator MK 1." Designed especially for sanding edges that are round, semi-round, or angle shaped, it is the perfect tool for uniformly and evenly shaping leading edges, as an example. It can be utilized to contour wing fillets, too! Patterns for seven different rounds are supplied, or you can make your own patterns for special shapes, and extra sliders for the tool are included for larger patterns. Complete with instructions for only \$19.95. California natives add 6%. Eldon J. Lind Co., 2912 Walker Lee, Los Alamitos, CA 90720.

From "Alman," really get your head in the clouds by enjoying your favorite drink and aircraft at the same time. Six different WW-I Aeroplanes, or WW-II War Birds, or even Classic Bipes, beautifully etched on Texas sized tumblers for \$22.95, matching etched ashtray, \$12.50, both PPD in the USA. Texas residents add 5% tax. For club or special logos, and group prices, write to: Alman, 2609 Burningtrees Court, Arlington, TX 70014.

Cockpit Control Systems creates "The Cockpit," designed to allow the R/C pilot to experience aircraft controls in positions familiar to full scale pilots. It's a perfect transition for full-scale pilots into R/C and an exciting and realistic flight experience for the accomplished R/C pilot. Easily adaptable to most conventional 2-stick transmitters, it folds to a 9-inch height and weighs less than 30 pounds. Control is accurate enough for pattern flying, as all parts are precision machined. Available complete and assembled, or in kit form with easy-to-understand plans and instructions. For

more information, see your dealer, or contact: Cockpit Control Systems, 1706 E. Indian School Rd., Phoenix, AZ; (602) 274-7118.

★ ★ ★

Fourmost Products, creators of "Innovative Model Products," has released its 'Miter Master,' a tool designed to enable the modeler-craftsman to make perfect joints in wood by accurately sanding preset angles. Consisting of a solid base mounted on non-skid pads, a slider block carrying sandpaper of two different grits and unique guide parts molded from filled nylon, any angle and its reciprocal can be formed by adjustment of the triangular guide. A retractable squaring fence provides for 90° corners, too. Now, you can make those precise joints required by cyanoacrylate adhesives for maximum strength. Suggested price; \$7.50 assembled and boxed. Fourmost Products, 4040 24th Ave., Forest Grove, OR 97166; (503) 357-2732.

★ ★ ★

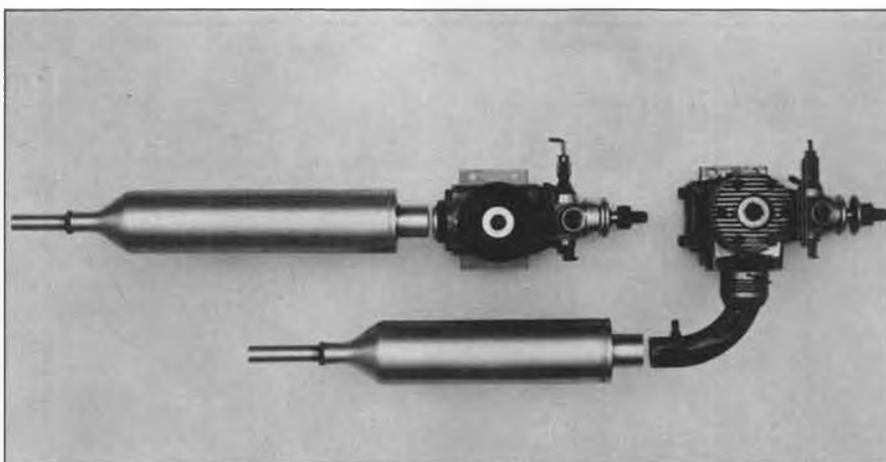
The M.E.N. "Big John" kit has finally been released and is now available at your dealers! Designed in 1963 by Bill Northrop, this realistic biplane with 1,500 square inches of wing area has been updated in materials and construction techniques to create a stronger, lighter (8-1/2 to 9 lb. flying weight), and easier to build model. Performance is excellent on any standard .60 engine. Featuring "Thru-Cut" die-cutting process and "Tri-Square-Loc" construction, assembly is fast and simple. "Big John" is designed for four-channel R/C systems and the kit contains quality lite plywood and balsa, rolled plans and building instructions, complete hardware package, formed cabane struts and landing gear wire, plus wing jig building fixtures. See your dealer now! M.E.N. Model Engineering of Norwalk, 54 Chestnut Hill, Norwalk, CT 06851.

★ ★ ★

Classic aviation film lovers, take note! UDS Video has announced the availability of a wide selection of aviation movies, such as "Twelve O'Clock High," "The Blue Max," and others. Many war documentaries, aircraft company films, newsreels, and other rare aviation films are available in either Betamax or VHS cassette format. A catalog is available for \$1 from UDS Video, 505 N. Sepulveda Blvd., Manhattan Beach, CA 90266; (213) 379-5497.

★ ★ ★

Blue Sky Products, Inc., has introduced its recently published book, *A Beginner's Guide To Radio Control Flying*. This very basic, well written book is slanted toward the person who has had very little, if any previous model building experience. Types of R/C aircraft (sport, scale, pattern, etc.) are defined and basic modeling tools required are listed and expanded upon. Covering materials and engine installations are mentioned, too, along with tips on pre-flight and flying. Introductory price is \$4.98, plus \$1 for postage and handling. Clubs and dealers should contact: Blue Sky Products, Inc., P.O. Box 564, Worthington, OH 43085.



The Original **MAGIC™ MUFFLER**

Phelan Competition Products "Magic Muffler" really is magic! This new concept in tuned mufflers will increase your engine's power whether you are battling it out in competition (FAI approved) or you fly just for fun.

Magic Muffler's exclusive design produces two tuning modes resulting in a broad power band through most of the rev range. That means you'll get better performance in the air—where it counts. Alcohol/oil fuel mixture delivers performance comparable to high nitro fuels with conventional tuned pipes. (Tests have shown Magic Muffler responds even better to nitro fuel mixtures.) What you won't get with the Magic Muffler is the annoying "drop-off" at low RPM's or "over-run" at high RPM's you get with conventional tuned pipes.

- increases fuel efficiency
- reduces wear and varnishing
- runs cooler
- compact sizes
- easy to mount

Find out what a little magic can do for you.

- 3.5 S/R: .15-.25 ci side or rear exhaust (\$36.95)
- 6.5 R: .40-.45 ci rear exhaust (\$39.95)
- 6.5 S/R: .40-.65 ci side or rear exhaust (\$39.95)
- 10.0 R: .60-.65 ci rear exhaust (\$49.95)

Dealer Inquiries Invited

17835 Sky Park Circle #F
Irvine, CA 92714 • 714/556-1888
TELEX 68-1490
EXTRONIC IRIN



Soaring Continued from page 41

facing the blade, and two parallel triangular strips emerge from the back side. Spruce, redwood, and other hardwoods can be cut in the 3/16 and 1/4 inch slots. You can receive further information in the form of a detailed catalog on all these items by sending \$1 and a self-addressed stamped envelope to Jim Ealy, Archaeopteryx Avion Association, Box 120, Pottstown, PA 19464.

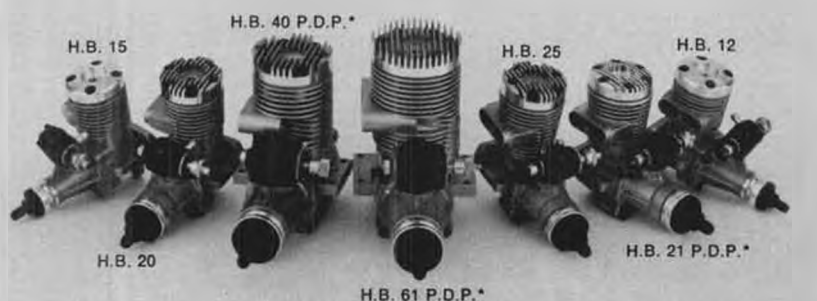
Have you been confused by European data on wing loading? Dave Watson of the Torrey Pines Gulls provides a table that'll save the day. He tells me that a decometer is 1/10 of a meter and metric

wing loading is expressed in grams per decometer (g/dm²). Thanks, Dave.

OUNCES PER SQUARE FOOT	g/dm ²
5.00	15.26
6.00	18.31
7.00	21.36
7.25	22.12
7.50	22.89
7.75	23.65
8.00	24.41
8.25	25.18
8.50	25.94
8.75	26.70
9.00	27.46
9.25	28.23
9.50	28.99
9.75	29.75
10.00	30.52
10.50	32.04

It's What's Up Front!

PUT AN H.B. ENGINE UP FRONT!



*Perry Directional Porting

TOP PERFORMANCE on F.A.I. FUEL!

H.B. Engines offer a full line of model engines, a complete choice of accessories and replacement parts.

Write for FREE COLOR CATALOG



HB-ENGINES

Made in W. Germany

BAVARIAN PRECISION PRODUCTS CO. • P.O. Box 8, Dept. C, New Canaan, Connecticut 06840

HB Hot Line

(203) 748-7320

Hours: 4PM to 10PM (EST)

DRAPER'S R/C SERVICE
10 Castle Hill Drive
Bethel, CT. 06801

11.00	33.57
11.50	35.09
12.00	36.62
13.00	39.67
14.00	42.72
15.00	45.77

And, if you like to collect airfoil data for ready reference, you ought to have a copy of the *Handbook of Airfoil Sections for Light Aircraft* by M. Rice, published by Aviation Press, P.O. Box 357, Appleton, WI 54991. This collection of early NACA and other airfoils and their polar plots was prepared in 1971 and is still of general interest. I found a copy for \$6.95 at the Air Force Museum, Dayton, Ohio.

See you next month. •

Indoor Continued from page 59

listed monthly in this magazine.

In indoor, you may fly for record performance in ROG Stick, Paper Stick, Hand Launch Stick, Rise-off-ground Cabin, Autogiro, Helicopter, Ornithopter, Hand Launch Glider, FAI Stick, Pennyplane, Novice Pennyplane and Easy B models.

You must be a current AMA member to fly for record. However, you can pay your AMA dues at the record trials and still fly.

Here are some tips to help in your quest for a new national record.

Pick an event that you feel you can better the time now existing. Get the current AMA Rules Book in front of you and make sure your model is legal. If you are building someone else's design, check it against the book. Do not assume the model is legal.

Build several models from the same plan. Maybe you can try a few subtle variations in rudder area, dihedral and stab area (while flying for ornithopter record in Akron, Ohio in 1968, I flew 5 models off the same plan). Build each one lighter than the last.

Check the current record time in your event. Some modelers call AMA Headquarters in Washington, D.C. just before the meet, to verify the latest record time.

Take your AMA Rules Book to the meet with you to settle any questions about area, weight, etc.

Strip plenty of good rubber of various sizes to take along, as well as extra Microfilm, Microlite and tissue for patching. Don't forget your stopwatch. Arrive early. You will need all the time you can get to set that record. Get serious. Record setting takes a lot of concentration, so keep the socializing to a minimum. (*That comes later.* wcn)

Test your models in the largest and most uncongested area possible. When you think your model is approaching record time, go to the officials table and ask for a timer. Take a buddy with you if possible, to help you wind and to stay with the timer and check his watch against that of your timers. I have been at record trials where the timer was seen timing the wrong model or had not checked to make sure his stop watch was running as the model took flight. Most Contest Directors require two watches on a flight for possible record.

Try to keep cool and unflustered as you fly. It's normal to get sweaty palms as you wind the model! Be very careful as you put the rubber onto the rear hook on the fuselage. Check to be sure that you are launching the model into the largest open circle area available and not into the path of another airborne model.

As the model descends, check the floor area to make sure that people are not standing around in the path of your airplane. A verbal "Heads Up" has saved me from many short flights.

After your model touches the floor and you've retrieved it, walk back to the officials table and check your time written down by your timer. If his watch didn't agree with that of your helper, speak to the Contest Director about it.

If you are successful in bettering the record, ask the CD to fill out the record application form. Part of this form must also be completed by the contestant.

The completed form and a plan of the model must be mailed to AMA Headquarters in Washington, D.C. within 10 days.

Don't assume the record is yours until you get confirmation back from AMA. Someone else may have flown a higher time in the same event on the same day. This situation happened to me in Pennsylvania in 1975.

Lastly, pack your model away carefully. Save it for another day and another record trial. Maybe you can better your time later or use this model in a different category.

JUNIOR INDOOR BIPLANE JUST FOR FUN

As promised, a junior fun-type model is presented in this issue. This is one of a series of biplanes designed and built by Chris Johnson. It was built the evening before an indoor flying session. So you juniors should have no trouble putting this biplane together in a few hours. With the exception of the 1/8 x 1/4 motor stick, and 1/16 x 1/8 center cabane struts, the entire model is built from 1/16 sq. balsa wood.

The prop is a 5-1/2 inch Delta Dart type and it flies on one loop of 1/8 x 13 inch rubber. The covering is yellow jap

tissue trimmed with red dope. To achieve the right turn pattern, Chris tweaked the rudder 1/16 to the right. The bottom wing was warped to give the right wing 1/8 washin (trailing edge down) to keep the model from spinning in as it turns to the right.

You can have a lot of fun flying this little biplane. Do you want to see more junior fun models in this column? Write and let me know if you do.

WHAT HAVE YOU DONE FOR A JUNIOR LATELY?

Do the juniors in your area have to fly against the older, more seasoned modelers? At many of the contests and sessions that Chris and I attend, there are no prizes for the juniors. That is, the events are Junior/Senior/Open combined. What chance has a 10 year old kid got when he has to fly against his dad and the other adults?

I think this is wrong! There should be separate awards for the kids. Even special contests just for the Juniors. One adult can help 4 or 5 kids trim their models and then time flights for these future experts. If we send these kids home happy, with a trophy and some "goodies" (merchandise), they will be back at the next session with a big smile and a new model.

INDOOR WINDING STAND

Many indoor modelers are now using a stand to hold their model, while the turns are wound in with the 16 to 1 winder. This stand, or stooge, is usually mounted on a table top or other horizontal surface. I recommend a wood card table. After visiting many garage sales in my area, I finally came across an old, but sturdy wood folding card table for \$3.00. Just what I was looking for. A 3 inch sq. hard wood block was mounted at one corner. Two screws with 1/8 shaft diameter were embedded into the block, leaving 1/16 of the screw shaft exposed. The model stand is then affixed to these screws and secured as shown in the drawing.

For safety, an extension rod, with hook at each end, can be put onto the front of the rubber motor and a plastic soda straw inserted into the model fuselage and around the motor. The wire with hook is coupled to the model winder. After the rubber motor is fully wound, the soda straw is slipped out over the motor and wire shaft.

The motor loop is then removed from the wire hook and the loop is placed over the hook at the back of the prop shaft. The nose of the model is then fitted in place at the front of the fuselage.

The only chore remaining is to remove the rod that holds the model to the stand and you're ready to fly.

This one person winding system is very helpful because it saves the fuselage if the motor breaks, while winding.

Next time, a plan and photos of my latest madness. Scale flying/flapping Butterflies! Airplanes are not the only things to fly!

Write comments and send photos to

MICROX

Micro-X Puts Excellence in Your Modeling

- ★ **HIGH PERFORMANCE** for the **EXPERT** in **YOU!**
- ★ **R/C Model Aircraft Kits!!!**
- ★ **MICROLITE - Plain & Silver!**
- ★ **Early Bird Tissue for Antique Aircraft!**
- ★ **3 Outdoor 22" Span Rubber or CO₂ power kits!**
- ★ **3 Indoor & 3 Outdoor "Peanut Scale" Kits"**
- ★ **True OLDE World Japanese Tissue White, Yellow, Orange**
- ★ **New Super Lite Japanese Tissue in 6 Colors!**
- ★ **Largest selection of Rubber Strip in the World! 21 SIZES**
- ★ **Microfilm, glues, C-Paper, Indoor wood & Accessories!!**
- ★ **Plan service over 17 Scale, Semi-scale & Peanut scale**
- ★ **Book on Indoor Model Building and Flying \$3.95**
- ★ **At better dealers everywhere! Or send for CAT. \$1.50**

MICRO-X-Products, Inc.
P.O. Box 1063-A
Lorain, Ohio 44055

See Micro-X
for NEW Fun in
Your Modeling!!

Picture: Margie holding
Stinson & Piper Peanut Kits
with 22" Taylorcraft & Voyager

★ New! Brown Pirelli in most popular sizes!

INSURANCE FROM

Ram

MODELS INC.

YOU'RE IN GOOD HANDS WITH A . . .

4736 N MILWAUKEE AVE CHICAGO IL 60630 USA

BATTERY BACKER #RED 09. Senses low or intermittent voltage from the primary RX battery and switches to a 100 milliamp or larger backup battery, then sounds an audio alarm. Eliminates the most common cause of radio failure. Backup battery and switch harness are required. 1 3/4" x 1/8" x 3/4" plus beeper 3/8" x 3/8" x 1/8". Total weight 1 oz. \$39.95.

DUAL SERVO SETTER #RED 10. Senses loss of radio signal or low battery and moves TWO servos to a pre-selected position. Connectors required. 1 1/4" x 1 1/8" x 3/4". Weight 1 oz. \$39.95.

AUDIO BATTERY ALARM #RED 11. Can be easily installed in either the RX (4.8 volt) or TX (9.6 volt) system. Senses low battery voltage and sounds an audio alarm. 3/4" x 3/4" x 3/4" plus beeper 3/8" x 3/8" x 1/8". Total weight 5 oz. \$19.95.

GO BOX #RED 12. Superbright red and green LED's tell you whether your RX (4.8 volt) and TX (9.6 volt) batteries are ready to "GO". Connectors required. 3" x 2 1/2" x 1/4". \$24.95.

AUDIO FLIGHT TIMER #RED 13. Dependable, solid state, can be set from 37 seconds to 20 minutes. Flick a switch to start and stop. 9 volt battery required. 3" x 2 1/2" x 1/8". \$24.95.

IF UNAVAILABLE LOCALLY, ADD \$1.00 FOR DIRECT ORDER. NO C.O.D. SEND S.A.S.E. FOR INFO.

Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344. •

C/L Continued from page 55

any power tool is a luxury item that should only be purchased with surplus money. These tools are nice, sure, but cannot do anything that you can't accomplish by hand. This is assuming that you have proper hand tools, of course, and most do as they are widely available for not much money at all.

To you folks like me, proud owners of fully-equipped shops, right down to a lathe and such, it is very important to not forget some of the little tricks learned back before you had that Wonder Shop. Remember back a few paragraphs and our combat flyer who tried sanding fuselages with a Dremel tool. I didn't make that up, it really happened. More common, just not as readily recognized, are similar techniques used by owners of WS's. It seems that when you have a WS, you feel obligated to use all of those tools for everything, often with poor

results.

Personal Experience: Just finished building a beautiful (just ran out of humility, will try to get a fill-up tomorrow) solid maple counter top for our kitchen. Started with huge, rough-cut planks 1-3/4 inches thick, sawed them into 1-1/2 inch wide strips and assembled all into a large chunk 30 inches wide, almost 4 feet long. All pieces are full-length, no odd chunks spliced in, so not exactly a low-buck project. Assembled a strange looking jig and surfaced the whole thing with a router spinning a surfacing bit. Came out super flat, which is what I wanted. But then, being a power tool freak and susceptible to just the kind of thing I am cautioning you against, did the next step with a belt-sander. In a couple of places accidentally sanded in a little low spot. . . Nothing you can see, but they can be felt and of course I know they are there, which is almost as bad as their being outlined in bright yellow spray paint.

While pondering this problem, it suddenly hit me that the best way to

HP Gold-Cup



displacement 1 20 cu. in.
weight 34 1/2 oz.
length 6 3/8 in.
spinner and glow plugs not included

HP 120 POWER-TWIN

- Over 3 Horsepower
- Very Low Vibration
- Only One Carburetor
- Ideal for Prop Drives
- Use in AMA Standoff Scale and IMAC competition



Available at your favorite dealer

MIDWEST MODEL

SUPPLY CO.

BOX 518R ROMEOVILLE, ILL. 60441

312-759-1955

MW1803

**NOW THERE ARE TWO
SUPER COVERITE'S: REGULAR
SHRINK AND NEW**

SUPERSHRINK

Both with coverite's exclusive
Hi Lo Temperature Range
that prevents accidental
warping caused by fabrics
with uncontrolled shrink



COVERITE

420 BABYLON RD., HORSHAM, PA. 19044

**NEW
ENGLAND
ROMANCE**



have finished the counter top was with a tool as old as woodworking itself, a plain old scraper. Down to Woodcrafters, a good quality, German steel scraper was only a couple of bucks. Hand-powered, yes, but it also did a superb job that a \$140 belt sander couldn't even come close to.

The second CL racing model I ever built was a Hooptee Rat and at the time didn't have diddly-squat for power tools. Will admit to cutting the crutch on a friend's jig saw, the upright, table-equipped kind, but other than that, it was all hand work and even if I have to say so myself, the Rat came out super.

If you are still in the beginning stages of assembling a mass of power tools, quit worrying about it, and if the tools are already there, don't just automatically flip the switch and go to it. Hand-jobs can sometimes be better, you know. . .

LIGHT VS. PRETTY

Keep seeing the occasional article attempting to give the beginning stunt fliers a hand up in the climb to Star Status and without exception, there is always mention of the need to build not only a straight and light model but to also get a super finish. Bah, humbug. You do need a good, straight model. And it does need to be light. It most definitely does not need to be pretty. Good construction techniques are pretty enough all by themselves. Satisfy your ego with that kind of pretty and take a pass on the coat after coat of clear dope, filler, base

color, color coats and then more clear dope.

A couple reasons for this; most important, all that paint adds weight very fast and it is extremely doubtful that a new stunt flyer will be building a first, second or even third model as lightly as desirable, especially if building from a kit, as is standard practice.

A more subtle reason is that any stunt model can generally benefit from serious trimming and this trimming can get fairly involved, entailing cutting flaps down, adding rudder offset, might even have to cut into the model to alter the control set-up. Chances are high that this type of surgery will need to be performed, makes sense to do it on a model that does not have hours and hours of work tied up in the finish. Also easier on the mind to whack on a Plain Jane Stunter.

Another subtle reason is, that when practice flying, you sooner or later have to get daring, flying that model right down on the deck. The amount of daring seems to be in inverse proportion to the amount of work invested in the model. With a well-built model that has only minimal finish, you can much more easily force yourself to lower those pull-outs a few feet. As soon as you get low enough, there will eventually come the time when you make a mistake or simply get blown down to the ground. Crashing a PJS is also lots easier on the mind.

There seems to be only a couple of

things necessary for an acceptable PJS finish. The pores in the paper should be filled, as wind blowing through the surfaces is a proven bad thing! The finish should also be smooth, as rough finishes have not proven to be better on stunters and it is also easy to wipe the model clean. And there should be enough finish, especially in the area of the motor, to effectively fuel-proof the model. Might be a good idea to simply paint on a coat or two of clear epoxy paint on the whole nose area; possibly a bit heavier than just dope, but lighter in the long run, when a doped model has absorbed fuel residue. With an acceptable finish on the model in clear dope, if you really want some color, just buy a spray can or two and shoot a couple of light coats. Even here, you could save some weight by only spraying the area of the model that you can see while flying: inboard wingtip, fuse side, rudder, etc. So it would look a little strange, nothing so very wrong with that, and the model, viewed from the center of the circle, would look fairly normal, which is about all that a learning stunt flier should be concerned with. ●

1 to 1 Scale . . Continued from page 22

ships in 1982!

SOME TOLEDO THOUGHTS

As one reflects on the exciting experience that is called "Toledo" for 1981, consideration must be given to the improvement that can be found in the materials and supplies for all phases of our hobby/sport. The many makeshift items that we often used short years ago are now well made and easily obtained. One company in particular has always fascinated me because of its innovative approach to modelers needs. Be assured I have no commercial interest in it, but Robart has always seemed to come up with new little gimcracks and dodads that solve some problem. Rather than just resting on the success of established items, every year they have new items or improvements on older themes. It was interesting to see a carb prototype which incorporates a pump, etc. right within the housing and a unique opening in the throat.

One concern that seemed to be on many lips was the cost of many items, especially in the big model line. These persons were not suggesting that the items were not worth the price but simply that they had to be more careful in their selection. I suspect that many manufacturers rest on the horns of a dilemma as to how much prefab work to do, since any degree of this type of work tends to escalate the price quickly.

The models on display appeared to be increased in numbers over last year. In addition, the models displayed a rather wide range of workmanship. One contest type modeler remarked that he was always concerned about the number of such models that may never know the freedom of flight. In addition, he mentioned something that had never

occurred to me. He suggested that at most any large contest, especially in scale, that the models were more closely grouped in quality that is often found in static competitions. Since my trade show experience is basically limited to Toledo, I cannot actually attest to the validity of that observation. At any rate it was a great and glorious show as usual. It's always fun to see new items, meet old friends, and make new ones.

OH, WERE IT ONLY SIMPLE

The most often asked question after the one that goes, "Where can I get information about ----" deals with the subject of model finishes. I'd love to think those who ask are captured by the fantastically beautiful finishes that I have on my models but we all know what a foolish notion that is, don't we? I suspect the real problem is posed by the myriad finishing techniques which are available. Back in the "old days" it was simple. You just used dope over silk or tissue. Of course there are still many people that use this method and produce outstanding models. Others now tend toward the newer two part types, enamels, polyurethane, etc.

It would be most wise to plan ahead carefully before finishing a model. Determine well in advance what type of finish is desired. Will it be glossy, flat, etc.? In addition, what types of surface will you be covering; fabric, filled sheeted surfaces, metal, etc.? Determine whether you can spray the finish or will you be brushing? Certain paints which dry rapidly such as dope and lacquer do not brush as easily as slower drying paints such as epoxies and enamels. Conversely, the slower, harder finishes are more difficult to rub out to a high gloss finish.

Check on color availability. Some paints are very difficult to mix since they are not basic colors but are blended. I was shocked to watch what I thought was a basic white for my Hyperbipe blended from half dozen different tints to match the Randolph color code. It may appear that a little of this or that will get you to the correct shade you want and you suddenly discover that you've created a beautiful mud. At any rate, make sure that you've checked out whatever you mix in sunlight rather than just under your workshop lights.

Pay attention to the basic rule of finishing. Don't expect the finish to cover an imperfect construction job underneath. Remember that a finish is only a few thousands of an inch thick and it won't hide scratches made by coarse sandpaper, improperly glued joints, etc. Often the best finishes require more time on the preparation than on the application.

Determine in advance what series of materials you will be using (surface prep, covering, primer, paint, etc.) since the modern finishes often have compatibility problems. Carefully check the instructions to determine such compatibility and whether there are time restrictions in applying materials over

Most Modelers Prefer GOLD-N-PUSH RODS ...but which one?

For a no-bind, smooth operation, GOLD-N-PUSH Rods are the hands-down favorite of most modelers. The patented splines on the yellow inner rod make GOLD-N-PUSH Rods easy to recognize.



But they're not all alike. There are nine different models, each best for its own special jobs.

That's why we've published the information sheet pictured here. It explains exactly which GOLD-N-PUSH Rod should be used for which job. You can obtain your own free copy of this helpful sheet from your dealer or by writing to us. It's information you'll want to keep around.

Sullivan
PRODUCTS, INC.



535 DAVISVILLE ROAD • WILLOW GROVE, PA. 19090 • (215) 659-3900

WARNING
Do Not Fly Near
Overhead Power Lines

one another. In some cases you'll find a warning not to apply another coat in less than 48 hours to allow for solvent evaporation. To disregard these types of instructions often courts disaster. What looks like a beautiful job right after application may turn into a checkered mess hours later. Or you may find that the finish never dries and is almost impossible to remove. If you have no experience with the material and you feel the directions are vague, for heaven's sake test it first rather than applying it to your two-year-in-the-making-project. Of course, check to determine whether it is fuel proof.

Lastly, you may wish to consider the cost. Some finishes are quite expensive in a unit cost per ounce, but since they cover quite well they are actually cheaper to use than others. Enamels and epoxies cover quite easily while dope tends to be much more transparent and requires many more coats. And lastly, if you are mixing colors, be certain to mix way more than you think you will need. Don't forget that there may be some repair work required later. There is nothing more upsetting than to try and mix more paint to try and match an already painted model.

And so —
There was a modeler named Fred
Who painted his model orangy red.
He crashed it one day
And was then heard to say,
"I wish it had been black instead!" •

R/C World . . . Continued from page 14

year, but the last of the winter/spring crop, was the Southwest Modelers Show in Dallas, Texas, held May 16 and 17. The boys who stage this show have been blessed (cursed?) with all sorts of problems over the past few years, such as a snow and ice storms. Gas shortages, and air conditioning systems that went kaput (last year).

This year, everything was going to be different, according to Show Directors Chuck Holden and Jim Simpson. . . Sure enough, it was different, all right! Very early Saturday (about 3 or 4 a.m., that is), a strong "local" wind lifted some roofing off the Holiday Inn, where most everyone was staying, blew in a window or two . . . and a few RV and car windows to boot . . . but didn't touch a tent erected to be used as a Swap Shop during the show. . . Now, this was a real Texas welcome. . . We won't repeat what they were promising for next year!

Truly a self-contained show, the hotel, display area for models, exhibitors area, bar and lounge, and restaurant, are all under one roof, and, only a short five-minute ride to D/FW airport. One thing for sure, like No. 2, the boys from Texas try harder. An interesting point about the hobby shows is that all manufacturers can't hit all of them; just too much expense and time away from the shop. Another point of interest is the new, or

INTRODUCING — ELECTRIC LINE CONTROL MODELS



ELECTROLINE MODELS
P.O. BOX 2503
BEVERLY HILLS, CA 90213

- FUN
- SAFE
- QUIET
- CLEAN
- EASY TO FLY
- FAST ASSEMBLY
- FLYS 15-20 MIN.
- LOW COST

SEND FOR FREE INFORMATION ON MODEL KITS AND ACCESSORIES

'local' manufacturers who surface in each area at 'show time' to display their wares, vie for exposure, and introduce themselves to the hobby world. I'm a bit surprised that a few more distributors don't at least visit some of the shows. One never knows what is being produced in some far away place, say like Taos, New Mexico. . .

Sport Scene . . Continued from page 45

the "Racers Edge," but it is a sport fliers delight!

I must say that I still have some problems. I find that the head tends to loosen and change the compression setting. I may not have the diesel knock yet, so starting is a pain in the arm. As I get used to re-checking the head, going to the somewhat different starting setting from the running setting and maybe even splurge on a fresh can of fuel, I suspect that things will improve. Oh yes, the exhaust sleeve throttle loses much of its effectiveness on a diesel, too.

That's the good news, the bad news is that a friend broke two crankshafts on his Medallion using the Davis head. He is sure that he was flooding the engine and found that the backplate was loose the second time around (causes very strange fuel draw characteristics conducive to random flooding). However, undaunted, he has a Davis crank on order, and will use the head he has on a Babe Bee instead, and reconvert the Medallion to

glow. I'll be sure to keep track of this progress, as it is interesting to see what other people are doing. Please let me know if you have experience with Davis products, and how you have fared. I am especially curious about control-line use.

One last note on the Davis products for now. I am playing with the conversion Bob makes for the O.S. Max .10FSR. I have an old and tired engine, but it has so far turned 9,500 on a 8/6, 12,500 on a 8/4, and 12,500 on a 7/6, all props being Master Airscrews for consistency. Once I feel really comfortable running the engine, I'll run a full set of rpm data on reasonable props and some comparisons on glow, and then run the data through the thrust formula I whopped up last month and see if Bob's claim to increasing the pulling power of an engine stands up to my bad aerodynamic theory. At least the rpm figures I got agree with Davis' published figures.

If you recall, I published a "What the World Needs, Mk. II" list a few months ago. I have received several useful replies on the low weight plastic covering question, and will publish the letter I have received when I have a chance to play with the information a bit myself. In the meantime, thank you for responding! In addition, I have located some more small biplanes, and will do show and tell on them as soon as I can get photos and information on them. Anyone who recalls old articles in any magazines on small, aerobatic bipes,

please let me know and I'll happily publish the list.

In fact, why don't we compile your "What the World Needs, Mk III" list. Give me your suggestions of products you would like to have and I'll publish it. (Why should I do all the work? You do the thinking for this one.)

Changing the subject yet again. I have a letter from Otto Gunnesch of Saline, Michigan.

"In the March RC MB, you had a photo and some words on the Polikarpov PO2 as turned out by Hurst Bowers. I thought I would let you know that the plans and construction article were in the April '77 issue of Model Aviation.

"I sent for the plans as soon as I saw the article and built myself a really fun model plane. Though a tad overweight at 39 ounces, it flies very well with an O.S. 15 in the nose. Take-offs are within 50 feet of opening the throttle . . . flight is gentle and responsive, turns 180° in its wingspan, tough and goes all day long. Four oz. fuel gives 18-20 minutes of flight. One of the most enjoyable models I have ever built. Plastered into the ground many a time, with very little structural damage. Mine is done up in silver Permagloss which makes a dandy bag to carry the parts home in! I really recommend this one for guys who like to play around with a model."

Unfortunately, Otto didn't include any photos of his version, but it is nice to hear of a model which pleases someone

What do you know about Modelling in Germany?

Not enough. I guess! Come on get in touch with it.

Order a subscription of the well-known and outstanding Special-Magazine „auto-modell + technik". This monthly publication informs you about the whole field of models, motors and re-sets. It shows working out, tuning und repairing of car and engine.

You don't speak German? Who cares, all the pictures, formulas and plans are speaking to you with their own language. That's why this magazine is known in more than 15 foreign countries.

Come on, just try it. Send us your cheque with US-\$ 30.- and monthly you'll find your issue in your mailbox. As a special gift we will send you our special magazine from the last famous Toy-Fair in Nürnberg with all the new models and developments, free of charge! Make use of this chance, and you will be more informed than all your friends!

Please send your order to: Verlag für Technik und Handwerk GmbH, P.O. Box 1128, 7570 Baden-Baden, West-Germany



12 issues per year free mail-box delivery
Only 30.- US-\$ for one year-subscription



100-page-information from the famous show „Nürnberg Toy-Fair"



"RIDGE RAT" - \$44.95
49" span Slope Sailplane
Area - 436 sq. in., Wt. - 32 oz.
Wing Loading - 10.6 oz/sq. ft.

COMPLETE KITS WITH
PRECISION CUT PARTS
ALL HARDWARE
FULL-SIZE PLANS

PIERCE AERO CO.

9626 Jellico Avenue, Northridge, California 91325 Phone (213) 349-4758



"PARAGON" - \$79.95
118" span Thermal Soarer
Area - 1080 sq. in., Wt. - 48 oz.
Wing Loading - 6.3 oz/sq. ft.

other than the original designer. As a designer myself, it is awfully easy to make a "one man design." A lot of work goes into doing the design so others can conveniently duplicate it without your own particular set of skills and tools. Good show, Hurst & Otto!

Moving along to the 1981 IMS, we see a new engine shown by Duke Fox. The caption reads "Fox .19 BB Prototype. Soon to be available with either side or rear exhaust. 2 ball bearings. Plans are for an 'Inside Cowl' (sic) Muffler ... what do you think?" Well Duke, I wouldn't mind having an American made engine with those specs available at all! The Veco is a good engine, but there is sure a heap of competition from abroad.

Speaking of which, I guess I'll throw in the Veco .19 photograph while we are talking about it. It is the smaller engine in current production by K&B, although it is rumored that the Conquest .15 designed by Cox will be resuscitated at K&B for at least one production run. All you QM, FAI FF, and engine collector types start saving your pennies! Actually the Conquest runs fine with an 8x4 for sport flying. I pulled the wings off a "Little Stik" with one.

Returning to aircraft from the world of power plants, we have the "Fake G" a very semi, pseudo-scale aircraft by Carlo Godel. The model is powered by an O.S. 10 and an 8/3 prop. Control is with four channels of Cirrus radio. Covering is silkspan and dope. In the background, you can see baby sister, a Peanut non-scale, also a Fake-G. Now is the big one an accurate scale model (say 3:1 scale?), or is the Peanut an accurate scale model at 1:3 scale? Hmmm, wonder if you could enter both at a scale contest with the models each providing scale data for the other. (Time for another beer, this is getting too involved! I know there was a good reason to stay away from contests.)

Despite the upheavals and relocations at Cox, they have continued to produce the Piper Arrow in one configuration or another. This model is a really slick ARF, and performs spectacularly with a Tee Dee substituted for the reed valve engine provided in stock configuration. The model is quite nice as sold, mind

you, but the pylon racing and aerobatic capability potential only appears with more power (and a little tricking up! j.e.).

Last item for this month is a source for really small battery packs. Your friendly neighborhood department, discount, drug, or hobby store should have these 9 volt rechargeable batteries by General Electric. Cleverly concealed within that slick black plastic housing are six, perfectly lovely 75mah Nickle Cadmium cells. That is enough to make a pack of four cells for your digital micro system and have two left over to make a pack for your ACE pulse proportional system. I did just that, and so far have had no bad cells. I did mis-wire one pack (blush!) and found that my Cannon Super-Micro system becomes intermittent on 2.4 volts. It tried its best, though! Rewired & recharged, the pack works fine on 2 channels; wouldn't care to try higher drain rates than that.

Until next month, this will have to do you! Please write, I enjoy your letters, and I think that the readers of this column enjoy hearing what their fellow modelers are doing, too. Suggestions for topics are almost as valuable as discussions of topics themselves. After all, the least I can do is a bit of research in addition to punching these typewriter keys.

R/C Boats . . . Continued from page 43

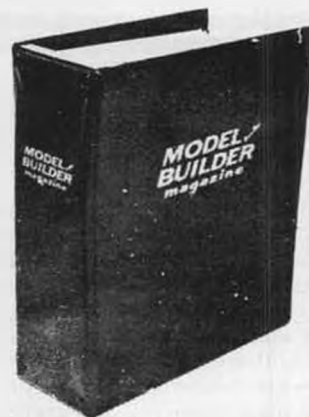
bad idea. That is the reason the Deep Vee Class will reappear in the 1982 NAMBA Rule Book. There will be no records kept for the class, however. If some people enjoy that kind of racing, far be it from me to keep them from having fun. With the Deep Vee Class coming back into the Rule Book, it appears like there will be something for everyone. I'm pleased we were able to have the Offshore Class adopted. I only wish more NAMBA members would give it a chance before making a judgement about this class.

A MINI PRODUCTS IN USE

Since our topic has been Offshore Class, I'd like to give a brief review of a .21 size deep vee hull that I recently completed. Herb Stewart, owner of

COVERUP!

Sturdy, dark green vinyl covered binders for your valued copies of **MODEL BUILDER**. Gold logo.



Only \$4.95 each, two for \$8.95, three for \$12.95, four for \$16.95, or five for \$20.50, postpaid in the USA. Outside the USA, add 90 cents per binder.

California residents add 6% sales tax.

NOTE: One binder holds 1971 and 1972. Use one binder per year for 1973 to present. (For UPS delivery, add \$1.25 per binder.)

**MODEL
BUILDER**

Box 335, 621 West 19th St.,
Costa Mesa, California 92627

Stewart Scale Models, Rt. 2, Box 220-5, Thonotosassa, FL 33592, provided me with a Stewart Scale Vee .21 for evaluation. This particular model has been successful the past couple of years in deep vee enduro types of events. Wally Stewart, no relation to Herb, used one of these boats to win the .21 Deep Vee Class at the 1980 NAMBA Nationals. The hull is 31 inches long and has 20 degrees of vee at the transom. This is more vee than the Prather Vee or Ward Craft Vee. The deck of the boat has the appearance of a day cruiser. Even without a hatch cover, the boat would be legal for the Offshore Class with just the addition of drivers.

SOUTHERN'S SORGHUM & FLEXALL

THE STANDARD
CONTACT
ADHESIVE
FOR
SHEETING
FOAM
WINGS

WILL
NOT
ATTACK
STYROFOAM
CORES!



SEE YOUR DEALER OR DISTRIBUTOR



PLASTICIZER
FOR
ACRYLICS
AND
DOPES

STOPS
CRACKING
AND
CHIPPING

DAVE BROWN PRODUCTS

8534 HUDDLESTON - CINCINNATI, OHIO 45236 - AREA CODE (513) 791-0744

The hull is available in white gel coat and the deck and hull are joined. The plywood motor mounts rails are glassed into the hull and the rails are predrilled for either a K&B or Octura 4 motor mount. The fuel tank base is also glassed in place. Any of the hardware packages available for .21 deep vees can be used. The cost of the boat is \$99.95 for the hull only. Unfortunately, the directions for setting up the model are rather limited. This might create some problems for a new model boater. It wasn't a problem for me since I have my own preferences in setting up a hull.

Our test runs proved the boat to be easy to trim by adjusting the strut angle and bending the ride plates. When properly trimmed, it responded very well to both left and right turns. It should do well in the Offshore Class type of course racing. It didn't have the top speed that I have obtained with other hulls with lesser amounts of vee. Herb has a variety of boats suitable for the Offshore Class and a price list can be

obtained by dropping him a letter. Include a SASE.

WARDCRAFT MARINE OFFERING TWO NEW OFFSHORE HULLS

Wardcraft Marine, 2212 199th Street S.W., Lynnwood, WA 98036 now has available a .21 size and a .65/.90 size offshore hull. Both boats are available in either a deep vee or pad vee bottom configuration. The pad vee is legal for NAMBA and the deep vee is legal for IMPBA. The .65/.90 hull is the current NAMBA record holder in C Offshore with a speed of 65 mph. There are hardware packages available for both sizes of boats. At the time of this article, prices were still not established. For more information, send a stamped, self-addressed envelope to Wardcraft Marine.

I have been running a pad bottom .21 size Wardcraft in recent months and I'm very impressed with its performance. I have seen the .65/.90 boat run and it is awesome. A Wardcraft Marine Offshore hull will be the subject of a PRODUCTS

IN USE article in the future. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498.

Electric Continued from page 46

his planes. Bob Kopski's Euphoria I is in the foreground in one photo; Bob now has his Euphoria II flying. It does rolls, inside loops, outside loops, and inverted flight. It uses a Silent Squire airfoil, constant chord wing, Astro 10 motor, and twelve 1.2 Ah. cells for 6 to 7 minutes flights. Bob uses dynamic braking and a prop stop to keep the prop horizontal for landings. You can use a three position switch for this. The center terminal should go to the motor, one outside terminal to the plus on the battery, and the other outside terminal to the negative line (the brake circuit). Make sure that the charge jack is wired between the switch and battery, not between the motor and switch. A servo is used to run the switch, and a ny-rod on the servo arm is set up to extend out the nose on full off to stop the prop.

Good idea Bob. I know what a pain it is to bend a motor shaft. I just did one in on my Olympic II! I was using an Astro 05 on six 1.2 Ah. cells with a 9x4 prop, and the freewheeling prop caught on the landing. Now I have a not so silent motor, despite all my efforts to get the shaft perfectly straight.

Heinz's four motor plane is neat. It is 61 inch span, 52 oz., 11% flat bottom airfoil, and 457 sq. in. It has a good climb out on four Astro 020 motors turning 5-1/4x3 props from an eight cell 1.2Ah. pack. On two motors, it will stay in level flight even on turns. The battery pack is set up to be easy to remove, since Heinz likes to use three packs. He flies one, charges two, and flies all day. He can also easily check on the battery temperature. He always provides plenty of ventilation, since he has lost some cells from overheating. Heinz always opens up the ventilating holes in the battery cases or discards the cases altogether. I agree with Heinz; the cases are strictly cosmetic, and actually hinder cooling. I always discard them and I have not had any problems with overheating, even though I do not provide for ventilation. I also live in an area with a cool climate, which helps.

Heinz's aerobatic plane that I showed in pieces last March is now back together again and flying well. It is 56 inch span, 522 sq. in., with a semi-symmetrical airfoil, 10% at the root, 12% at the tip. It is gentle on a 7x4 and snappy with a 7x6. Heinz uses an 075 with ten .550 mah cells (46 oz.) or ten 1.2 Ah. cells (53 oz.). He has also used an Astro 10 with twelve 1.2Ah. cells and a 8x5 or 8x6 prop.

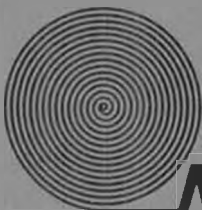
Heinz made some comments about battery charging that I have found to be generally true, but for some reason I've never got around to saying them in the column. I'll quote Heinz: "We did some experimenting and found out the following . . . a NiCd battery will take less of a charge when cold. Then during

MOVING TO SOUTHERN CALIFORNIA?

MAKE SURE YOU GET A HOME
WITH A MODEL WORKSHOP!!

FOR ALL YOUR REAL ESTATE NEEDS,
CONTACT:

ANITA NORTHROP



NORTHROP
Real Estate Inc.



621 West 19th St., Costa Mesa, California 92627 (714) 642-5062



CARL GOLDBERG

Introducing the

eaglet 50



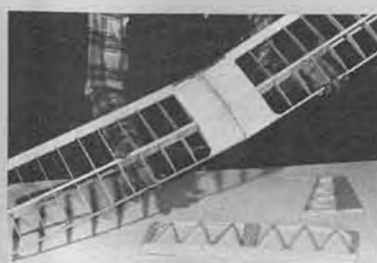
SPAN 50"
LENGTH 39"
AREA 450 SQ. IN.
WEIGHT 45 - 50 OZ.
(With Radio, Ready to Fly)
FOR .09 TO .20 ENGINES
and 2, 3, or 4 - CHANNEL RADIO

\$34.95

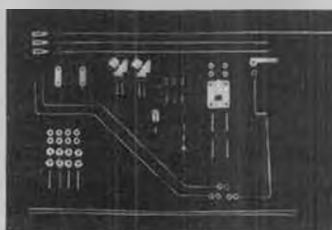
Kit G28 No. 61

THE EASIEST-TO-BUILD R/C TRAINER

The EAGLET is designed for really easy building. Assembling the parts is simple and accurate and surprisingly fast — even if you've never built a model before. The photo instruction booklet shows you one easy step at a time. With full-size plan, you see exactly where everything goes, and in a few evenings you're done. In the air, EAGLET is gentle enough for the novice, yet sporty for the experienced flyer. Throttled back, it flies slowly and stably — wide open it scoots and stunts! And it's tough, because it's mostly die-cut plywood and hardwoods. Study these features, then get ready for some real fun!



Can Be Built in a Few Evenings!



FEATURES

- ★ Easiest-to-build R/C trainer
- ★ Interlocking plywood fuselage parts
- ★ Step-by-step photo instruction and flying booklet
- ★ Full-size plan with radio layout
- ★ Complete 3-channel hardware furnished
- ★ Optional 4-channel wing illustrated
- ★ Vac-formed windshield, windows, wing tips
- ★ Steerable nosegear, large decals, etc.

781

AVAILABLE IN CANADA

CARL GOLDBERG MODELS, INC.

4736 West Chicago Avenue • Chicago, Illinois 60651

TREAT YOURSELF TO A CUSTOM BUILT

Telephone:
(801) 261-1402



★ NEW, 825 sq. in. TIPO
AVAILABLE NOW !!

5269 Lucky Clover La.
Murray, Utah 84107

TIPORARE

by DICK HANSON

Our custom built airframes are used by many of the country's top pattern fliers. For example, we furnished basic components for 1/6 of the models flown in the 1979 Masters Tournament. Some were TIPORARES, some were not.

Building pattern birds is a business with us, not a sideline. We can save you considerable building time by providing you with good, basic construction.

Write or call us concerning your requirements. We will be happy to review them with you and quote prices and delivery.

or come to the meet at the KRC Club flying field, SPS Technologies, Hallowell Division, Township Line Rd., Hatfield, PA, on September 20. Fly high at the Electric Fly!

Thornburg . . . Continued from page 10

of these ideas by stealing them from other people. So drag out your old magazines. Look at Lee Renaud's Sagitta from RCM; at Jim Gray's Boomerang from MAN. Copies of the full-scale sailplaners' magazine, *Soaring*, are available in some libraries, or from members of the Soaring Society of America. Appearance-wise, full-scale design has been in a very boring rut since the mid-sixties, but some interesting shapes pop up occasionally in the homebuilders' column, and in old-timer articles.

I know what you're thinking: Suppose I find a design I like, a design that my recycled Windfree wings would look good on. Where do I get the plans?

C'mon, c'mon, don't be so serious. You don't need elaborate plans to build a fuselage. Despite the fact that they give a plane all of its character, fuselages don't fly — all they do is hold the wing and stab in place. And tote your radio gear. So, if you're worried about your stability to put together an airworthy machine of your own design, keep this in mind: you already have the most important ingredient for a successful model — a proven set of wings. Almost anything you hang underneath a good wing by way of fuselage can be made to fly.

Within reasonable limits, of course. I wouldn't recommend an asymmetrical biplane canard for your first rule of designing: if you're going to steal ideas, steal good ones.

What about moments . . . tail moments, nose moments? Can't you get in trouble by making a nose too long, say, or a tail too short? Sure you can, but you have to work at it. Some surprisingly strange looking creatures have been made to soar like eagles. You may recall the Windhover, published in RCM in the mid-seventies: an elliptical-dihedral soarer with almost no nose mount and a

mere stub of a tail. The design was based, not on another aircraft, but on the European falcon for which it was named. Despite its "impossible" moments, it flew fine.

So don't let aerodynamics scare you away from designing what you want in the way of a fuselage. Even if you stray far from the norms, the problems you encounter are more likely to be physical than aerodynamic. For example, if you make the nose too short, you may have to add a ton of lead to make the plane balance. If you make the ship too skinny, you may have to install the radio with a shoehorn.

There are a few simple formulas to guide you in designing a fuselage for a given set of wings. Overall length of the average sailplane fuselage is 40-60% of the wingspan (power planes, in spite of their short noses, run closer to 80%). The root chord of the wing is helpful in laying out the proper moments. Generally speaking, the distance from the leading edge of the wing to the tip of the nose will be between 1.1 and 1.5 times the root chord. (Power planes may be as short as .5 wing chords, depending on how heavy their engine-tank-nosewheel assembly is.)


What about tail moment? Technically, this can vary quite a bit, depending on the area of the stabilizer. But in practice, it too, stays within simple parameters. Most stab areas fall between 15% and 25% of the wing area. A safe rule of thumb for these average stabs is to allow from 1.8 to 2.5 root chords between the wing and stab.

Sounds like too much math? Let's run through the figures quickly, using our set of Windfree wings as an example. They span 99 inches. That gives us an overall fuselage length of 40 to 60 inches, right? Let's choose 50 inches, since it's the average (the original Windfree fuselage was 41 inches, incidentally). The wings have a 7 inch root chord, so let's multiply that by 1.5, to get a nice long nose (I hate adding noseweight).

Now we have a fuselage layout with a 10.5 inch nose, 7 inch chord, and . . . what's left of 50 inches sticking out behind the wing. Let's see, if we draw in the stock Windfree stab (4 inch root chord) at the very end of this fuselage layout, then measure the gap between wing and stab, we get . . . 23.5 inches. (That's 50 inches minus 10.5 inches of nose, 7 inches of wing, and 4 inches of stab.)

Hmmm . . . that 23.5 inches gap is a bit large. We just said that the wing/stab gap usually runs 1.8 to 2.5 wing chords — that translates to 12.6 inches to 17.5 inches. Maybe we should shorten that tail moment a bit by moving the stab forward a few inches. How about moving the stab in about 3.9 inches then hanging the rudder over the rear of the fuselage, like the Brigrleib BG-12 (or, come to think of it, like the Windfree).

Of course, we could stick to our guns and leave the gap at 23.5 inches. The plane would still fly fine — but it might require a bit of extra noseweight to



Hobby Horn

hobby specialists

OLD TIMER KITS. (Full and Partial Kits)

4K's Models—Full Kits—Gas and Rubber

1940 Baby Buzzard Bombshell, 36", 020	\$13.95
1941 Lamb's Clumber, 44" Span Rubber	\$14.95
1939 Korda Wakefield, 44" Rubber (Cabin)	\$14.95
J & R Models—Full Kits—020 Replica	
1942 Brooklyn Dodger, 32" Span	\$12.95
1940 So Long, 32" Span	\$12.95
Tyro Models—Full Kits—1A TEXACO R/C	
1938 Bay Ridge Mike, 48", .049-.099	\$28.95
P & W Semi-Kits—Rib, Tip, and Former Kits	
1937 Dallaire Sportster—108" Span (Plan Ext.)	\$26.00
(Companion Stripwood Kit for Dallaire)	\$30.00
1940 Sailplane (Comet)—78" (Wing Plan Ext.)	\$47.50
(Companion Stripwood Kit for Sailplane)	\$26.36
[Plans] Dallaire—\$5.00; Sailplane Wing—\$3.00	
The Midway Model Co.—Full and Partial Kits	
Rib, Tip, & Former Kits—Machine Cut Parts	
1936 Flying Quaker, 84" Cabin (Plan Incl.)	\$21.50
1937 Quaker Flash, 67" Cabin (Plan Incl.)	\$17.50
1937 Long Cabin, 78" (Plan Extra—\$5.00)	\$15.00
Replica Old Timers—.020, Gas or Electric	
1940 Buzzard Bombshell, 30" Span FF	\$11.95
1940 Scientific Mercury, 36", FF or 1 Ch R/C	\$13.95
1941 Request, 30" Span, FF	\$12.95
Old Time R/C Sport—Full Kits—2-3 Ch R/C	
1938 Powerhouse, 50", .10-.15 engine	\$35.96
1939 Air Trails Sportster, 50", .10-.15 eng.	\$35.96
BOOKS ON OLD TIMER MODELS	
NEW "1934" Zaic Year Book	\$5.50
Antique and Old Timer Model Air Craft	\$10.00
Air Age Gas Models (M.A.N. Requests)	\$3.95
FREE FLIGHT KITS. Sport and Scale	
Sparkey (Comet), 30" Span Old Time Rubber	\$4.40
Navarick (R/N), 36" Span Coupe Rubber	\$13.46
Lacy M 10 (Peck), Peanut Scale	\$4.46
Satellite 450 (4K's), 56" Span, .15-.30 eng.	\$25.95
ELECTRIC SYSTEMS AND KITS	
Astro 05 System (Wired), \$59.95 (SPECIAL**)	\$47.96
Astro 15 System (Wired), \$119.95 (SPECIAL**)	\$95.96
Astro Sport Kit (For 05), 2-3 Ch R/C	\$21.20
The Quiet Revolution (Book) \$5.95 (SPECIAL**)	\$5.00
Shipping and Handling	
Up to \$8.00 add \$1.50	
\$8.01 to \$20.00 add \$2.25	
\$20.01 to \$45.00 add \$3.00	
\$45.01 to \$70.00 add \$3.50	
and over \$70.00 add \$4.00	
CA. Addressee add 6% for Sales Tax	
Send MO. CK. or Visa MC (8-EXP.)	
COD Exact Chg. +\$1.50 Hdl	
50 Page CATALOGUE	
\$1.00 PP (A copy will be sent free, upon request, with an order)	
Hobby Horn	
P.O. Box 3008	
Seal Beach, Ca 90740	
(714) 894-6223 (Best mornings or recorder-activates on 5 rings)	

the first flight it will warm up and take a good charge the second time. During the second flight the battery will warm up even more. After several charge and discharge cycles the battery is so hot that it might get damaged. This does not happen too often in a glider, since there is enough time after the motor run in the glide to cool off the battery." I agree, and I think the good old touch test is the best battery saver you've got. If it feels hot, let it cool off!

So, there's a lot of good information from the KRC, just think of how much more the Electric Fly Clinic will produce! For more information, write Bob Kopski, 25 West End Drive, Lansdale, PA 19446,

balance that long tail. The choice becomes an aesthetic one: do we want it to look long and lean, short and squat, or somewhere between? Now's the time to start drawing a shape around our moments, start creating the "character" of our new model.

This is where back issues of model mags become invaluable. If you don't have access to a lot of back issues, take heart. Both *Flying Models* and *RC Modeler* publish anthologies of their plans in book form. I have a copy of the *RCM Illustrated Plans Guide*, and it's probably the most valuable book in my workshop: seventeen years of model designs condensed into a single \$12 book.

A good plans anthology will give you hundreds of construction ideas as well. Take the "square box," for example. This is the simplest kind of fuselage to build. It's light, it's strong; but God is it ugly! (Go back and take a look at the Hollywood Square, September 1980 *RC MB*). You can do better than that.

Turn a square box on edge, for example, and you have a diamond . . . a much more interesting shape. Especially for the boom on a pod-and-boom design.

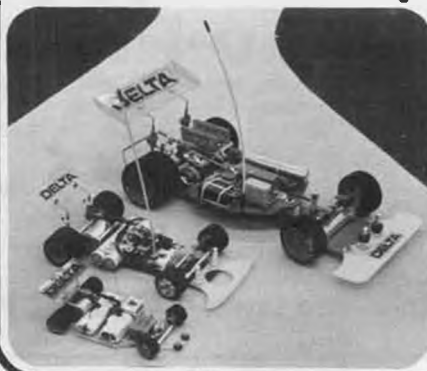
Add a noseblock and some stringers and your square box turns round. Fill in some curves with block balsa or styrofoam. Add a canopy. Sig sells them in all sizes. If you can't locate a canopy, make an open cockpit (remember Le Gray's "E-Z Juan"?).

Almost any shape can be duplicated in almost any medium, if you're willing to put the time into it. Case in point: I just designed a 1500 square foot passive solar house that fits on an arrowhead-shaped lot between two arroyos, up in the mountains east of Albuquerque. It has a half-dome on top (plywood and rib construction), a medieval tower in the rear (concrete block), and lots of soft, curving walls (local adobe). Anything you can draw, you can build!

Looking over some of my own designs, I find that most of them are some version of the square box. By using thicker wood than most designers, I find I can round and soften the corners without losing too much structural strength. Look carefully at the Honker Rocket fuselages in the photo and you'll see that the sides are 3/16 sheet, rather than the 1/8 sheet called for in the plans. By choosing very light but slightly thicker balsa, I can do a lot more rounding and streamlining on my "box." And the Rocket's turtledeck is a nice triangle shape created with just two pieces of wood, a long backbone sheet and a simple triangle former at the wing trailing edge.

By contrast, the Don Quixote (December '72 *MB*) is built around a horizontal crutch. Crutch construction dates back to the 'thirties, at least. I stole it from Dr. Walt Good's "Royal Rudderbug," published in *Flying Models* when I was about ten. The "crutch" is merely a piece of sheet balsa cut to the outline of the top view of the fuselage. To assemble

DELTA R/C Race Cars



- 1:8 GAS SUPER-J USA National Champion
- 1:12 ELECTRIC PHASER 120
- 1:18 ELECTRIC POCKET ROCKET
- PICCO 21 RACING ENGINES

We manufacture the most complete line of gas R/C race car accessories.

Send \$1.00 for catalog package



DELTA Mfg., Inc.

27 Racecar Court, Lorimor, Iowa 50149
USA Phone: (515) 763-2220

the critter, you glue the top half of each bulkhead in place, add all the stringers and sheeting, then turn her upside down and do the same on the bottom. The crutch helps keep everything aligned during assembly, so you don't wind up with a banana-shaped fuselage, good for nothing but tight right-hand circles!

It's possible to do this same trick using a vertical crutch, in which case it's cut to the profile outline of your fuselage instead of the top view. And if you want a truly symmetrical, torpedo-shaped appearance, use both a vertical and a horizontal crutch, cutting the bulkheads into quadrants. Crutch construction has this virtue: it tends to absorb the impact of head-on crashes with a minimum of damage.

The third photo shows one of my favorite fuselages, a 100" Schweizer 1-26. Construction is simple and strong. And light, too, if you pick your wood carefully. The sides are soft 3/16 sheet, the noseblock is pine. Both the large underbelly block and the smaller cowl block are laminated from 3/8 sheet balsa. The canopy is a 13 inch Sig Standard, with 1/8 balsa floor added. The four "tombstone" bulkheads are 1/8 balsa, and the stringers are 1/4 square.

The model goes together quickly, yet looks surprisingly scale-like when covered with silk or Coverite. I've used this construction to duplicate the 1-23, 1-26, and 1-29, in sizes from six foot to ten. All it takes is a little confidence and a good block plane.

Of course, these are just the more orthodox ways of scratch-building fuselages. I've built lots of planes using fiberglass fishing rod blanks for the boom of a pod-and-boom assembly. I once built a slope soarer around a plastic baseball bat from the dime store. But my favorite appeared in *Model Airplane News*, back in the 'fifties. Some feller put together a power model, using a cigar box for a pod, and a window-shade roller for a boom. He strapped on a wing, a set of trike gear, a red-hot .19 engine, and by cracky, he flew!

Still think you can't design a fuselage for that old set of wings in your workshop?

BOATS

ARE OUR BUSINESS
FIBREGLASS HULLS, KITS
& SCALE ACCESSORIES



FROM ANCHORS
TO WINCHES —

FULL CATALOG \$3.00

(Refundable First Order)

Dynamic
MODELS

DRAWER "C"

PORT JEFFERSON STA., N.Y. 11776

TEL: (516) 928-8200

F/F Scale . . . Continued from page 63

those of you who admired Lindbergh and his plane will enjoy building this either as a static or a flying model. Plenty of hardware comes with this superb kit, along with their usual high quality balsa.

John Morrill, of Simplex ignition engine fame, has come out with a much needed rubber winder. The following will give you a bit of background on this first class piece of machinery.

The SIDEWINDER by SIMPLEX is designed for the all-around Free Flight rubber modeler. It is meant for Flying Scale, Sport, Old Timer & Commercial Rubber, Coupe, and any other medium to medium large model. This custom

ProROD NYROD SU-PR-ROD MASTEROD MASTEROD-XF



The Leader in ADVANCED Push-Rod Systems

PLAINFIELD, ILLINOIS 60544

GEIST ELECTRIC FLIGHT SYSTEMS

featuring Samarium-Cobalt Magnet Motors

Send \$1.00 For
Information Folder -
\$1.00 Will Be
Refunded With
Purchase



Wilshire Model Center
3006 Wilshire Blvd.
Santa Monica, 90403
213-828-9362

made winder will easily go to 100 inch ozs. before becoming difficult to turn. A Modern Wakefield motor of 16 Strands of 1/16 x 1/4 will strain this winder to its limit. You may do this without fear of damaging the winder. If you fly any or all of the above, and say, the occasional Wakefield, this winder will work nicely for you.

The SIDEWINDER has been engineered from the ground up as a rubber motor winder. It is not a converted hand drill. It does, however, use standard Stanley hand drill gears. If you should wear out a gear it is easily replaceable/obtainable. That goes for the rest of the Winder as it is designed to be 100% rebuildable. The heart of the winder is a 9 ball thrust bearing, the balls are in a nylon retainer and run against hardened and ground washers. The body is milled from alum. bar stock. All aluminum parts have a brushed finish and are clear anodized to retain their new look as well as to protect against corrosion. Snap rings are used to assemble everything so the winder may be easily taken apart and cleaned, even in the field. The large gear bearing shaft is hardened and precision ground. The nose piece is made of brass and threads on to the shaft with a standard thread. The winding hook fitting is spring loaded so you need not worry about a hook flying around your face when the rubber breaks. The crank arm has two

positions for those who prefer a longer arm. It is also designed to be remade by the owner to suit his own personal length. The winding knob is wood and large enough to really grab onto. The main shaft rides in oil impregnated bearings. All in all, this is a lot of winder for the money. We think you will agree when you receive yours. The cost is \$56.25, available from SIDEWINDER 143 Richmond Street, El Segundo, CA 90245; (213) 322-7858.

PeanutContinued from page 49

the tip is shortened for the wing taper and its lower side is tapered up to match the trailing edge thickness.

To achieve the horizontal tail airfoil, the tail is first assembled as a flat surface directly over the plan. After it is dry, remove it from the plan and add soft balsa strips directly over all the members except the leading and trailing edges and the spar. A short piece will have to be added at the center of the spar on top and bottom to allow a good airfoil to be developed near the tail cutout for rudder clearance. Cut two pieces of 1/8th soft balsa to the airfoil shape and use them for tail tips. Now, using a large sanding block, sand the horizontal tail to the proper airfoil. The tips have a half-round cross-section.

A piece of aluminum tubing is shown for the propeller shaft bearing and for the rear motor peg. Other suitable materials can be used, and in fact a Peck Polymers nylon thrust bearing was used on the model for a shaft bearing.

If desired, wheel pants can be made out of soft balsa laminations to the shape shown on the plan.

A windshield pattern is provided. It exactly matches the windshield on the model in the photos but since models built from plans may vary a bit use it as a guide for exactly sizing your own.

The model is covered with yellow tissue. It has a wide blue stripe on the fuselage with a thin white stripe above and below. The upper white stripe is located just on the fuselage centerline and is 1/16 wide. The blue stripe is 3/8 wide and just below, but touching the white stripe. The lower white stripe is

just below, but touching, the blue stripe. Registration letters, in blue, 1/2 inch tall, "F-WYJC" are located on the aft fuselage sides just above the stripes. Unfortunately, the real color scheme does not photograph very well. It does look good to the naked eye, however.

The Pottier model flies quite nicely. The vertical tail being as thick as it is very resistant to warp adjustments for turn. A thin plastic drag flap, 1/4 wide by 1-1/4 inch long added under the left wing trailing edge was used to obtain the turn necessary to fly the model in an indoor gym. This won't be necessary for outdoor flying.

Have fun with your French "Caca-huete."

RetractsContinued from page 27

side bracket with 4:40 bolts. The link used to rotate the gear is made by joining two Rocket City brand heavy duty ball links. The balls are fastened to the bracket and the strut cam with 2:56 bolts. The position of the cam on the strut and the length of the ball link determines the amount of rotation. It is easily adjustable to change the "tow in" of the wheels. The Rocket City ball links have proven very reliable in use. Something else will probably let go before this link will give you trouble.

Mount the air cylinder on a bracket fastened so that it can pivot at one point. The type mounting and pivot point is not critical but the cylinder must be free to swing or the linkage will bind. Link "C" is drilled and tapped for a 6:32 bolt. Same for the 3/16 wheel collar. The bolt locking the air cylinder shaft is a loose thread fit so that it can rotate in cam "C" while it locks the wheel collar against the cylinder shaft. Easy to adjust the cylinder throw and classically simple in operation.

The operating scissors on the oleo is made from brass sheet and tubing and is mainly window dressing for scale appearance. A steel pin riding in a slot in the strut tubing holds the axle against twist.

You can install this gear in the same manner as any other pneumatic retract system. Any of the valves and tanks will work. I have been using a single tank to operate the P-40 retracts together with

These Competition Models are now

RAVAN MODEL PRODUCTS



EINDECKER
F/F
1-CH. R/C
~~\$13.50~~
\$ 9.50



EASY RISER
ALL BALSA
R/C GLIDER
~~\$53.50~~
\$ 21.50



B-70
SPORT F/F
.020-.049
ALL BALSA
~~\$14.95~~
\$ 10.50



TAUBE
F/F
35" SPAN
45" LONG
ALL BALSA
2-CH. R/C
~~\$22.50~~
\$ 17.50



EASY RISER
R/C GLIDER
86" SPAN
ALL HARDWARE
~~\$53.50~~
\$ 21.50



TAUBE
F/F
2-CH. R/C
.020-.049
40" SPAN
~~\$15.50~~
\$ 15.50

ADD \$2.50 SHIPPING
CALIF. RESIDENTS ADD 6% SALES TAX

RAVAN MODEL PRODUCTS P.O. BOX 59513 NORWALK, CA 90650

the Robart retracting tail wheel. If you want to cycle the gear several times in the air, I would recommend adding a second tank for increased air capacity. There is no positive up-lock on the gear but there is a lot of pressure holding the gear in the retracted position. So far, the gear has stayed in place during pullups that would have had the wheels out of the well with other pneumatic systems I have used. The weight of the model, while at rest, will keep the overcenter lock in place even with zero air pressure. However, like other air systems, you need some air pressure to hold the lock while landing. It actually takes very little air pressure to lower and lock the gear even though it is moving the wheel against the airstream.

After reading this, you may feel that building your own retracts is too difficult a job. Well, they all are until you get started! I never tried it before either, but after getting started, I found that it took a lot less time than it did to build the model. If you run into problems, drop me a line in care of *Model Builder* magazine.

Pattern Continued from page 24
roll, minimizing the distance consumed during the 1/2-roll. You will probably find that the roll takes up at least 1/3 of the altitude used. Just be careful.

After the 1/2-roll is complete, finish the dive, centering the roll. Push to

inverted and establish a level heading, then add full power. Push to vertical after completing the 200-foot inverted leg.

The next part is tricky; you must climb far enough to center the next 1/2-roll with the altitude used for the first roll. The tendency is to start the first roll high and the second roll low . . . watch it! The final push to level flight should be at 300 feet (starting altitude). Note: The final turn may want to wander left due to propeller action at high rpm and low airspeed. The high-pitched and/or very large propellers tend to aggravate this situation. A touch of right rudder should keep things in line.

That's it for this month. Keep practicing and let me know if there are any points I haven't covered that you would like discussed.

Mini Bird . . . Continued from page 19

the wing tip is 3-3/4 inches above the work surface. Trim the dihedral brace until the wing tip is the proper height. Bevel the leading and trailing edges so they butt snugly with the inner panel.

5. Pin the inner wing panel to the work surface and glue the outer panel to the inner panel. Glue the triangular gussets to the rib K10-W3. Block up the outer panel to the 3-3/4 inch dimension while the glue is drying.

6. When the glue has dried remove the assembly from the work surface and

CARBON FIBER TAPE

005" x 1 25" wide

25ft	50ft	100ft
\$8.95	\$14.95	\$26.95

• \$1.00 p.h.

SLOPE ASSOCIATES 2317 n 63rd
SEATTLE, WA 98103

NEW!



BROWN A-23 CO-2

TINY PEANUT CO 2 ENGINE
ENGINE \$39.95 CHARGER \$9.95

COMPLETE CATALOG \$1.00

PHONE (714) 469-0675 or 442-4636



Peck-Polymers

BOX 2496 MB LA MESA CALIF 92041

pin the outer panel to the surface. Fit and glue the top spar in place. Glue and pin the top leading edge sheeting in place. Butt and fit this sheet against the inner panel and glue it to the top surface of the wing tip.

7. When the glue has dried, remove the wing from the work surface and coat all of the joints with aliphatic resin glue. Put plenty of glue on the spar/shear web joints. Add the one triangular gusset that you could not get in to step 4, then sand the assembly so there are no bumps to mar the covering.

8. If you are building a one-piece wing you can now join the panels. With one center panel flat on the work surface, block the other center panel up so the panel is 2 inches above the work surface as shown in the 1/8 scale draw-



12 issues per year free mail-box delivery 1-2 construction-plans
Only 35.- US-\$

What do you know about Modelling in Germany?

Not enough. I guess! Come on get in touch with it. Order a subscription of the long-known and old-established german magazine „Flug + modell-technik“. This monthly publication informs you about the whole field of flying models, describes self-made constructions for models, motors and re-sets. And each issue has included one or two construction-plans as an extra!

You don't speak German? Who cares, all the pictures formulas and plans are speaking to you with their own language. That's why this magazine ist known in more than 15 foreign countries.

Come on, just try it. Send us your cheque with US-\$ 35.- and monthly you'll find your issue in your mailbox. As a special gift, we will send you a 100-page-catalogue about 800 construction-plans, free of charge. And you will see, soon you are more informed than all your friends! Make use of this chance!

Please send your order to: Verlag für Technik und Handwerk GmbH, P.O. Box 1128, 7570 Baden-Baden, West-Germany.



100-page-catalogue contains 800 available plans instead of 3,50 \$ free of charge as a gift

Meeting the Challenge of the Eighties!



T61 R/C
\$148 Including Muffler

K61 R/C
\$139.95 Including Muffler

Write or call for more information.

R/L INDUSTRIES • P.O. BOX 5654 • PASADENA, CA 91107 • (213) 359-0016

Fly The NASA

Space Shuttle

FLYING MODEL ROCKET CATALOG

New, full-color, 64 page Estes Catalog features more than 100 exciting flying model rocket kits. Includes scale models like the NASA Space Shuttle, Cruise Missile and Saturn V, interplanetary voyagers, multi-stage, payload vehicles, and rocket powered gliders, plus launch systems, real rocket motors and much, much more!

Send for your copy today!

☐ Please rush Flying Model Rocket Catalog featuring the NASA Space Shuttle to me at once. 75¢ enclosed for postage and handling.

Name _____

Address _____

City _____ State _____ Zip _____

Mail to: Estes Industries, Dept. 54M, Penrose, CO 81240

ing of the wing dihedral. Glue the panels together.

9. When the glue has dried, coat the center section sheeting with resin and lay a 2 inch wide strip of 4 ounce glass cloth in the resin. After the resin has cured coat the cloth with another layer of resin. When the resin has cured, sand the surface so that it blends into the sheet balsa.

10. The wing should now be ready for covering. Cover the wing with Super Monokote; apply heat and pressure to each rib for maximum structure strength. Do not use any of the low temperature covering films or any of the fabric covering materials. Monokote has a very high tensile strength with very little

Announcing!



... Is Back

Immediately upon acquisition, Ace R/C, Inc. made service parts available for repair centers around the world to people with ProLine systems could keep them going and not be afraid that they'd be left out in the cold with an expensive radio and no one that has parts to fix it. We felt this as an obligation to our fellow modelers although we will never make a penny doing it.

Currently, as we sort through the material and analyze what we have, we are setting up production on replacement components such as battery packs, servos, receivers, switch harnesses, chargers, etc. all for existing ProLines. They will be ready on a regular basis.

As we look to the future, Ace will produce a line of radios under the ProLine label which will combine our 28 years of experience with ProLine's dedication to quality to produce a radio which we feel will carry on the tradition of unmatched performance and dependability directed toward the truly dedicated R/C modelers. The transmitter will consist basically of the proven ProLine gimbal and the exceptional Silver Seven encoder which has been universally accepted. We will upgrade the receiver and servos for positive pulse compatibility and more efficient operation. Our goal will be to retain what made ProLine the most used radio in competition circles several years ago and add the things necessary to update it to the current state-of-the-art to make it once again the "Winner's Edge".

We most certainly plan to stand behind what we manufacture and are here to stay. Our 28 years in this business is proof of that.

Pro Line Electronics

Is a Division of

ACE R/C, Inc.

If you would like more info on parts and service, call or write PRO LINE Box 735D 203 W. 19th St. Higginsville, Mo. 64037. Telephone, (816) 584 7121.

elongation. This stressed skin effect provides necessary rigidity to the structure. For maximum visibility at extreme altitude, black Monokote on the bottom surface is excellent.

FUSELAGE

1. Tape the drawing of the fuselage side view to the work surface. Tape a sheet of plastic wrap or wax paper over the drawing.

2. Pin the 1/8 poplar plywood nose section over the plan and fit the 1/8 balsa rear fuselage side to the nose section. Glue and pin these sections together. Glue the 1/16 scrap balsa doubler over the joint. Draw lines across the fuselage side to show the location of the bulkheads K10-F11 and K10-F5. Remove this

assembly when the glue is dry. This part is the left hand fuselage side.

3. Repeat the above step except the plywood nose section is shimmed up off of the work surface so that it will be flush with the rear fuselage side. Do not glue the 1/16 doubler in place or mark the position of the bulkhead until the glue is dry and you can turn the fuselage side over. If you make this second side exactly the same as you made the other side, you would have two left hand fuselage sides! Don't! (Unless you plan to build two Mini-Birds! wcn)

4. Place the fuselage sides on the workbench so that the surfaces that will be on the inside of the fuselage are up. Glue the 1/16 doubler on to the right hand fuselage side and the 1/4 triangle corner gussets and the 3/16 square wing rests onto both fuselage sides. Note that the bottom gusset extends to the front edge of the fuselage side. Be sure you do not make two identical left hand fuselage sides! (Unless... etc., etc. wcn)

5. Draw a vertical center line on the bulkheads K10-F3, K10-F5 and K10-F11. Glue the plywood doublers K10-F8 and K10-F9 onto their respective 1/4 thick bulkheads for the 3/16 dia. dowels. If you plan to use pushrods to drive the elevator and rudder, cut a large hole in each bulkhead to permit the installation of the pushrods. Stranded steel cable in a tube will require the bulkheads to be notched to clear the tube. Drill the 1/16 dia. hole in the tow hook retainer K10-F6.

6. Draw a straight line on the plans from the rear of the fuselage to the front bulkhead. Use this line as a guide to keep the fuselage straight while the glue is drying. Glue the fuselage parts together. Bulkheads K10-F3, K10-F5, and K10-F11 along with the two hook retainers, K10-F6 and the cross brace K10-F12 are all glued together in one set up. Shim the tow hook retainer K10-F6 up off of the work surface with K10-F7. Do not glue K10-F7 in place. Use masking tape to hold the fuselage sides and bulkheads together. Pin the assembly over the plan so that the straight line can be used to align the fuselage assembly. The bottom of the fuselage is resting on the work surface and pins are used to "nail" the assembly down until the glue is dry. Do not glue the rear of the fuselage together just yet.

7. When the glue is dry remove the fuselage assembly from the work surface and bevel the 1/4 inch triangle gussets at the rear so that the fin base K10-F8 will fit in place.

8. Glue the dorsal fin K10-F12 and the fin K10-F15 together.

Pin a piece of scrap 3/32 balsa to the top rear portion of the fuselage so that the fin assembly will be positioned properly. Use the fin assembly K10-F15 and K10-F12 to align the fin base in respect to the fuselage. When you are satisfied with the fit, glue the fin base in place. Use pins or clamps to hold it all together while the glue is drying. Sight down the fuselage to be sure the fin base

is straight.

9. Install the elevator and rudder pushrods, or cables, and the tow hook. Drill a hole in the 1/16 plywood doubler K10-F7 and slip it over the tow hook.

10. Cover the top and bottom of the fuselage with 3/32 sheet balsa. Slot the bottom sheet to clear the tow hook. Glue the doubler K10-F7 in place between the retainer K10-F6 and the bottom sheet. Cut an access hole in the top sheet to permit access to the rear dowel that retains the wing rubber bands.

11. Spot cement the canopy block in place. Use a very small amount of cement (such as Ambroid) so that the application of thinner to the cement will soften it after the canopy block has been shaped. Sand the front of the fuselage flush with the bulkhead K10-F3 and fit the nose block in place.

12. Get out your whittling knife and get ready to "move wood." Round off all of the corners of the fuselage except where the wing rests on the fuselage. You can get an idea on how much wood can be removed by studying the cross-sections of the fuselage drawn on the plan. You can really remove a lot of weight in this step, so make a template to show the correct corner radius and use the template as you cut. Shape the canopy and nose block. When the knife work is completed, get out some rough sandpaper and finish off the corners and high spots. Finish up with fine sandpaper.

13. Bend two 1/16 inch dia. wire hooks as shown on the plan and epoxy them to the inside surface of the fuselage. These hooks retain the canopy hold down rubber bands. Glue the plywood rubber band retainer and the 3/16 square canopy alignment stick to the bottom of the canopy. The plywood rubber band retainer fits into a slot cut into the canopy.

FIN AND RUDDER

1. If you are going to Monokote the fuselage, then Monokote the top of the fuselage, from the wing to the rear, at this time.

2. Sand the fin assembly to a streamline shape. Remove a 3/16 wide strip of Monokote and glue it in place on the fuselage. Note the balsa insert that is glued into the plywood fin base to permit installation of the bottom hinge.

3. Glue the rudder components together over the plan K10-R1 and K10-R2. Do not install the stab fairing K10-F14 at this time.

4. Sand the fin and rudder to a streamlined shape and slot them to receive the hinges. Do not install the hinges just yet.

5. Cover the fin and rudder with Monokote.

6. Slot the rudder for the 1/16 plywood rudder horn and glue the horn in place. Be sure the hole for the pushrod clevis is in line with the hinge line.

STABILIZER

1. Tape wax paper over the plan and pin the leading and trailing edges over the plan. Build both stabilizer halves at the same time. Do not put K10-E3 and K10-E4 in place just yet.

SCALE INSTRUMENT KITS



With the TATONE Instrument Kits, it is now possible for any model builder to make a beautiful instrument panel, one that even a professional will find hard to beat.

Each kit contains five metal instrument cases, machined turned and plated. Glasses and dial backs are precision cut to fit cases. Also included are a selection of twenty typical instrument dial faces and instructions.

—KIT SIZES—

1/4" dia.	4.00	1/2" dia.	5.75
3/8" dia.	4.00	3/4" dia.	7.50
1/2" dia.	5.00	7/8" dia.	8.50
5/8" dia.	5.00	1" dia.	9.50

TATONE PRODUCTS CORP.

1209 Geneva Ave.

San Francisco, Ca 94112

(415) 334-7109

PEANUT SCALE

13 in. PEANUT

NEW! LACEY M-10

11 PEANUT KITS \$4.95 EACH

LACEY M-10	COUGAR	MUSTANG
PIETENPOL	GIPIY MOTH	ZERO
PIPER CUB	GANAGOBIE	MILES M-10
ANDERSON		DRUINE

COMPLETE CATALOG \$1.00

HARD TO FIND ACCESSORIES, KITS AND PLANS FOR RUBBER POWERED MODELS

Peck-Polymers P.O. BOX 2498
LA MESA, CALIF. 92041

PHONE (714) 460-8675 or (714) 442-4636

REALISM!

GEE BEE RACER

FINE QUALITY

PLASTIC DISPLAY MODELS • PILOTS
WHEELS • CYLINDERS • ENGINE KITS
MACHINE GUN KITS

WILLIAMS BROS. INC.

SEND \$1 FOR
COMPLETE CATALOG
DEPT. MB

181 PAWNEE ST., SAN MARCOS, Ca. 92069

HEAD LOCK MARK III

U.S. PAT. 427,1452

THE "NEW STANDARD" FOR GLOW PLUG CONNECTORS

CHECK THESE FEATURES

1. Push, twist, its locked on.
2. Push, twist, its off.
3. Will not come off, even under heavy engine vibration.
4. Will not short out.
5. Positive spring contact.
6. 30 inch lead wire.

Still \$2.95
at your favorite hobby dealer

If not available, write direct, add 50¢ (\$1 outside U.S.)

MODEL PRODUCTS CORP. BOX 314 Pompton Plains, N.J. 07444

2. Cut the 1/16 x 1/4 balsa strips (ribs) to fit between the leading and trailing edges. Cut the 1/16 x 1/4 strips that form the root rib. See section A-A for the location of these strips.

3. Epoxy the 1/8 dia. aluminum tube to one 1/8 x 1/4 hardwood spar and epoxy the 3/32 pivot wire to the other spar, there is really no need to shim the wire away from the spar if you build both stab halves at the same time. Wrap the tube and wire with thread then glue and pin the spars in place over the ribs. Let the 3/32 wire extend into the aluminum tube to align the spars.

4. When the glue has dried, remove

the pins from the leading and trailing edges and shim them up with 1/16 sheet scrap.

5. Install K10-E3 and K10-E4, then glue and pin the top 1/16 x 1/4 ribs over the top of the spar. Mark the locations of the tie wire to its aluminum tube.

6. Now is as good a time as any to install the 1/16 piano wire (tie wire). We can call it a tie wire because it ties the stab halves together. Drill a hole for the wire and tube in each stab half then epoxy them place. Let the epoxy cure while the stab halves are pinned over the plan.

7. When the stabilizer structure is dry

JOHN POND Old Time Plan Service

The largest selection of plans in the world at the most reasonable prices
Each list \$1.00 •
All 4 for \$3.00

- No. 11 OLD TIMER F/F GAS
- No. 11 OLD TIMER RUBBER/TOWLINE
- No. 11 OLD TIMER FLYING SCALE A through K
- No. 11 OLD TIMER FLYING SCALE L through Z

*New prices effective June 1, 1980

P.O. Box 3215

San Jose, Calif. 95156

Phone (408) 292-3382

ELECTRIC FLYERS

★ New flight system gives 8-12 minutes on Kraft Cardinal ★

Send S.A.S.E. for more information.

LIESURE ELECTRONICS

11 Deerspring
Irvine, CA 92714
(714) 552-4540





**"Matched Performance System"
for TOP PERFORMANCE**
K&B ENGINES
16 Airplane - 4 Marine
K&B FUELS 7 Blends K&B GLOW PLUGS 4 choices

**"Matched Finish System"
for BEST APPEARANCE**
K&B FIBERGLASS CLOTH K&B Micro-Balloons FILLER
K&B SUPER POXY RESIN K&B SUPER POXY RESIN
K&B SUPER POXY PRIMER K&B SUPER POXY PAINT
K&B MIXING CUPS



K&B MANUFACTURING
12152 Woodruff Avenue
Downey, California 90241

remove it from the work surface and sand the structure to the streamlined shape as shown in section AA and BB. The sharper the leading and trailing edge, the less drag, so get that surplus wood off!

8. Fit the small fairing block K10-E5 onto each stab half and glue them in place. Sand them to fare into the stab.

9. Cut a 1/16 deep notch in the left hand stab half to receive the 1/16 plywood elevator control horn. Let the aluminum tube protrude.

10. Cover the stabilizer with Monokote.

11. Glue the 1/16 plywood horn in place.

This concludes the festivities having to do with the cut and glue mode of construction. Now we can get it all together.

GETTING IT ALL TOGETHER

1. The wing is complete, covered and ready to fly. You have checked for warps and removed them with a hot iron.

2. The fuselage needs the wing saddle or rest trimmed to fit the bottom of the wing and the canopy needs a tunnel cut to allow clearance for the rubber bands that retain the wing. Then you have to decide whether to paint the fuselage or Monokote it.

3. The fin and rudder are covered, but the rudder is not yet attached.

4. The stab is complete but the stab fairings K10-F14 are not yet shaped or

installed and the 1/8 dia. pivot tube through the fin has not been epoxied in place.

5. The radio has not been installed.

LET'S START WITH STEP NUMBER 2!

6. Set the wing on the fuselage and see where the fuselage interferes with it. The front bulkhead K10-F11 will have to be trimmed a bit to allow for the wing dihedral. The 3/16 square wing rests are also sloped to provide for the dihedral.

7. The 1/8 o.d. x 3/4 long pivot tube is mounted in a hole drilled undersize in the fin base. Use the pivot wire to locate the pivot tube in the fin base. Cut a small circle of Monokote from around the pivot tube hole then press the pivot tube into the hole. Do not install the fairings K10-F14 but slide the stab halves together on the fin. Use the stab to align the pivot tube in the fin. Make big epoxy fillets around the pivot tube. Sight down the fuselage both from the front and rear to be sure the stab is aligned. Let the epoxy cure.

8. Install the radio. Do not depend on the canopy to hold the batteries in place. Hold them in with rubber bands, tape or screws, but do not trust the canopy. Be sure the rudder clevis at the rudder horn rotates freely on the threaded portion of the push-pull cable or rod. The rudder horn is at an angle to the rod so as the rudder swings through its travel the clevis must rotate on the threads. Use a metal clevis.

9. Three-quarter ounce glass and resin on the forward fuselage bottom won't hurt anything. The plane will be a little heavier but much stronger. If you paint the fuselage, then glass the nose. If you Monokote, do not bother with the glass.

10. Paint or Monokote the fuselage.

11. A skid is only necessary if you plan to fly the plane over dirt or pavement.

12. Attach the rudder.

13. You are correct . . . we have the plane ready to fly but we never did get the stab fairings installed. The reason is we never have been able to figure how to get the fairing onto the fin at the correct angle!

14. Fly the plane and get it trimmed out the way you like it . . . THEN glue the fairings in place so they align with the stab! You can do this at the field. Let the fairings slip over the pivot tube then when the stab angle is correct glue the fairings in place while the stab is installed.

Two Sides . . . Continued from page 23

than double. Many non-linear relationships are obvious when you think about them. For example, if you double the size of a wing that is 10 in. by 50 in., the area of the wing goes from 500 sq. in. to 2000 sq. in. The area went up 4 times when the sizes was doubled. This is known as a "square law" relationship, since the area increases as the square of the (scaling) factor: times 2 results in times 2², or times 4 for the area. The relationships become even more complex when the characteristics of the air are examined. On one hand, the reaction of the air varies non-linearly with respect to the speed at which the aircraft moves through it, while on the other hand, the acceleration of gravity remains constant whatever the scale. These two facts must be properly combined (with due consideration of a factor known as the Reynolds Number) if the model is to behave in maneuvers in a manner similar to the original. Further, engineers can prove that structural strength of spars and other aircraft parts are not proportional to their size. Here again the factor is not linear, and has been well-defined mathematically.

Through use of these mathematical relationships, and by observation of the flight of a dynamically scaled model, it is possible to find out many things of importance about a contemplated full scale design. For instance:

How will this airplane behave in a spin? Accurately dynamically scaled models are usually tested in special wind tunnels where air is blown vertically up, at such speed that the model remains spinning in the tunnel at the height of the observer's window (observer outside the tunnel, of course). He is also usually replaced by a camera, whose film can be studied in slow motion or frame-by-frame. Qualitative information can be obtained if the model is radio controlled and deliberately made to spin. If

BIG IS BEAUTIFUL

Dick Phillips

CAT. #
HS-4



CAT. #
HST-4

**ECONOMY 2 OUNCE HOT STUFF & SUPER 'T'
ONLY \$12.00 EACH AT YOUR DEALERS**

Satellite City
P. O. Box 836,
Simi, California, 93062

Dear Guys:

I thought you might be interested in the following, as a totally unsolicited testimonial to the value Hot Stuff and especially Hot Stuff Super T have been to me.

I had some severe reservations about the strength of so called 'Instant Glues' in the beginning. However, my lack of building time caused me to give them a try and now I couldn't get along without Hot Stuff and Super 'T'.

Using the more conventional adhesives requires extensive drying time on the building board, thus reducing the amount of building I could get done in the rather limited time available. Since switching to Hot Stuff, and particularly Super T, I have more than doubled what I can get done in the time available. Now, by working alternately on two sub-assemblies of a model, I can keep building at a surprising rate compared to the old ways. A few minutes between the application of Super T and the assemblies readiness for further construction permits me to get a great deal more done in the time available than I ever could using the traditional adhesives we have used for years.

Hot Stuff and Super T have given me the opportunity to both keep my correspondence and my column up to date and to do more building than I have been able to do for years. For anyone whose time at the building board is limited, whatever the reason, *I heartily recommend Hot Stuff and Super T!*

Best regards,

Dick Phillips

**IF YOUR FAVORITE DEALER DOES NOT STOCK
HOT STUFF AND SUPER 'T' IN THE 2 OUNCE
ECONOMY SIZE, ORDER DIRECT.
SEND CHECK OR MONEY ORDER WITH YOUR ORDER.
HOT STUFF #HS-4 \$12.00 ea. - SUPER 'T' #HST-4 \$12.00 ea.
Add \$1.00 Packaging & Postage Inside the U.S.**



Dick Phillips, RCM's *Big Is Beautiful* columnist, uses Super 'T' to permit more building time in his busy schedule. On the building board is the 'proof' wing for Dick's current project, a quarter scale Monocoupe 90A. The wing ribs being glued are made of plywood, foam core, and balsa; all spars are spruce. Super 'T' works on them all!

Satellite City

P. O. BOX 836 • SIMI, CA 93062 • (805) 522-0062



The 77 SPECIAL!

A custom built engine of .61 displacement, developed for operation on ignition R/C, using gasoline for fuel. Fuel by-pass ports have been faired and polished for maximum performance.

Exterior surfaces have been finished to compete with the finest display engines.

Performance is unexcelled as a sport engine. Complete details in our new expanded catalog on ignition engines and accessories, available for \$2.00

77 PRODUCTS

17119 So. Harvard Blvd. Gardena, California 90247 (213) 329-0273

the model refuses to spin, the full scale version will refuse to spin.

Various speeds can be accurately predicted: typically, cruise, top, takeoff, and stall. Two people are needed: one for piloting, the other for taking measurements. For accurate results the use of movie cameras is recommended. Knowing the various scaling factors, you apply them correctly and presto, you know what to expect from your future prototype.

In the air you may want to try tight-controlled horizontal turns, and check how close a turn you can make without falling into a spin; again, following the scaling rules, you can determine the

minimum radius of turn of the prototype. And such tasks can also tell you something about the efficiency . . . or deficiency . . . of your control surfaces.

If you are designing a seaplane, you will be able to see waves created by the hull's motion, the amount of spray generated, and other pertinent points which may be considered to improve your hull design. (The scaling factors related to the water are mainly affected by the Froude Number, not the Reynolds Number.)

Some of the scaling factors for Dynamic Scale are shown in Table I. These can be used to make a model that will serve as a prototype for a full size

model. Its speed will be the square root of the scaling factor. For example, a 1/4-scale model will fly at 1/2 the full scale speed. The model will be dimensionally accurate. Airfoils and other dimensionally related things must be exact if the model is to serve its purpose, although some airfoil adjustments may become necessary to compensate for the expected type of airflow (usually turbulent for the original, and probably laminar for the model).

When accurately dynamically scaled, a 1/4-scale P-51 will fly at 150 mph rather than the 75 mph that would be visually correct. "Accurate dynamic scaling" would entail making dimensions, weight, power, propeller rotational speed, and thrust agree with the aerodynamic rules (scale factors). The weight and power of the model will most probably be greater than that of the average R/C model. Such a model would give rise to safety concerns, but would be great to fly on a windy day!

You will not achieve visual scale speed with a dynamically scale model. It is a matter of aerodynamics that can not be violated. Dynamically scaled model airplanes are not like model trains that easily move at visual speeds since they do not need speed to stay on the tracks.

VISUAL SCALING

A large fraction of the model airplane builders are very concerned about the appearance of their models in flight; they should look like the real thing. This

We'd like you to meet

THE FOX EAGLE III .60 BB-RC

★ An Improved Thrust Washer — squares up on the taperlock

★ The most sturdy Con Rod of any .60

Schnuerle Ported

The Engine:
\$125.00

Muffler:
\$19.95

11 7/8" Maple Prop is recommended
(Propeller is not included)

Features an improved Cylinder design. Modified ports produce more power, yet less critical on settings.

★ New "Droop" style Muffler design

★ Larger Rear Main Bearing

★ A Heavier Piston

★ A Shortened Con Rod

Full Size Engine Drawing is available on request.



We're at (501) 646-1656

FOX
MANUFACTURING CO.

5305 Towson Ave., Fort Smith, Arkansas 72901 U.S.A.

500 to 700 Additional R.P.M. —

Little Improvements result in More Performance!

means that the speed must scale directly with the size. That is to say, the one-tenth scale model must fly at one-tenth the full scale speed. For instance, a 3-foot model of a 30-foot lightplane that cruises at 85 mph will have to fly at 8.5 mph, or slower than most people can run. (The visual scale model is almost always at the mercy of the wind!)

Table II shows the essential visual scaling factors. (The factor for area is determined from the dimensional factor.) In this case, weight, thrust, and lift/drag factor (typically, airfoils) can be varied to achieve visual scale speed.

Slower speed can be achieved by: a) decreasing the model's weight and thrust or, b) increasing the model's lift and drag. Increasing the wing area also does the trick at the expense of dimensional accuracy. Changes in weight and thrust have no visual effect and are easiest to accomplish. Changes in lift and drag involve changes in airfoils or the addition of drag inducing features such as greater fuselage frontal area. All of the lift/drag related factors compromise scale fidelity. By reducing weight, increasing lift, and drag, and reducing the thrust, a model can be made to fly at visual scale speed. In fact, weight reduction (and consequent thrust reduction) may be enough in many cases. This would certainly be the case for rubber powered scale.

With visual speed accomplished, the model's other flight characteristics will suffer. The probability of maneuvering as the full scale aircraft does is greatly reduced. Further, it may be necessary to reduce structural strength significantly to achieve low enough weight.

Use of a small motor is an attractive weight saver. This will accomplish weight and thrust reduction. If the motor size is chosen to reproduce visual cruise and top speed, the reserve power to do violent maneuvers will most probably not be available. Here we come close to another classical argument: should scale model flight performance be judged (as it is most often) by the model's ability to do violent maneuvers? It seems to us that a scale model should perform as its full scale equivalent does: no more, no less. (Scale rules seem to have this fairly under control. wcn)

CONCLUSION

Dynamic scaling must be done in accordance with the aerodynamic laws. The resulting model will not fly at visual scale speeds. Visual scale speeds can be accomplished by violating the aerodynamic scaling rules. However, the other flight characteristics achieved will not be scaleable to the full size aircraft. Typically, the model will not necessarily simulate the stall, turn, and spin characteristics.


Both dynamic and visual scale have their places. However, it must be remembered that they are different and serve different purposes.

ACKNOWLEDGEMENT

The assistance of Mr. Milenko Mitrovich, Aeronautical Engineer and Teacher of Aeronautical Design is grate-


FREE FLIGHT FOR EVERYONE
GREAT FLIERS, STABLE AND EASY TO TRIM.

BLUE RIDGE SPECIAL HANDLAUNCH GLIDER



all parts pre-cut, shaped
airfoil, milled dihedral
joints, quality balsa

RUBBER POWER
Machined and notched ribs,
quality tissue and balsa.
Almost 3,000 sold.



WOULD CHUCK

\$4.00 each plus \$1.75 shipping.
Some of the finest hand crafted freeflight kits
you'll ever see, for beginners and experts.

BLUE RIDGE MODELS
BOX 429, SKYLAND, N.C. 28776

STOP-A-PROP Engine Brakes

1/2A (TDI)	Brake Kit No 101	\$2.75
FAI (ABI)	Brake Kit No 102	\$3.25
BC	Brake Kit No 103	\$3.75
1 of each size	3 of FAI size	\$8.50
Adaptor for Cox 15, Kit No 107		\$1.50
(Used with Kit No 102)		

Pennsylvania Residents add 6% Sales Tax
K & W ENTERPRISES, 7824 Lexington Ave.
Philadelphia, Penna. 19152

AVIATION FILM
CLASSICS ON VIDEOTAPE

START YOUR OWN COLLECTION OF AVIATION FILMS ON EASY TO USE, INEXPENSIVE VIDEOTAPE. AVIATION FILMS OF ALL TYPES: FEATURES, WAR DOCUMENTARIES, NEWSREEL, ETC. NOW AVAILABLE ON VIDEO TAPE. SEND \$1.00 FOR CATALOG.

UDS 505 N. SEPULVEDA, MANHATTEN BEACH, CA 90266

fully acknowledged. It was Mr. Mitrovich's patient correspondence that answered the technical questions posed by the subject. Mr. Mitrovich has been long associated with man powered flight activities, and his name is linked to a number of well known full scale aircraft. ●

Hornet Continued from page 32

originally belonged to the late Eddie Keil of Keilcraft fame.

We immediately went to our old magazine files and dug out the July 1940 issue of M.A.N., which featured Sal's construction article on the Hornet, and put Al Paterson to work on the full size drawings. We also sent a note to Sid, asking for photos of the model after covering and finishing. As you can see, Sid came through. By the way, we also had to call Sal and find out where he balances the Hornet. Typically, this info was not provided in the 1940 article or on the plans.

Construction of the Hornet is really simple, and any modeler who can build from scratch will have no problem. Watch your tail weight, however. Sid ended up having to add a pound (not a British pound, dummy, we mean 16 ounces!) of ballast to the nose in order to get the proper balance. (This was mostly due to his using the Super Cyclone engine, which could be almost a pound lighter than the Forster 99.)

Incidentally, Sid added a two-channel

BARRONS SCALE CLASSICS
PLANS WITH CONST MANUAL

SPORT SCALE AT ITS FINEST

CURTISS HAWK P6E	\$12.50
CURTISS GOSHAWK FII	\$15.00
CURTISS GULFHAWK IA	\$15.00
2IN SCALE 63IN SPAN	
STINSON RELIANT SR9	\$15.00
2IN SCALE 84IN SPAN	

PLEASE ADD \$2.00 FOR P/H

ALSO AVAILABLE IN 1/4 SCALE
SEND \$1.00 FOR COMPLETE
INFORMATION TO—

RICHARD G BARRON
1213 HOLLY SPRING LANE
GRAND BLANC, MICHIGAN 48439

CUSTOM TUNED ENGINES
COMPETITION ACCESSORIES

*Specialists in custom T.D. 049/051 and
reed engines. Throttled T.D.'s available.
Complete inventory of individual stock
and custom parts for Cox
T.D. 020, 049, 051 & 09 engines.*

*Exclusive distributor for the
Nelson 15 engine and parts.*

*Hard-to-get items such as custom needle
valves, racing wheels, quick fills,
fuel shut-offs, solid control
lines and many others.*

*For detailed brochure, send 25 cents to:
Kustom Kraftsmanship, Box 2699
Laguna Hills, CA 92653 Ph: (714) 830-5182*

radio because of a shortage of free flight space (tell us about it!) in his area. He says the rudder is very effective with about 1-1/2 inch movement either side of center, and 3/4-inch up or down on the elevator is ample. Sid also noted a certain amount of dutch roll on the first flight, then realized the model was designed to spiral left while climbing. Setting the trims for a circular climb, allowing the model to fly the way it was intended, solved the whole problem!

We also learned from Sal that he himself went for the two-wheel gear on his last two Hornets. This eliminated ground-looping when winds were under 5 mph at takeoff. He uses a single strut of 5/32 music wire.

A comment from Sid about the photos of the finished model. "An interesting note. The photos were taken on nearby ex-RAF Battle of Britain aerodrome, North Weald Essex, which a group of us have access to. Whilst Taibi's Hornet was flying in the early 1940s, the Hurricanes and Spitfires were operating from this famous aerodrome . . . now all is quiet, and the Hornet is using those same runways. . ."

Workbench . . Continued from page 6

not difficult to drive, handle well, are not equipped with governors (in our opinion, governors on a vehicle make them unsafe to use on public roads!), and about the only trick is backing up if

YES-SIR, YES-SIR, THREE BAGS FULL! 4TH BAG AVAILABLE NOW



SAME NUMBER OF PLANS-SAME PRICE!

WALT MOONEY NOW OFFERS 4 BAGS OF PEANUT SCALE PLANS

ALL WELL TESTED DESIGNS, AT ONLY \$5.00 EACH

EACH BAG FEATURES FOURTEEN PEANUT PLANS,

ONE OTHER, PLUS PHOTOS AND INFORMATION

SEND \$1.00 FOR COMPLETE LISTING AND SAMPLE PLAN TO:

WALT MOONEY, 2912 CABRILLO MESA DR.

SAN DIEGO, CALIFORNIA 92123

VINTAGE R-C PLANS



REARWIN SKYRANGER

1/4 SCALE MODEL 175

9 FT. WING SPAN

4 LARGE PLAN SHTS. - PLANS \$ 20.00

QUADRA OR GLO ENGINES ADD \$ 2.00 POSTAGE

CATALOG - OVER 50 PLANS 50¢ DEALERS WRITE

SID MORGAN

13157 Ormond, Belleville, Mich. 48111 USA

you have to do it into possible oncoming traffic. Oh yes, there was plenty of room between the bucket seats for a folding captain's chair (the kind with arms) for a third passenger in the cab.

If the above sounds like a testimonial for Jartran and the Ford truck, it is. In 4150 miles, the truck used one quart of oil and one quart of transmission fluid. Although mileage was less than 10 miles per gallon (you buy the gas), Jartran guaranteed 10 mpg and pays the difference!

If there's one thing that could be added to the service, it would be the convenience of being able to rent a CB unit for long trips. Without one, we soon learned the trick of falling into formation with a group of fast-moving tractor-trailers. Truckers would no more drive without CBs than they would without brakes or steering! If there's a "County mountie" up ahead, there's a 99% chance the truckers know about it. When the trucks rolled, we rolled; when they slowed down, we slowed... and smiled at "Smokey" as we cruised by at 55 mph. During the whole trip, we were stopped once, in Texas, and given a warning only (the police car was driving the other direction and 'clocked' us at 67 mph). It was one of the few times we didn't have a trucker escort. We finally bought a CB unit in Tucson, Arizona, and enjoyed its use for the rest of the trip

... it saved us a ticket coming into Phoenix, Arizona.

From Braintree, we drove through Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania, where we visited oldest daughter DiDi and husband Bob (plus two grandsons Steve and Chris). Next day we stopped to look at the house we lived in from age five to 20 in Newark, Delaware (and where we first started building models), then on to Washington, D.C. for a quick tour of the capitol, and finally to Newburg, Maryland. Newburg? It's the small town on old Route 301 just before you cross the Potomac River into Virginia. It was the town we used to stay in when flying in the R/C record trials at the Dahlgren Naval Weapons Lab facility just over the bridge in Virginia. Here we took the world altitude record from Maynard Hill in 1965 (16,620 feet) and then lost it to him three years later when we both reached 19,300 and 19,500 (his). Anyway, the purpose this time was to enjoy hot steamed blue-point crabs, a delicacy native to that area that we had not tasted since 1971 after the R/C World Champs in Doylestown, Pennsylvania. It was worth the 300-mile detour!

Next day we drove the length of Virginia, visiting our printer in the tiny (1300 plus population) town of Gordonsville along the way, and ended up in Kingsport, Tennessee.

We would have missed Mississippi entirely, probably stopping in Memphis the next night, had it not been for a temporary cap. This item was on one of Anita's lower teeth, and it had been getting looser and looser the last couple of days. Whaddya do about a loose cap? Call a dentist... And guess who lives in New Albany, Mississippi? Right... Pattern and scale R/Cer, USPJA Judge, and chief judge at the Las Vegas Tournament of Champions, Doctor Jim Edwards, DDS, etc. Jim not only fixed the cap, he also took us to a steak dinner to check out the cap, and put us up at his home for the night. While Anita and Belinda hit the sack early, we discussed models and settled all of the world's difficulties, waiting for a bunch of accumulated dirty clothes to come out of Jim's washer and dryer. Jim's wife, Jackie, was visiting relatives in Florida, so we missed her.

Getting to Dallas by the next evening, Friday, was a bit too much, and as John Elliot would be there to set up and tend to our booth at the Southwestern Modelers Show, we decided to split the distance in half and take two days. That put us in Arkadelphia, Arkansas on Friday night. (We're still trying to find out if some dude from Philly settled in that part of Arkansas and established that town!)

We arrived at the Holiday Inn show headquarters Saturday afternoon and heard all about the 80 mph wind storm that cut a path right through the hotel early Saturday morning, knocking the glass out of 38 cars in the parking lot, closing about 20 rooms, and generally raising hell. The boys are running an earthquake for next year's show!

Monday morning we set sail for the Texas Panhandle and finally stopped in Van Horn, where the very comfortable Best Western Lodge was a welcome change from America's innkeeper, which had, in two out of three tries, given us noisy or inoperable air conditioning and no hot water for showers.

Our next destination was Sedona, Arizona, in Oak Creek Canyon, a place we knew nothing about, but which came highly recommended by Eldon Lind, who was in Dallas, showing his Duplicator sander and Extra Hands covering tool. Strong headwinds and lots of road work slowed our progress, and by the time we reached Tucson, we called ahead and changed our Sedona reservation for the following day, and set Phoenix as our destination.

Once settled in our room at a new Ramada Inn at the north end of Phoenix, we got out the phone book and found Jerry Bonzo, who many R/Cers remember in connection with Pro Line, while it was owned by Pace. Jerry and Shirley joined us at the Ramada and we talked into the late hours.

With Sedona not that far away, we bypassed it the next morning and headed for Flagstaff, driving on north to show the Big Ditch (Grand Canyon) to Belinda. As would be expected, jumping along the rocks at the various viewpoints and

Ace Radio Control	92
American R/C Helicopters	5
Associated Electrics	1
Barrons Scale Classics	97
Bavarian Precision Products	80
Blueridge Models	97
Dave Brown Products	86
Byron Originals	Cover 3
Charles R/C Goodies	74
Circus Hobbies	Cover 2
Condor Hobbies	79
Coverite	82
Jim Crockett Replicas	72
Curacao Modelbouw	72
Delta Mfg. Co.	89
Drapers R/C Service	80
Gene Dubois	102
DuBro Products	81
Dynamic Models	89
Electroline Models	84
Electronic Model Systems	78
Enya Model Products Co.	3
Estes Industries	92
FAI Model Supply	102
Fox Mfg. Co.	96
Carl Goldberg Models	87
Dick Hanson Models	88

INDEX TO ADVERTISERS

Hayes Products	75
Hobby Horn	88
K&B Mfg. Co.	94
Kraft Systems	52,53
K&S Engineering	77
Kustom Kraftsmanship	97
K&W Enterprises	97
Laughing Whale, The	82
Leisure Electronics	94
Micro-X Models	81
Midwest Model Supply Co.	82
Model Products Corp.	93
Model Rectifier Corp.	Cover 4
Walt Mooney Peanuts	98
Sid Morgan Plans	98
Northrop Real Estate, Inc.	86
Octura Models	68
Peck-Polymers	91,93
Pierce Aero	85
John Pond O.T. Plans	94
Probar Design	78
Radio Control Buyer's Guide	76
RAM Radio Controlled Models, Inc. .	81
Ravan Model Products	91

Rhom Products	73
RJL Industries	92
Satellite City	95
Sig Mfg. Co.	4
Slope Associates	91
Smith Plans	74
Sterling Models	70
Sullivan Products	83
Su-Pr-Line	90
Tatone Products Corp.	93
Top Flite Models	69
Uber Skiver Knives	103
UDS Video	97
Verlag fur Technik	84,91
VL Products	102
Williams Bros.	93
Wilshire Model Center	90,98
77 Products	96

HOUSE ADS

Ad Index	99
Binders	85
Classifieds	99
Flying Scale Models	104
Full Size Plans	100,101
Oldies But Goodies	104
Subscription Form	100

CLASSIFIED ADS

Non-commercial (personal items) rate is 25 cents per word, with a minimum of \$3.00. Commercial rate is 40 cents per word, with a minimum of \$5.00. No advertising agency discounts allowed.

All ads are payable with order, and may be for any consecutive insertion period specified. Name and address free, phone number counts as two words. Send ad and payment to: MODEL BUILDER, Classified Ads, Box 335, 621 West 19th St., Costa Mesa, CA 92627.

FREE FLIGHT ONLY! 1981 catalog 70 pages \$2. Che Hobbies, 10900 Eastwood Ave., Inglewood, CA 90304

GLASS CLOTH: 0.6 oz., finest woven quality. 38" wide, continuous length: 5 yds \$16.65, 10 yds. \$29.70 — ppd. Airmail overseas add \$2. Dan Parsons, 11809 Fulmer N.E., Albuquerque, NM 87111.

TWO HOUR VIDEOTAPE of One-Eighth Airforce 1981 Phoenix Scale Fly-in or CAF Airshow 80. Unedited, unannounced, with natural sounds \$35 ea. ppd., specify VHS or Beta. Wright Enterprises, 13315 Chico Rd. N.E., Albuquerque, NM 87123.

WANTED — OLD MODEL ignition engines, cars, etc. Paying top dollar. Bill Simpson, 7413 Via Lorado, Rancho Palos Verdes, CA 90274. (213) 377-3532

EMBLEMS - Direct from manufacturer. Swiss embroidered. Custom made to your design. Send sample or sketch and quantity needed for free quotation. David Haemmerle & Sons, Inc. Box 711, West New York, NJ 07093

AIRCRAFT MODELS designed and/or built. Research/test/commercial applications. demonstration/display/flying remote controlled, fixed or rotary wing. AERO DEVELOPMENT Box 80276, Ft. Worth, TX 76180

NUTS, BOLTS, WASHERS, WING-NUTS, PINS, SCREWS, every size and shape you can think of. These are the ones you always need but can never find. All new never used. Over 3000 pieces, \$12.95 — \$2 postage. D. ROSE, 3713 El Jardin, Las Vegas, NV 89102.

WANTED: Aircraft or Missile Manufacture Promotional Desk Models. J. Dodyk, 29144 Cambridge, Flat Rock, MI 48134; (313) 379-4340.

ISLAND R/C REPAIR SERVICE Ace-Kraft-Futaba-Cannon-Royal. 40 Fireside Lane, East Setauket, NY 11733; (516) 331-2961.

WANTED: F/F, Scale, OT, Kits, Magazines, Plans. Sell/Trade that kit, you'll never build. Will exchange lists. (1-612) 251-0471

WANTED Old model airplane engines, gas model race cars, related items 1935-55. Arthur Suhr, W218 N5866 Maclynn Court, Menomonee Falls, WI 53051

020 REPLICA Old Time Kits Free list Write J&R Models, 5021 W. Sheridan St., Phoenix, AZ 85035

looking for squirrels was a lot more entertaining to an eight-year-old. Doubling back that afternoon, we pulled into Sedona before sundown and were absolutely awestruck at the beautiful and weird red-rock protrusions that rose majestically out of the canyon floor and towered thousands of feet above our heads.

The next evening we were home, but not before several long, low-gear climbs through mountain passes, including a stop in the almost ghost town of Jerome, just hanging on the steep side of a mountain range. Then it was down the other side and across more desert to Interstate 10 and Blythe, California, past Palm Springs, Riverside, and finally Costa Mesa and Newport Beach.

Whew... Nothing feels better than your own bed after a long trip!

TEACHER OF THE MONTH

With summer just arriving, and schools about to recess until September, this

may not be the best time of the year to attempt the launching of a new MB feature. On the other hand, when recognition is overdue, seasons mean nothing.

From time to time over the years, we have heard about, and often talked with school teachers, particularly of the elementary level, who have, with the blessings of their school administrators, but without financial aid, instigated an extracurricular program for teaching their students about aviation. In several local examples, teachers have been presented hundreds of surplus back issues of MB, which they pass out to their students (Hmmm... better watch the grammar and strong language).

Anyway, we would like to give recognition in another way, to the unselfish efforts of these teachers. Monthly, if possible, we'd like to present a brief resume of the efforts of some dedicated teacher who is doing his or her part in

promoting aviation at the elementary school level. We need the teacher's name, details of the aviation program being presented (particularly if it involves model building by the students), and of course, the name and location of the school involved. For each story presented, a free, two-year subscription to **Model Builder** will be awarded to the school, in the name of the teacher responsible for the program.

It is our hope that students, or parents of students in schools that do not have such a program, will show these articles to the appropriate school teachers or administrators, on the chance that someone in the school will be inspired to conduct similar programs.

To get things rolling, our first two-year subscription award goes to Sierra Vista Elementary School, in Placentia, California, in the name of Ed Marestaing, sixth grade teacher. As reported by Victoria Adams, another teacher at

FULL SIZE PLANS SERVICE

Including reprint of construction article
(if any)

No. 8811 MINI BIRD \$4.00
Two-meter version of Dave Thornburg's well known Bird of Time. Mark Smith.

No. 881-C.P. SEVERSKY P-35 \$4.00
Miniature Aircraft Corp. 3/4"-scale kit plans. All printwood parts duplicated.

No. 881-O.T. TAIBI'S HORNET \$7.50
Sal Taibi's 1940 design for Forster 99 engine. Span 88", chord 16", 1300 sq. in.

No. 7811 SPINE-TAILED SWIFT \$3.50
Contemporary 1/2A pylon racer designed to win. Easy glass fuse. Jim Gilgenbach.

No. 7812 BIG PROP CHARTS \$1.50
Charts for determining best engine and prop sizes for the "biggies". John Burns.

No. 7813 GREAT EXPECTATIONS \$1.50
West Coast/Mooney Bostonian design for beginner or expert. By Ernie Wrisley.

No. 781-O.T. BERRYLOID WINNER \$5.00
Winner of the coveted best finish trophy at the 1938 Nationals. Harold Coovet.

No. 6811 CURTISS P-40 \$10.00
Exact-outline giant/sport R/C scale for .90 power, 80" span. By Art Johnson.

No. 6812 LETTERS & NUMBERS \$1.50
Letters/numbers in round/square block, plus proportional guide to make any size.

No. 681-O.T. ROCKETEER \$4.50
High-climbing Class C gassie from Nov. '38 Air Trails. By Maurice Schoenbrun.

No. 5811 BLANIK L-13 & L-13J \$9.50
Czech 2-place sailplane in 1/5 R/C scale. Optional power. Span 126". L. Houha.

No. 5812 CO₂ BANSHEE \$1.50
A 40% reduction of Leon Shulman's Cl. A post-war gassie, for CO₂. By Ed Toner.

No. 581-O.T. MY SPARKY \$2.00
Original design of longest running kit by Comet. Many building hints. Ed Lidgard.

No. 4811 NORTH STAR \$4.00
Military scale-like R/C twin for .15 size engines. All wood. By Kalevi Sundquist.

No. 481-C.P. STINSON 105 \$3.00
Competition quality 50-inch rubber scale kit plans by Megow. All parts detailed.

No. 481-O.T. POU DU CIEL \$3.00
Finely detailed 22-inch span rubber scale, Oct, '36 Flying Aces. By Ken Hamilton.

No. 3811 DORMOY "BATHTUB" \$15.00
Unusual 1/3-scale R/C (8' span) early ultra-light homebuilt, 40-60. Hank Itzsch.

No. 3812 HANDLEY PAGE 0/400 \$4.00
F/F scale WW-I bomber, 66" span, for 2 1/2A's. Major contest winner. B. Dennis.

No. 381-O.T. SUPER BUCCANEER \$7.50
Most famous Antique gassie from 1937. Great for R/C, 90" span. Bill Effinger.

No. 381-C.P. WACO YQC-6 \$3.00
Super-detailed plan from Skymasters kit. All ribs and bulkheads accurately shown.

No. 2811 LIBERTY SPORT \$17.75
Mammoth 3-1/4" scale biplane for belt-drive 60 on up. Four sheets. Roger Stern.

No. 2812 DYKE DELTA \$1.50
Super-light indoor Peanut Scale model. Will fly 35-45 seconds. By Ken Johnson.

No. 281-O.T. HERON \$3.00
A 48" span Class A gassie from Dec. '39 Flying Aces. Cabin style. Frank Gagne.

No. 1811 WACO YKS-6 \$6.75
Classic cabin biplane in R/C Sport Scale. For .29 - .40 engines. By John Burns.

No. 181-O.T. '32 WAKE WINNER \$2.00
Super-light 37" span rubber model uses motor stick. Designed by Gordon Light.

No. 1812 PAULHAN-TATIN \$1.50
Interesting 1911 streamliner with curved dihedral, in Peanut Scale. By J-F Frugoli.

No. 12801 OMAC-1 \$7.50
R/C Sport Scale pusher-canard executive aircraft, 60 power. By Col. Bob Thacker.

No. 12802 AUSTER J-5 \$2.00
Fine flying, 18" span rubber scale light-plane. Double for Jumbo. Steve Gardner.

No. 1280-O.T. STRUCK'S KGS \$4.00
So-called because proportions are KG-ish, but the looks are Zipper-like. Class B/C.

No. 1280-C.P. WEDELL-WILLIAMS \$3.00
Plans from golden era Wanner rubber kit. All ribs and bulkheads shown, 30" span.

No. 11801 "MAMA MIA!" \$9.50
Latest, super-size pattern ship by leading flier/designer/kit manufacturer, Joe Bridi.

STICK 'EM PATTERNS

Complete sets of pressure sensitive patterns provide "printed wood" . . . on your stock . . . for selected MODEL BUILDER plans. Press all patterns for ribs, bulkheads, tips, etc., on proper thickness sheet balsa or plywood, and cut 'em out! No tracing, no transferring, no plans tearing, no inaccuracies. Just like making up your own kit with printed wood. "Stick 'em Pattern" numbers correspond to plan numbers. Order with plans and they'll be mailed together . . . 3rd Class. Add 50¢ per set to mail patterns 1st Class.

CALIFORNIA RESIDENTS ADD 6% TAX.

No. 11731SP BIG JOHN the FIRST \$5.95
No. 574-O.T.SP T-D COUPE \$2.95
No. 6741SP TRIXTER BEAM \$2.95
No. 7741SP CURTISS A/12 SHRIKE \$3.95
No. 874-O.T.SP POWERHOUSE \$3.95
No. 91074-O.T.SP BUHL PUP \$4.95
No. 11743 SP "C-QUELL" \$3.95

No. 775-O.T. SP BOMBSHELL \$3.25
No. 277-O.T. SP BERLINER JOYCE \$5.25
No. 577-O.T. SP GLADIATOR \$4.75

Price includes 3rd Class postage and reprint of building instructions (if any). Add 65¢ PER PLAN for 1st Class postage. Add \$1.00 PER PLAN for overseas orders (except APO and FPO). Complete plans list 35¢.

CALIFORNIA RESIDENTS ADD 6% TAX.

MODEL BUILDER PLANS SERVICE

Box 335, 621 West 19th St.

COSTA MESA, CALIFORNIA 92627

FLYING
SCALE MODELS
OF WWII



FREE

THIS \$6.95 BOOK

PROTECT YOUR
SUBSCRIPTION IN
AN ENVELOPE . .
SEE BELOW

IMPORTANT!! Is this a NEW() or RENEWED() sub?

SEND ME:

Expiration date: _____

☐ 12 ISSUES FOR \$25.00
(17% OFF Newsstand Cost)

☐ 24 ISSUES FOR \$47.00
(22% OFF Newsstand Cost)

Rates apply to the U.S., its possessions. Elsewhere add \$3.50 per year. () Credit Card () Check Enclosed

To have your subscription mailed in a protective envelope, add \$3.00 per year to the above rates, and check here ().

SPECIAL

MODEL BUILDER SUBSCRIPTION OFFER

WITH YOUR MONEY-SAVING SUBSCRIPTION OR RENEWAL TO MODEL BUILDER MAGAZINE. THE BOOK CONTAINS ARTICLES ABOUT BUILDING, COVERING, FINISHING, AND FLIGHT ADJUSTMENT . . . PLUS FULL-SIZE PLANS FOR 12 1/2-INCH SCALE, FREE FLIGHT, WW-II FIGHTER PLANES.

Name _____
(please print clearly)

Address _____

City _____ State _____ Zip _____

VISA () Master Charge () No. _____



Expiration Date _____

Signature _____

MODEL BUILDER, Box 335, 621 West 19th St. Costa Mesa, California 92627

NO NEED TO CUT YOUR MAGAZINE. DUPLICATE THE FORM, OR JUST SEND US THE INFORMATION REQUESTED ON A SEPARATE PIECE OF PAPER.

MODEL BUILDER

MODEL BUILDER's 40 BEST SELLERS!

SEE PAGE 100 FOR ORDERING INSTRUCTIONS. COMPLETE PLANS LIST SENT WITH EACH ORDER.



No. 6781 LOCKHEED P 38L \$12.00
R/C Sport Scale, balsa and ply const., a trophy winner, big, 8' span. Art Johnson.
No. 3771 WACO UPF 7 \$5.00
Stand-off R/C scale (1 8"-1') of one of the prettiest Waco biplanes. Span 54" R. Stealy.
No. 12711 CURTISS WRIGHT JR. \$4.50
Two inch scale model of famous pusher light plane R/C By Ralph Fidence



No. 6771 GIPSY MOTH \$12.00
Exact quarter-scale (7-1/2 ft. span) R/C of famous D.H. biplane. By Bill Northrop.
No. 1722 PUSS MOTH \$4.00
Chet Lanzo's famous rubber F/F scale Puss Moth returns! By Hal Cover.
No. 680-C.P. GRUMMAN F3F-1 \$4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.
No. 4742 CESSNA AW \$3.50
Jumbo scale rubber powered model of a 1928 classic. Span 48". By Jim Adams.



No. 1731 SPROUSE GOOSE \$5.00
EAA type R/C sport biplane, mostly spruce, for 60 engines. By Bill Northrop.
No. 11781 TRAVEL AIR D4D \$1.00
Accurate 2-inch R/C scale model of famous Golden Era biplane. By Bill Seidler.
No. 11731 BIG JOHN the FIRST \$7.50
Modified prototype of editor's notorious monster R/C biplane. By Bill Northrop.
No. 1080-C.P. STINSON RELIANT \$4.00
A 3/4" scale model from 1934 Ideal kit. Excellent plans for F/F rubber, R/C, etc.
No. 1723 WHITE TRASH \$4.00
A proven, trophy winning R/C sailplane with 7 and 10 ft. span. By Rick Walters.
No. 7801 APPRENTICE \$5.00
Continually popular genuine R/C trainer for .19-.35 eng., 72" span. Bill Northrop.



No. 175-O.T. FLYING QUAKER \$5.00
First gas model kit by Megow, 1937. Span 7 ft. Redrawn by Phil Bernhardt.
No. 8783 R/C STEAM LAUNCH \$6.00
Natural finish mahogany planked 40" OA "African Queen" type Kilburn Adams.



No. 2761 DRAGONFLY \$4.50
R/C lunship, looks like giant rubber stick model. Superb trainer. By Tex Newman.
No. 8741 WOODY PUSHER \$4.00
Easy to build & fly semi-scale R/C home-built, like C.W. Jr., .09-.15. Chris Moes.
No. 9781 GREAT LAKES TRAINER \$4.00
Sport scale biplane for 3-4 channels and .19 engines, 40" span. By Bill Northrop.
No. 4801 BRUSHFIRE \$6.00
Contemporary design being used by several top pattern fliers. By Ken Bonnama.
No. 2801 TIPORE \$6.50
Top pattern ship in 1979. Flown by Dave Brown at World Champs. Dick Hanson.



No. 4751 R/C AUTOGYRO \$4.00
Semi-scale twin rotor R/C autogyro for .35 engines. Very stable. By Skip Ruff.
No. 9792 CRICKET \$3.00
Balsa profile fuse, Ace foam wing 1/2A quickie for 1 or 2-ch. radio. J. Headley.
No. 1174-O.T. LANZO STICK \$3.50
Rubber stick winner, '40 Nats. Span 4 1/2". Still good in Unlim. By Phil Bernhardt.
No. 574-O.T. The T O COUPE \$5.00
Classic high wing 1936 'C' cabin gas job. Span 64". Redrawn by Phil Bernhardt.
No. 773-OT LANZO 8' GAS MODEL \$6.00
Chet Lanzo's famous "Record Breaker" Two large plan sheets. 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.



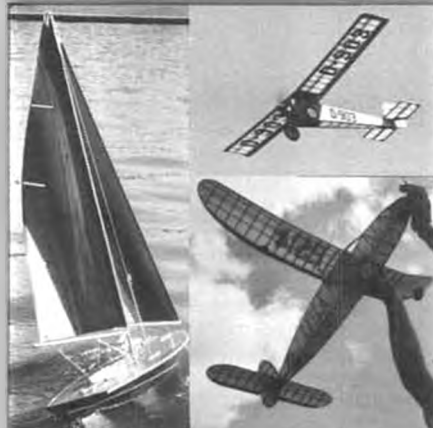
No. 174-OT EHLING '37 GAS JOB \$5.00
Frank Ehling's 8 ft. span 1937 gas model. Still winning! Drawn by Phil Bernhardt.
No. 477 O.T. CLOUD CHASER \$1.50
This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.
No. 12792 EXCALIBUR II \$5.00
R/C tunnel-hull outboard constructed of plywood, for K&B .21. By Jerry Dunlap.
No. 12741 85' HARBOR TUG \$8.00
Complete plans (3 sheets) for R/C tug. All wood, 37" LOA. By Francis Smith.



No. 7724 TRAVELAIR '2000' \$5.00
Two inch full scale Classic R/C biplane. Proven flier, 60 power. By Bill Northrop.
No. 7721 FAIRCHILD 51 \$3.50
One inch scale Classic for R/C also F/F gas or rubber. By Hurst Bowers.
No. 879-C.P. CURTISS F-11C-4 \$4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.



No. 8723 TAYLORCRAFT, F/F \$1.50
Rubber powered, 24-inch scale seaplane. An excellent flier. By Walt Mooney.
No. 579-O.T. TAYLORCRAFT \$12.00
Quarter-scale in 1941! Famous 9-foot design kitted by Miniature Aircraft Corp.
No. 10753 SUPER PUP \$3.00
Profile C/L stunt ship for .29 to .36 power, 42" span. Easy-built. Mike Parenteau.
No. 8781 R/C VELIE MONOCOUE \$9.50
Light-weight 1/4-scale for belt reduction electric power, 90" span. Bob Boucher.



No. 4733 PEA POD \$4.50
A 36" long R/C sailboat easily made of 1/8" Luan mahogany. Clever sail control. Full size patterns. By Tom Protheroe.
No. 5761 ALBATROS \$5.50
R/C sport scale post-war German light plane. Span 74". 36 eng. By Jeff Breece.
No. 176 O.T. KORDA WAKEFIELD \$2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt.



FLY ELECTRIC

- VL-101 Electric propulsion system shown—using Hytork 48 motor and planetary gear box, SJ-3 switch & charging jack, and B-33L fast charge ni-cad flight battery—total weight 2½ oz.—will power models 25 to 50" wingspan weighing up to 10 oz.
- Send 50c for latest catalog showing full line equipment & accessories.
- Hobby dealers send for information.



V L PRODUCTS
Division of Vista Labs

7871 Alabama Ave., No. 16
Canoga Park, California 91304

NO NONSENSE BALSA STRIPPERS



Strips Balsa Fuzz-Free, w/out Adjustments
Small - \$11.00, Large (shown) - \$22.00
Please add \$1.50 for postage

Peanut Kits — Miniature Replicas



GEE BEE (shown)
\$6.00 (please add
\$1.00 for postage)

Catalog \$1.00



See Your Dealer, or Order Direct
GENE DUBOIS
PO Box c, Acushnet, MA 02743
DEALER INQUIRIES INVITED

RUBBER STRIP

FAI RUBBER: 4 out of 5 in the
Flyoff at the 1979 World Champs
used **FAI RUBBER**. Made in U.S.A.

SIZES: 1/4", 3/16", 1/8", 3/32", 1/16"
1mm (.042") THICK. SPOOLED.
GROSS WT.: 1-1/4 to 1-1/2 LBS.

PRICE: \$12.50 first spool PPD in
U.S. Additional spools \$12.00 each.

NEW PIRELLI

SIZES: 6mm, 5mm, 4mm by 1mm.

PRICE: \$15.00 first hank PPD in
U.S. Additional spools \$14.50 each.

Sole U.S. Distributor and World Wide
sales. Send 25¢ for 1980 CATALOG.

F.A.I. Model Supply



P.O. BOX 3957 TORRANCE CA 90510

Sierra Vista Elementary, it all started when each student in Ed's class built a model rocket and thus began to find out something about thrust, stability, lift, and drag. In no time at all, the questions got quite involved, and Ed decided to demonstrate for the whole school.

On Wednesday, March 25, 1981, the entire student body of over 600, plus teachers, were treated to a display of rocket firing. Earlier, the fourth, fifth, and sixth graders were given the full aeronautics treatment.

Jack Britton, owner of the Hang Glider Shop in La Habra, demonstrated his powered hang glider, landing easily in the space provided by the school yard. In another area, Paul Deutsch, Commander of Squadron 25, Civil Air Patrol in Upland, and Cliff Rose, former Navy officer, displayed a German made "Phoebus C" sailplane. Members of the B.I.R.D.S. Club of Long Beach flew R/C aircraft demonstrations, and Jed Kusik and Dale Kirn showed the art of control line flying. Dale is with Cox Hobbies, and Jed has several times been to Europe representing the U.S. in World Championship C/L Team Racing. Ed Marestaing's wife, Marilyn, demonstrated their brightly colored hang glider, allowing students to "try it on," parachute harness and all.

Meanwhile, inside shows included R/C helicopter movies by Kim Tucker of

Kavan Model Aircraft Inc.; a slide presentation of the 1980 Gordon Bennett Balloon race by Vicki Bublitz, fifth grade teacher and freelance photographer; talks and slides by Jim Walker of Douglas Aircraft and Pete Goldade, of Collins Avionics Company; and Steve Parker's "Sky Diving" film. Steve jumps with the National Championship Team, and has completed over 3,100 jumps.

One student's comment summed it up. "I learned more in one day than I can in two months of reading about aviation."

MB PEANUT PLANS

On page 104 of the March '81 issue, we listed all of the Peanut plans published in **Model Builder** from the beginning up to and through January '81. We also stated that any of these plans could be obtained by purchasing the appropriate back issue, and that if the issue was sold out, a copy of the plan from that issue could be obtained for \$1. Unfortunately, some readers have misinterpreted our statements, and have sent for a number of Peanut plans and included \$1 each in payment. In some cases this would amount to too much, as some back issues are on sale for less than \$1, but in most cases, the payment is not enough to equal the cover price charged for certain issues. The key to the whole matter is this . . . we only make and sell (for \$1) copies of the plans from issues

that are no longer available. All other Peanut plans will cost you the advertised price of the magazine as listed in "Oldies But Goodies," our back-issue list. Also, we remind you again that the Avro G, listed in the July '72 issue is NOT a Peanut. The all sheet balsa model spans 15 inches.

WANTED

Can anyone give us the whereabouts of Rod Doyle? According to the July 1940 issue of M.A.N., "Gas Lines" column, he was the 1936 California State Champion. A photo in that issue, supplied by Pete Bowers, shows a very neat design by Rod with which he placed second in the 1937 State Fair, senior event. We assume he was a California resident at the time, but we have no other leads.

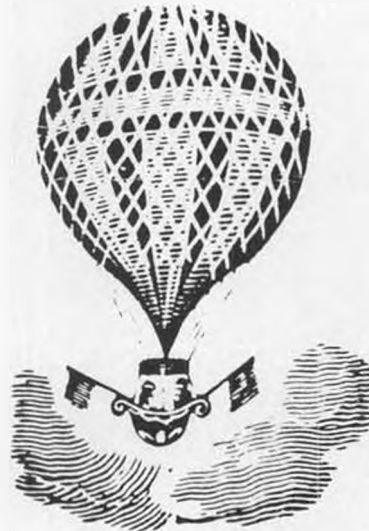
"CAVU" NO,

"WILLIAM PARASOL" YES!

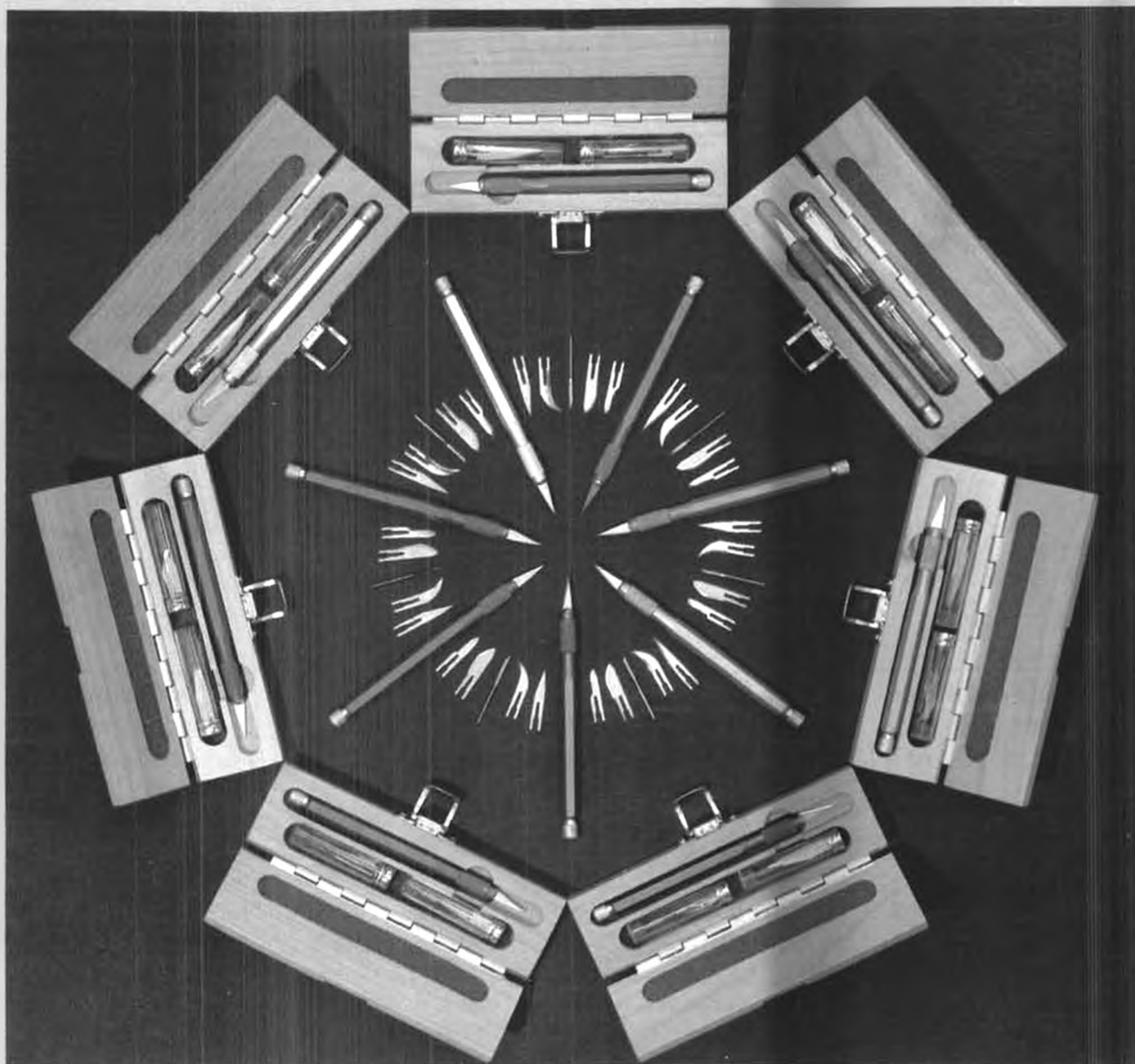
Knew we shoulda checked it, 'cause even "Daddy Warbucks," SAM President John Pond, was taken in. The old timer parasol model shown on page 33 (lower right corner) of our June '81 issue, was NOT Ken Willard's "CAVU" (Ceiling And Visibility Unlimited) design, as captioned.

We asked in that caption if anyone knew the builder, and received our answer a few days after publication, plus some added information. Granger Williams, one of the salt flats drag racing Williams brothers of yesteryear, and now of the Williams Bros. Inc., manufacturer of model accessories and plastic display aircraft models, located in San Marcos, California, designed and built it. And for your and our information, it wasn't a CAVU. It was an original design, circa 1938, by Granger, and as was most typical in those days, had no name. For none other than identification purposes, such as the Eastern States Champion, and the Lanzo Record Breaker, it was simply called the "Williams Parasol."

As Granger said in his letter, "Any resemblance to any Ken Willard design is purely coincidental." Good enough for us, but where's the Williams Bros. pilot, machine guns, and streamlined wheels!?



IN THE BEST CIRCLES, IT'S **über skiver**



A PRECISION INSTRUMENT FOR THE DISCRIMINATING MODELER

- *Safe, Rear Draw-Bar Clutch*
- *Precision, Instrument-Quality Materials*
- *Strong-Holding Advanced Collet Design*
- *Non-Rolling Hex Cross-Section*
- *Deeply Knurled, Non-Slip Grip*
- *Long-Life, Stainless, Surgical Steel Blades*



Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, violet. Complete set in fitted hardwood case; includes über Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 \$14.95
Individual handles (specify color) \$5.95
Vial of 6 blades (No. 10, 11, or 15) \$2.10
(No. 12 or 20) \$3.30

See your dealer, or order direct.
Dealer inquiries are invited.
All direct orders sent postpaid in U.S.
California residents add 6% sales tax.

MODEL BUILDER  **PRODUCTS**
621 West Nineteenth St., Costa Mesa, California 92627

Greatest Book of
FULL-SIZE RUBBER
SCALE PLANS, plus
building, trimming, and
flying instructions ever
published!

Twelve half-inch scale
rubber powered flying
models by some of the
world's best modelers,
including Doug Mc-
Hard, Clarence Mather,
Bill Hannan, Bill War-
ner, Bob Peck and
others.

Compiled and pro-
duced by I.E. Coleman,
edited and published
by Model Builder Ma-
gazine.

FLYING SCALE MODELS

FLYING SCALE MODELS OF WWII



12 FULL SIZE PLANS

• GRUMMAN F4F WILDCAT
• GRUMMAN F6F HELLCAT
• Vought P-40 Corsair
• Mitsubishi Zero
• Hawker Hurricane I
• Supermarine Spitfire
• Messerschmitt Bf-109
• Focke-Wulf Ta-152
• Bell P-39 Airacobra
• Curtiss P-40C
• P-47D Thunderbolt
• P-51 Mustang
• Covering and Trimming
• Making It Fly
• Building and Finishing



ALL 1/24 SCALE
1 1/2" x 1"

FEATURE ARTICLES ON
BUILDING, FINISHING, AND
FLIGHT ADJUSTMENTS.

AVAILABLE NOW - \$6⁹⁵

SEE YOUR HOBBY DEALER, OR ORDER
DIRECT. ADD \$1.50 FOR FIRST CLASS.
CALIFORNIA RESIDENTS ADD 6% SALES TAX.

621 West 19th Street
Costa Mesa, Ca. 92627

Flying Near Airports? Be Careful!

Free Flight or Radio Control flying
near airports, or in any situation
which might involve the possibility of
models being in the vicinity of full-
scale aircraft operations, must be
avoided—or conducted so as to
eliminate any dangerous situations.
Models should not be flown in the
proximity of full-scale aircraft
operations unless the flyer has
someone else with him for the sole
purpose of watching for full-scale
aircraft and supervising the flying so
as to prevent accident possibilities.

PROTECT YOUR RIGHT TO FLY!

**Safe Flying Is
No Accident!**



MODEL BUILDER
MODEL BUILDER
MODEL BUILDER



OLDIES



MODEL BUILDER
MODEL BUILDER
MODEL BUILDER



(BUT STILL GOODIES!)



MOST BACK ISSUES OF "MODEL BUILDER" ARE STILL AVAILABLE, THOUGH SOME ARE IN
SHORT SUPPLY. ORDER NOW, WHILE THEY LAST! PRICES VARY ACCORDING TO QUANTITY
REMAINING IN STOCK. NOTE SPECIAL ANNIVERSARY PRICES LISTED BELOW!

SPECIAL !!!

MODEL BUILDER MAGAZINE'S BACK-ISSUE SALE !!

ANY ISSUE MARKED WITH "o" 75 Cents!

ANY ISSUE MARKED WITH "•" 50 Cents!

Nov. 71 \$3.00()	May 73 o 1.00()	Apr. 74 o 1.00()
Dec. 71 2.00()	Jul. 73 • 1.00()	May 74 1.00()
Jan. 72 o 1.00()	Aug. 73 • 1.00()	Jun. 74 o 1.00()
Feb. 72 2.00()	Sep. 73 • 1.00()	Jul. 74 o 1.00()
M/A 72 o 1.00()	Oct. 73 • 1.00()	Aug. 74 • 1.00()
May 72 2.00()	Nov. 73 o 1.00()	S/O 74 • 1.00()
Jan. 72 3.00()	Dec. 73 • 1.00()	Nov. 74 o 1.00()
Jul. 72 4.00()	Jan. 74 o 1.00()	Dec. 74 o 1.00()
F/M 72 2.00()	Feb. 74 • 1.00()	Jan. 75 o 2.00()
Apr. 72 2.00()	Mar. 74 o 1.00()	Feb. 75 2.00()
		Mar. 75 2.00()

Apr. 75 2.00()
May 75 3.00()
Jun. 75 1.25()
Jul. 75 • 1.25()
Aug. 75 o 2.00()
Sep. 75 o 1.25()
Oct. 75 o 1.25()
Nov. 75 o 1.25()
Dec. 75 o 1.25()
Jan. 76 o 1.50()
Feb. 76 o 1.50()
Mar. 76 o 1.50()
Apr. 76 o 1.50()
Jun. 76 o 1.50()
Jul. 76 o 1.50()
Aug. 76 through
June 78, 1.50()
Dec. 77 and
July 78 sold out
Aug 78 - Dec. 80
less Oct. 78
each 2.00()
Jan 81 to date
each 2.50()

Put a check mark () by the back issues you
wish to order. Magazines will be mailed by Sec-
ond Class, postpaid. Foreign orders (except
Canada, Mexico, FPO, APO) add 30¢ per copy.
Allow about four weeks for delivery. If United
Parcel Service (UPS) is desired, add \$1.25 mini-
mum for up to two magazines, or add \$1.25 plus
35¢ for each additional magazine on orders for
three or more. Send check or Money Order (no
cash, please, and no COD's). A facsimile of this
order form may be used.

Name: _____

Address: _____

City: _____ State: _____

PLEASE PRINT ZIP: _____

MODEL BUILDER, Box 335, 621 West 19th St., Costa Mesa, CA 92627



A product of Midwest Industries, Inc. Ida Grove, Iowa, 51445 Ph. 712-364-3165



Prices Effective June 1, 1981

Authentic 1/6 Scale Beechcraft Series

Like all Byron Originals products, our new .60 size Beechcraft line promises you a truly unique R/C experience. From the standpoint of building time and accuracy, it's an industry first. Our "complete kit concept," with its many time and labor saving innovations, is our way of making sure your building experience is as fascinating as it is accurate.

By providing every last construction component (except radio & engine), we save you both the guesswork and unnecessary expense of additional purchases. And when it comes to performance, your choice of any standard .60 engine is all it takes to put these scale beauties through the full range of aerobatic maneuvers. Quality. Performance. Top value. Pride of ownership . . . You'll find them all. So visit your dealer today and ask for your money's worth for once. Ask for Byron Originals.

F-33A
Retail value - \$174.95
Factory direct - \$148.71
(plus \$8 shipping)



A-36
Retail value - \$181.20
Factory direct - \$154.02
(plus \$8 shipping)



T-34B
Retail value - \$186.20
Factory direct - \$158.27
(plus \$8 shipping)



T-34C
Retail value - \$198.00
Factory direct - \$168.30
(plus \$8 shipping)



Prices subject to change without notice.

Byron Originals - P.O. Box 279 - Ida Grove, Iowa
51445 - Ph: 712-364-3165 - Telex: 439012 IDAG

Complete Kit Concepts . . .

"We build up to a standard,
not down to a price."

V-35B Bonanza
Retail value - \$162.44
Factory direct - \$138.08
(plus \$8 shipping)



Kit includes scale wingtip nav/strobe detailing.



Scale effects include molded louvered inspection panel, landing light and grill plus scale nose gear strut, wheel doors, cowel flaps, engine exhaust & removable cowel.



Other super scale features include vacuumed-formed skin detailing for stabs and control surfaces.



An optional instrument panel and cabin interior are also available for the V-35B, F-33A and A-36.

Optional Interior
Retail value - \$29.50
Factory direct - \$25.08
(plus \$2.50 shipping)

1/2 Scale Pitts Special
Suggested Retail Value \$292.80
Factory Direct Price \$248.88
(Plus \$12.50 shipping)



Pitts
Wing Span 68"
Wing Area 1400 sq in
Length 62"
Power Quadra engine or 60 Byro Drive Proto Reducer

Kit highlights of our new Beechcraft Series

- Scale detailed fiberglass fuselage
- Injection molded foam wings, stabs and control surfaces
- Wheels • landing gear
- Robart scale nose strut
- Spinner • scale, vacuum formed detail for all control surfaces
- Decals
- Antenna & beacon
- One piece, vacuum formed window insert
- Hinges
- Pushrods
- Cowel flaps
- Wingtip nav strobe detail
- Plus all necessary hardware and die-cut materials to complete model

Model	Wing Span	Wing Area (sq in)	SPECIFICATIONS Ready to fly wt	Channels No. req.	Power (No Prop) Reducer required	Length
V-35B	66"	700	8.9	4.6	stand. 60s	53"
F-33A	66"	700	8.9	4.6	stand. 60s	53"
A-36	66"	700	8.9	4.6	stand. 60s	54"
T-34B	66"	700	8.9	4.6	stand. 60s	53"
T-34C	66"	700	8.9	4.6	stand. 60s	57"



MiG-15
Suggested Retail Value \$170.68

MiG 15
Wing Span 57"
Length 55
Wing Area 600 sq in.
Flying Wt 8.9 lbs
Power Byro Jet Ducted Fan & 60 Engine

Factory Direct Price \$145.08
(Plus \$8.00 shipping)

**This may be
the fastest
electric R/C car kit
ever made.**



MRC-TAMIYA'S CAN AM LOLA...THE RACING MASTER

ONLY EXPERIENCED RACE DRIVERS NEED APPLY

Conceived solely for competition, this ground hugging, aerodynamically advanced racer has revolutionary engineering and electro-mechanical features designed to give skilled drivers an unbeatable racing machine.

THE FIRST R/C CAR YOU "TUNE UP" INSTANTLY

Professional drivers who have been looking for the ability to completely adjust wheel and steering settings need look no further. Positive and negative castor, camber, kingpin and Ackerman are adjustable. Track surface, weather and the direction of the course no longer present steering problems. They can all be adjusted for at trackside in only seconds. This versatility gives you a driving edge that can't be matched.

EFFICIENT POWER TRANSFER

A four ball bearing, limited slip differential provides smooth quick top end power transfer on high speed straightaways. Sealed in an aluminum housing, the differential is free from dirt, dust and the burnt rubber from blistering turns.

SPEED CONTROL THAT WINS RACES

A micro switch and non-step slide resistor provide winning speed control. At full power it allows for maximum current to the motor with minimum heat loss. There's also infinitely variable, throttle

stick controlled braking for the precise responsiveness that gets you from hairpin turns to the winner's circle.

BLACK BEAUTY

The seat of power is the renowned, high torque, high RPM Tamiya racing motor. Precision balanced, its output shaft ball bearings provide longevity for continuous high speed running.

DESIGNED TO WIN . . . Ten ball bearings are included in the kit, with more available for those who demand the optimum in performance. The chassis/frame is 2mm thick fiberglass reinforced plastic with unique cut-away contours which were engineered to offer flexibility with strength . . . giving you extreme stability in all running positions. In addition, the polycarbonate body is exceptionally light in weight, with a capability for absorbing maximum punishment. MRC-Tamiya's Can Am Lola . . . it may well be the fastest and "winningest" R/C car kit ever made. See it at your hobby shop, it was designed to be unbeatable.

MRC

