MODEL BUILDER

APRIL 1982

$2.50

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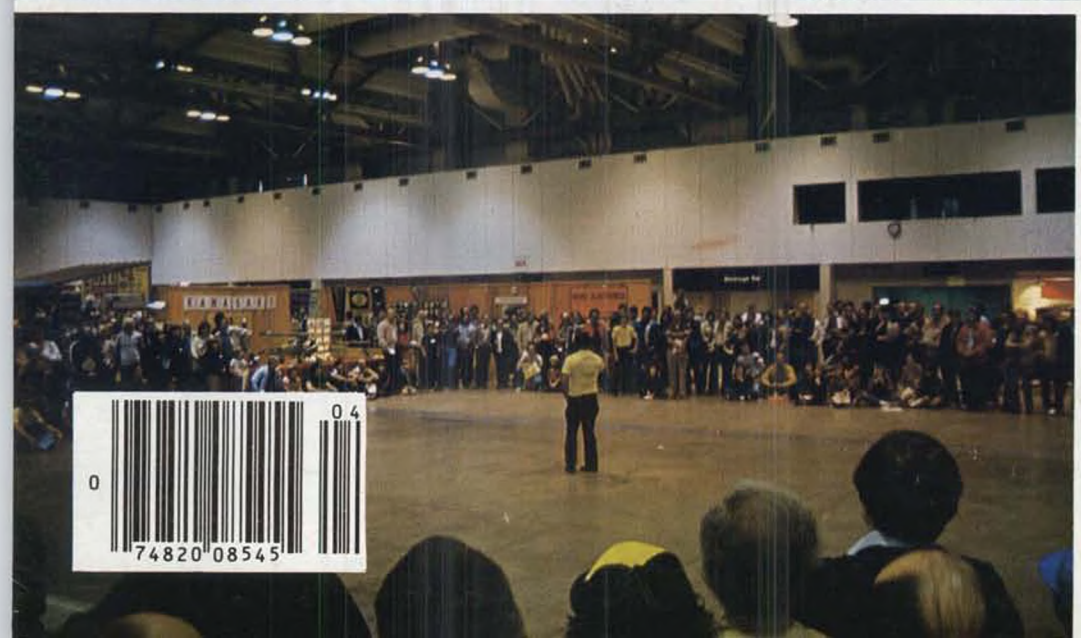

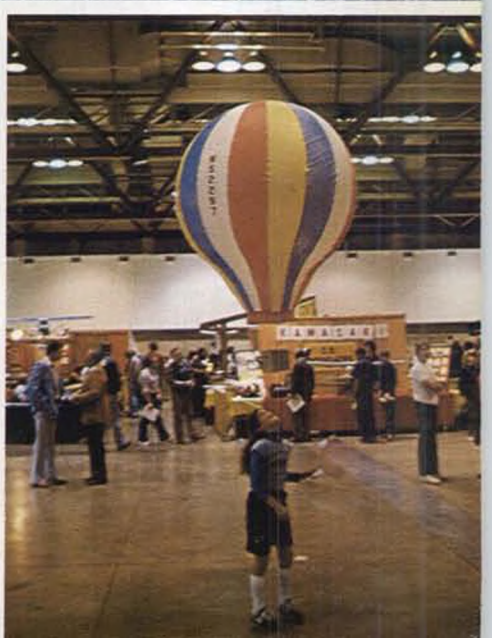

Complete Kit Concepts . . .

"We build up to a standard, not down to a price."

BYRON ORIGINALS

A product of Midwest Industries, Inc. Ida Grove, Iowa, 51445 Ph. 712-364-3165

NEW

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 truely 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.

V-35B Bonanza
Retail value - $162.44
Factory direct - $138.08
(plus $8 shipping)

F-33A
Retail value - $174.95
Factory direct - $148.71
(plus $8 shipping)

Kit includes scale wingtip nav/strobe detailing.

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)

Scale effects include molded louvered inspection panel, landing light and grill plus scale nose gear strut, wheel doors, cowel flaps, engine exhaust & removable cowel.

T-34C
Retail value - $198.00
Factory direct - $168.30
(plus $8 shipping)

Other super scale features include vacuumed-formed skin detailing for stabs and control surfaces.

Optional Interior
Retail value-$29.50
Factory direct-$25.08
(plus $2.50 shipping)

An optional instrument panel and cabin interior are also available for the V-35B, F-33A and A-36.

Prices subject to change without notice.

Byron Originals - P.O. Box 279 - Ida Grove, Iowa 51445 - Ph: 712-364-3165 - Telex: 439012 IDAG

⅓ 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 Prop 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	54¾"
T-34B	66"	700	8-9	4-6	stand. .60s	53"
T-34C	66"	700	8-9	4-6	stand. .60s	57"

MiG-15
Wing Span - 57"
Length - 55"
Wing Area - 600 sq. in.
Flying Wt. - 8-9 lbs.
Power - Byro-Jet Ducted Fan & .60 Engine.

MiG-15
Suggested Retail Value
$170.68

Factory Direct Price
$145.08
(Plus $8.00 shipping)

18,000 R.P.M.'s on an 8-4 Maple Prop!

Presenting the New

Schnuerle Ported

FOX .19 BB-RC

★ The Exhaust Port can be Rotated into any of four positions!

★ Swings an 8-4, 8-5 or a 9-4 size prop.

$89.95

#22000

(8-4 Maple Prop not included.)

#50203 Engine Mount 8.00

★ It will deliver several thousand more R.P.M.'s than a baffle .19.

Full Size Fox 19 BB RC Engine Drawing available on request

It runs great on economical Fox "Gold Star" Fuel!

It starts easily by hand. That's a nice feature. Large 11 mm. front main and rear main Ball-Bearings to withstand the radial loads of electric starters and belt-drive or spur gear systems for large props (or race car type use). You may even choose your exhaust position. Loosen four machine screws and rotate the cylinder left, right, or rearward for your cowling convenience. A really smooth idle and screaming performance when you want it. You can expect more from this .19, it tears holes in the sky. Economical on fuel too! We think you'll like it!

These American-Made Fox Engines Run on "No-Nitro" Fuel:

FOX .78 BB-RC

This big willing brute has the torque to handle a 12-6, 12-7, 13-5 or 14-4 prop. Improvements for 1982 include a sturdier piston, new head with offset plug, new Mark X carburetor, improved taperlock and thrust washer. It runs great on FOX "Gold Star" No-Nitro Fuel. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation. Fuel cost for 10 minutes flying approximately 25¢ based on drum prices.

Bore: 1.00 Stroke: 1.00 Displ: .785
R.P.M.: 12,500 on 12-6 Prop
Fuel Consumption: 1¼ oz. minute

#27800 FOX .78 RC	$125.00
#90264 Tilt-Down Muffler	19.95
#90265 Tilt-Up Muffler	19.95
#50603 Engine Mount	10.00

FOX "EAGLE III" .60 BB-RC

The FOX EAGLE III has many improvements over the EAGLE II resulting in considerably more power, longer life, and a less cranky nature. Also, the EAGLE III runs best on our lowest cost fuel. Physical improvements are a re-designed piston, shorter conn rod, improved cylinder porting, new head contour, heavier duty rear main ball bearing, improved taper lock and thrust washer. Muffler is available with Tilt-Up or Tilt-Down flange. Select the one best suited to your installation. Fuel cost for 10 minutes flying approximately 25¢ based on drum prices.

Bore: .907 Stroke: .937 Displ .61
R.P.M.: 13,000 plus with 11-7 Prop
Weight: 17 oz.
Fuel Consumption: 1¼ oz. minute

#26500 FOX .60 EAGLE III Side Exh	$125.00
#90262 Tilt-Down Muffler	19.95
#90263 Tilt-Up Muffler	19.95
#50604 Engine Mount	10.00

You'll Like Our Service:

We really try to take care of our customers. If you crash and need parts that are not in stock at your Dealer, call us at (501) 646-1656 and we will try to get parts on the way, usually within 24 hours. We offer a complete re-build with the assurance your repair costs will never exceed 60% of new motor price.

Our Hot Line: (501) 646-1656

FOX MFG. CO.

5305 Towson Ave., Fort Smith, Arkansas 72901

Attention of CANADIAN HOBBY DEALERS:

You can now order Fox Model Products direct from the factory. Standard discounts apply. Freight Prepaid on all except fuel. Most Fox Products should be Tariff Free under provisions of Tariff Item 62435-1. Call us or write for further details.

MODEL BUILDER

APRIL

1982

volume 12 , number 123

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

CONTENTS

FEATURES

CONSTRUCTION

Cover: Walt Musciano's Lockheed Vega, in the colors of Jimmie Mattern's 1933 solo 'round-the-world flyer, is the subject of our feature R/C construction article this month. Below the Lockheed are pictures taken during the 1982 I.M.S. show in Pasadena. Tony Naccarato flies an electric powered control line model in photo at left, while Belinda Northrop admires the relaxing maneuverability of George Steiner's "hot air" (really helium) balloon. Top photo by Jerry Marks. Bottom photos by Bill Northrop.

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

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

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

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

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

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

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

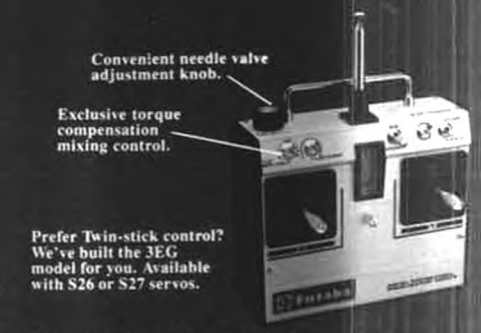
An oversteering, sliding car instantly responds to the pre-set steering ratio and is dialed-in again.

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

Gentlemen, choose your servos.

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

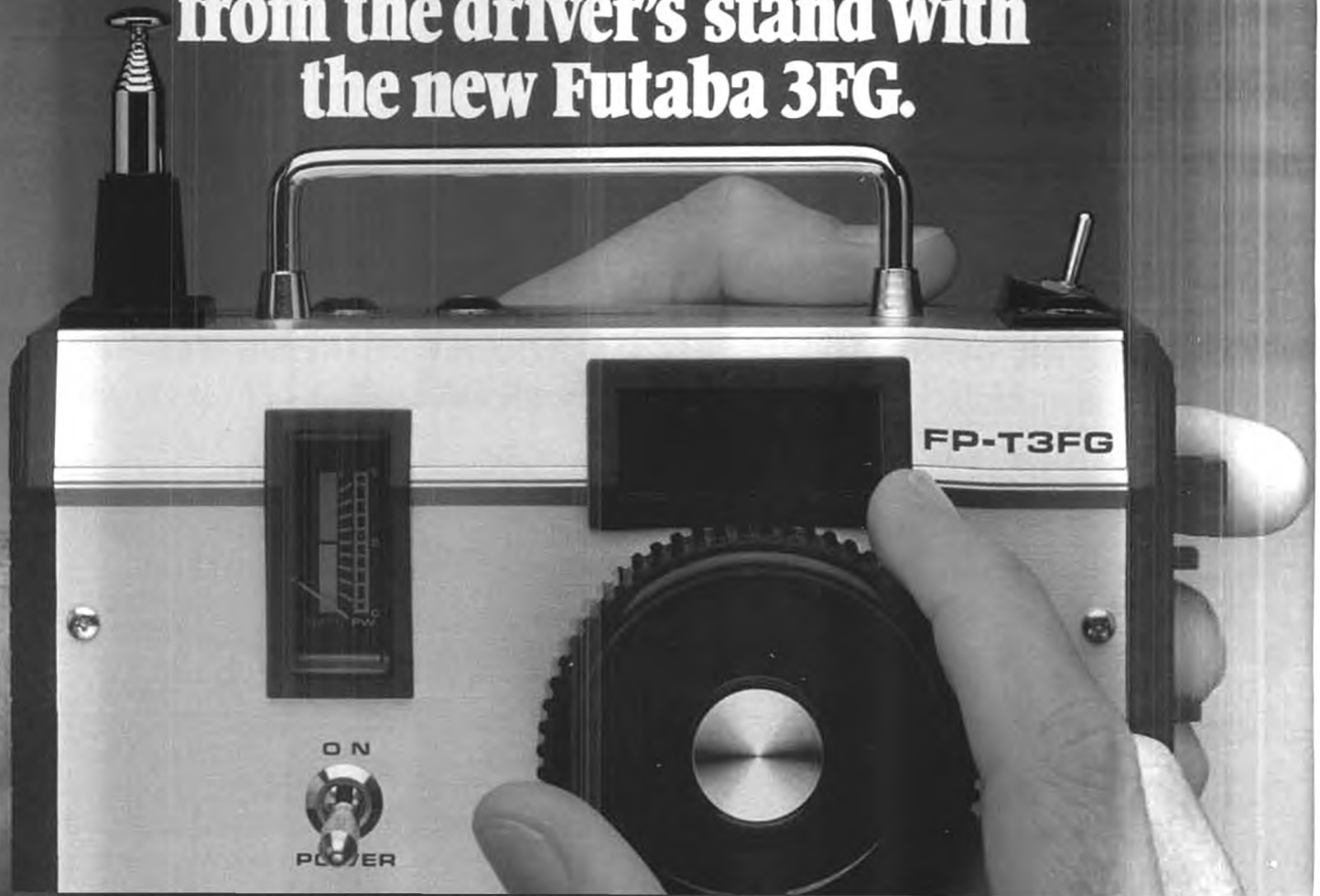
The deluxe 3FG/3-channel system includes R3F triple-tuned receiver, 2-S24 servos, NiCads and charger. 27 and 72MHz.



Prefer Twin-stick control? We've built the 3EG model for you. Available with S26 or S27 servos.

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

Futaba



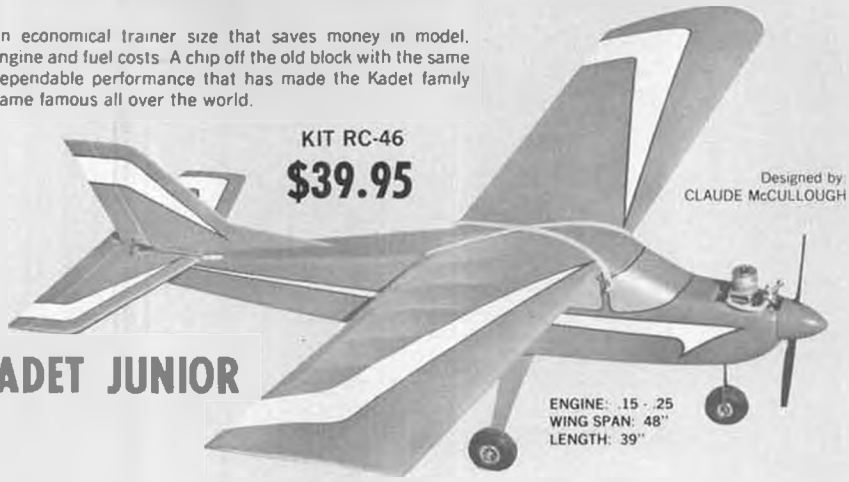
GET STARTED RIGHT--- FLY KADET

An economical trainer size that saves money in model, engine and fuel costs. A chip off the old block with the same dependable performance that has made the Kadet family name famous all over the world.

KIT RC-46

$39.95

Designed by: CLAUDE McCULLOUGH



KADET JUNIOR

ENGINE: .15 - .25
WING SPAN: 48"
LENGTH: 39"

KADET MARK I

$49.95

KIT RC-51

ENGINE: .19 - .40
WING SPAN: 57"
LENGTH: 42"

Designed by CLAUDE McCULLOUGH

This is the original model that started it all, intended for use with 3 radio channels and rudder control. Many thousands of fliers have successfully soloed an "Old Faithful"

Club instructors and hobby dealers know from experience that a Kadet is the best radio control trainer. Student pilots need time to think and a chance to start developing some automatic reactions during those first few critical hours of practice. A too fast, jumpy, symmetrical winged trainer is not the answer. Ask the thousands who have successfully soloed on a sturdy, docile Kadet with a flat bottomed wing. They'll tell you that learning to fly "the Sig way" is the only way to go!

ALL KADET KITS HAVE THE FOLLOWING FEATURES: Full size plans, photo illustrated construction booklet, die cut balsa and plywood parts, speedy method of constructing the fuselage by gluing the parts directly to the printed wood sides, aluminum motor mounts to fit any engine installation, formed main landing gear, coil spring nose gear, nylon nose gear steering arm and bracket, nylon control horns, molded control surface hinges, Tuf-Steel RC links and rods, hardware package of bolts, blind nuts, screws, etc. (The Kadet Mark I and Mark II have in addition an injection molded plastic cowl.)

FIRST — AND STILL BEST

"Learn To Fly The Sig Way" was the first of the step-by-step training programs currently being advertised. We appreciate the compliment from those who have followed our lead — it proves we were on the right track.

The biggest advantage is that our trainers are the only ones designed from the start to fit together in a carefully graduated progression from one level of flying skill to the next.

The latest refinement of the ideal trainer design in an aileron control version with all-new construction. It's selling so fast, our production facilities are strained to the limit trying to keep up!

Designed by: CLAUDE McCULLOUGH

ENGINE: .25 - .40
WING SPAN: 57-1/4"
LENGTH: 44-1/4"

KIT RC-49

$54.95

KADET MARK II

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

STEP 2 - INTERMEDIATE - FASTER SHOULDER WING DESIGNS

KIT RC-39

$59.95

KAVALIER

$59.95

KOMANDER

KIT RC-32

STEP 3 - ADVANCED AEROBATICS

$59.95 KIT RC-35

KOUGAR

STEP 4- EXPERT

KOMET

KIT RC-29-1 **$69.95**

KIT RC-29-2 **$72.50**

After practice flying one or more of the three Kadet designs shown above as a Step 1 basic trainer, the RC student pilot will be ready to graduate to one of the Step 2 intermediate models shown here and then move on to Steps 3 and 4.

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

SIG MANUFACTURING CO., INC. . . . . MONTEZUMA, IOWA 50171

"HOT STUFF"™
ORIGINAL **PENETRATING** FORMULA
¼ Oz. ½ Oz.
2 Oz. ECONOMY SIZE
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NEW

ANY WAY **YOU** LIKE!

DISPENSE **THREE** WAYS!
DO NOT REMOVE SAFETY LOCK INSERT

SUPER 'T'™
GAP-FILLING POSITIONABLE FORMULA
¼ Oz. ½ Oz.
2 Oz. ECONOMY SIZE
AVAILABLE IN CANADA

LOOK FOR THE "HOT STUFF"™ DISPLAY AND PICK UP YOUR FREE TIP BOOKLET AT YOUR FAVORITE DEALER

Satellite City P.O. BOX 836, SIMI, CA 93062 • (805) 522-0062

"YOU CAN DO ANYTHING IF YOU HAVE **THE RIGHT STUFF**"
Wash Martin

TOTAL BUILDING TIME
22 DAYS!
THANKS TO
"HOT STUFF"™
AND
SUPER 'T'
ALL-PURPOSE INSTANT GLUES

Dear Bill:

Enclosed is a picture of my *second* AT-6 which was built under unusual circumstances.

The first and only AT-6, at that time, was to be flown at a Somers, New York fly-in in August.

In July, I flew the plane for the second time at my club field in Tuscarora. With shock, I watched it crash. It was totally wiped out, the problem being a battery pack. (Well, I thought that's it for Somers, New York.)

Upon arriving at home, I called Nick Ziroli in New York and told him the bad news. Then, I asked him to ship out a cowl and a new set of plans as soon as possible. He thought I was crazy, for he knew what I had in mind.

Well, **22 days later** in Somers, New York, **I flew a test flight** of my ***second* AT-6.**

I can only say that without **Hot Stuff, Super T** and my wife I could not have done it.

I've always used Hot Stuff & Super T, but never realized how invaluable they are. You can bet I'll never be without them. They really saved the day for me. I can honestly recommend the use of Hot Stuff and Super T for their speed and strength.

Sincerely,
Wash Martin

Wash Martin Tamaqua, PA

from Bill Northrop's workbench

• It's quite an experience to put on a hobby trade show. The myriad of details that need attention are mind-boggling, and at times it seems as though there is no way they will all get attended to and completed at the proper time.

This year's Fifth Annual IMS show in Pasadena was eminently more successful than the previous four as far as we, the organizers, were concerned, and we hope the large number of exhibitors and spectators felt the same way. In terms of actual numbers, both the exhibitor and spectator attendance was up by more than 15 percent over the previous year. Over 70 exhibitors, occupying about 107 booths, were visited by better than 9,300 spectators during the two-day show on January 9 and 10, 1982.

Key to this year's success was the excellent and timely coverage by several of the Los Angeles TV stations, especially network channels 2 (CBS) and 4 (NBC). With several minutes about the show being presented on evening news segments both Friday and Saturday, the stage was set for an avalanche of spectators on both Saturday and Sunday. In spite of the final playoffs in both football leagues being televised on Sunday, it was still the largest of the two days, with spectators still streaming in as late as 3:30 p.m., only an hour and a half from closing.

A complete, booth-by-booth rundown of the exhibitors present, and what they had to show, begins on page 10, in John Elliot's "R/C World" column.

Red Garlough came down from Sacramento to operate our first Swap Shop, and though it was not a large operation, Red says that a lot of money and interesting items changed hands. Red's own weekend was made when he picked up a brand new Contestor, still in the original box. No doubt next year's Shop will be considerably larger.

Adding to its previous first (the introduction of indoor radio controlled electric powered aircraft flying), the Pasadena show featured what we believe to be the first full-scale aircraft at a model show. Several manufacturers of ultralight aircraft (powered hang gliders) were invited to display, and it was Mark Smith, of Marks Models and International Ultralights, who set up his very aircraft-like "Wanderer" (yes, the same name as his popular R/C glider kit design) in one corner of the exhibition hall. Unfortunately Eipper Formance, manufacturers of the popular "Quicksilver" ultralight, cancelled at the last moment. They might have taken home some firm orders, as did Mark!

This year, the indoor R/C flying was limited to demonstrations. Introduced in 1979 at the IMS show in the form of during-the-show competition, it was decided that the quality of the models and the capability of the flyers has reached too high a level to share its time with a trade show. It would be unfair for the worthy competitors to handicap their efforts by making them fly at only specified times in cooperation with the show schedule. The spectators did not lose out, however, as two of last year's winners provided most of the demonstration action. Tony Avak came back from the East Coast . . . to warm up, and also to fly the latest of his blimp designs. The excellent maneuverability and close-in control that he exhibited would certainly have made him a winner, had there been competition. And another Tony, Tony Naccarato with his mother, Addie May, flew the seven-foot span 23-1/2 ounce (!), 035 electric powered Farman Moustique (Tony calls it the world's lightest 1/4-scale model, and we have to agree), as well as his radio controlled rubber powered model which made about three figure-8 laps in the exhibit hall.

In addition to the indoor flying, which also included electric control line aerobatics and carrier (Tony and Addie, plus members of the Black Sheep Squadron, built an 18-foot carrier deck of lightweight foamboard, which was permanently installed for the weekend in the centrally located flying demonstration area), the off-road electric R/C cars were driven in the carpeted entry hall, and R/C helicopters were flown outside, on the Pasadena Center park area. There was live action going on almost continually during the show!

The static model display is always an important part of the show. This year, there were more models than ever, yet some categories went uncontested. Of course, any that we drop from the list will immediately attract a whole bunch of entries, so we'll probably keep them on. However, some new ones are needed . . . non-flying static models, for instance. And the rules will be tightened on others. R/C models, for example, will have to have radio equipment installed, and may even have to be proven operable. Unequipped R/C models will not qualify for the non-flying category either, by the way!

Pardon my expression, but it's 4 p.m., Sunday, January 10, 1982, and the I.M.S. show has only one more hour to go! The other guy in the group is John Rogers, of Westminster, California, who just won a free, three-day trip for two to Acapulco in the Giant Raffle. The prettier portion of the picture includes (l to r): Cindy Marra, Holiday Inn Convention Sales Manager (who also sold tickets for the raffle), Anita Northrop, and Cherie La Porte, who sold the most raffle tickets. Photo by John Elliot.

Plans for next year include a larger and separate area for the static display, a carpeted R/C car demonstration layout (the smooth concrete is too slippery for just about any type of solid or pneumatic tire), and more booth space in the main exhibit hall.

DON'T MISS IT!

SHOULD WE?

As we studied the drawings, text, and photos of Walt Musciano's beautiful Lockheed Vega, this month's R/C construction co-feature, we couldn't help thinking that many of our readers would like seeing it at a larger scale. Technical theory and calculations aside, anyone who has built and/or flown larger scale models knows they are easier to handle, and fly more realistically.

The processes currently involved in producing reduction negatives to fit the magazine format and making autopositives or cronaflex "originals" from which full-size prints are run off, permit relatively easy blow-ups to other scales. Considering stock paper and film sizes, it would not be unreasonable to produce two-inch scale plans (80-inch span) for the Vega which would require one splicing joint down the middle of the larger sheet. Three-inch scale plans (10-

Continued on page 100

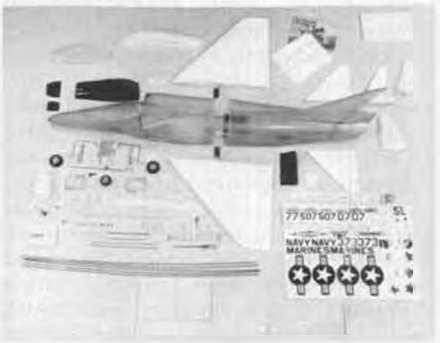
OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases furnished by the manufacturers and/or their advertising agencies, unless otherwise specified. The review and/or description of any product by R/CMB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by R/CMB.

Byron Originals' ducted fan A-4 Skyhawk.

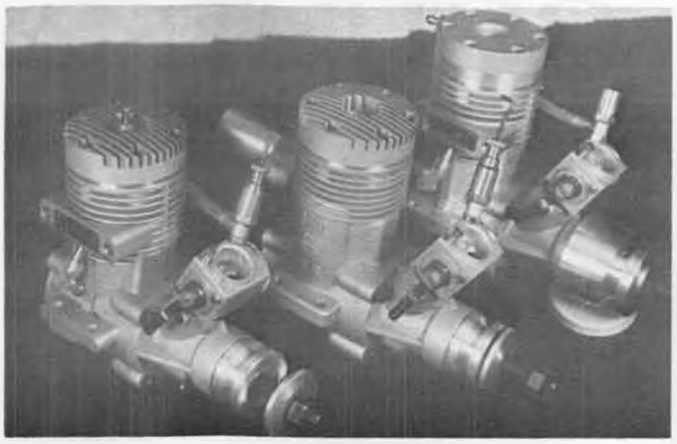
• The never idle folks at Byron Originals have several new offerings for the avid R/C scale model enthusiast. Byron Originals has just announced plans to market its 1/5-scale P-51 kit without the four-bladed prop reduction system. The company has reported a significant number of requests from consumers and dealers wanting to purchase the kit this way. Despite the fact that the deluxe kit and its proven power system is well worth the factory price of $594.96, many modelers still find it rather difficult to pay this initial investment all at once. In response, Byron Originals is now offering the same deluxe kit, less power system, for a factory direct price of $430. Modelers also now have the option of either purchasing the complete power unit later, or if they desire, they can use Quadras or other similar engines on a direct drive basis. Factory tests have proven the P-51 will perform well with direct drive applications and smaller props. Granted, this means sacrificing the scale realism of the massive 24-inch four-bladed prop but for many large scale modelers, the dollar savings would be worth it. Byron Originals anticipate an even larger demand for this popular kit as a result of its recent marketing decision.

Byron has also announced the release of its latest ducted fan model; the world famous A-4 Skyhawk. Like its predecessors, the Mig and F-16, this 1/7th scale jet fighter utilizes the proven Byro-Jet ducted fan and tuned pipe system. A semi-kit it is not. Like all Byron Originals kits, the A-4 is designed with the 'complete kit concept' in mind. Every item needed to complete the model, except fan unit, engine, radio, paint, and glue is included. In addition to the latest state-of-the-art construction methods and materials, the A-4 package includes an impressive list of scale appointments. They include; a highly detailed fiberglass fuselage and rudder assembly, scale strut assemblies, cockpit interior, extensive mylar decal set, optional drop tanks, plus others. Exclusive plug-in wings and aileron linkage for quick and easy transport are just a few of the many unique A-4 standard features. Flight characteristics are just as impressive. The patented Byro-Jet fan unit promises plenty of power reserve for both hard surface and grass field takeoffs. True scale performance ranks the A-4 well within the capabilities of today's jet enthusiasts. Byron also reports the model will readily accept retracts. With a wing span of 45 inches and a wing area of 762 sq. in., a ready-to-fly weight of 10-1/2 lbs. with retracts, a Schnuerle ported .60 on regular fuel will give a most realistic performance envelope. Now available, factory direct for $248.88



Byron A-4 is very complete kit.

Nick Ziroli's 2.7-inch scale DR I Triplane for Quadra power.



Redshift 60 engines being imported from England by Drapers R/C Service.

Quarter-scale Davis D-1K from plans by D.G.A. Designs.

plus $8.50 shipping and handling from: Byron Originals, P.O. Box 279, Ida Grove, IA 51445; or call (712) 364-3165.

★ ★ ★

The new K&B 7.5cc (.45) Outboard Engine is the first in its size range. A big brother to the popular K&B 3.5cc Outboard Engine, it has all of its features plus many more. Water-cooled like its little "brother", its additional features include: slotted mounting hinges for up and down adjustment, long skeg for stability, a redesigned propeller shaft assembly for ease of drive cable or prop shaft assembly replacement, built-in silencer in exhaust chamber to lower decibel reading to as much as 80 decibels, new K&B all-metal carburetor, K&B's own super bearings . . . will withstand 30,000 rpm plus. A tough ready-to-go engine and easy to start, too. Available now at your local hobby shop.

K&B has revamped its ever popular 3.5cc (.21) to make it better and more powerful. New features include con rod machined from high tensile strength aluminum and bushed at both ends, heavier cylinder wall sleeve to minimize distortion, piston honed after grinding operation for perfect roundness and extended life, K&B's own super bearings . . . will withstand 30,000 rpm plus, a redesigned propeller shaft assembly for ease of drive cable or prop shaft assembly replacement, and a much longer skeg for better stability. This tough, water cooled engine is available too, at most hobby shops. K&B Manufacturing, 12152 Woodruff Ave., Downey, CA 90241.

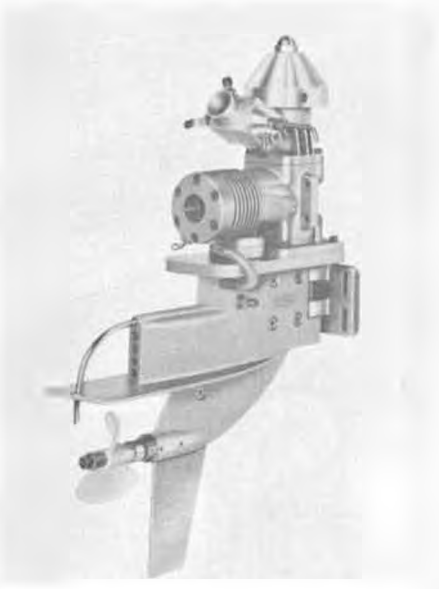
★ ★ ★

Introducing . . . MICAFILM! By Coverite! What is MICAFILM? Micafilm is said to be the best of two worlds. It is an ultralight film that has been reinforced with extremely thin, but very tough mica fibers. The result is a covering with positive ripstop! No other film has it! Yet MICAFILM is 40% to 70% lighter.

How strong is Micafilm? Its puncture

Byron P-51 kit now available with power unit as an option.

Loctite enters the model hobby with its cyanoacrylate adhesives.



The new K&B 7.5cc (.45) outboard engine and drive system.

The completely updated K&B 3.5cc outboard.

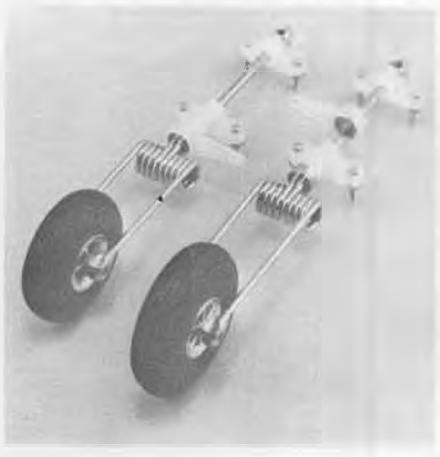
and teat resistance are claimed to be extraordinary due to the combined force of its film and mica fibers. For example, Monokote has a 1.69 rating on the Elmendorf Tear Test, while 1-1/2 ounce MICAFILM scored a remarkable 14.1! That's more than 700% tougher. The film is impregnated with the color and therefore, less subject to scratches, and, it does not become brittle as it ages. The translucent, 1-1/2 oz. Micafilm comes in red, yellow and blue, Pearly White weighs 1-1/3 ounces, while the 3/4 oz. is clear, all having positive ripstop. All three weights are available in 29 inch by 65 inch and 29 inch by 16.4 foot rolls, packaged in a reusable lightweight clear plastic container.

Micafilm is reversible, too! That is, either side, depending on the use, or type of model it is applied to, may be the outside. The smooth side out yields maximum speed and penetration, while the side with the mica fibers gives you the benefit of increased turbulation and greater lift. This side is also the paintable side. To apply, simply brush Balsarite on the wood surfaces where you want the Micafilm to stick, wait a few moments till dry, set your iron to 240 degrees, to adhere, and less than 300 degrees for full shrink. For more information on new MICAFILM, please send a business size SASE to: COVERITE, 420 Babylon Rd., Horsham, PA 19044.

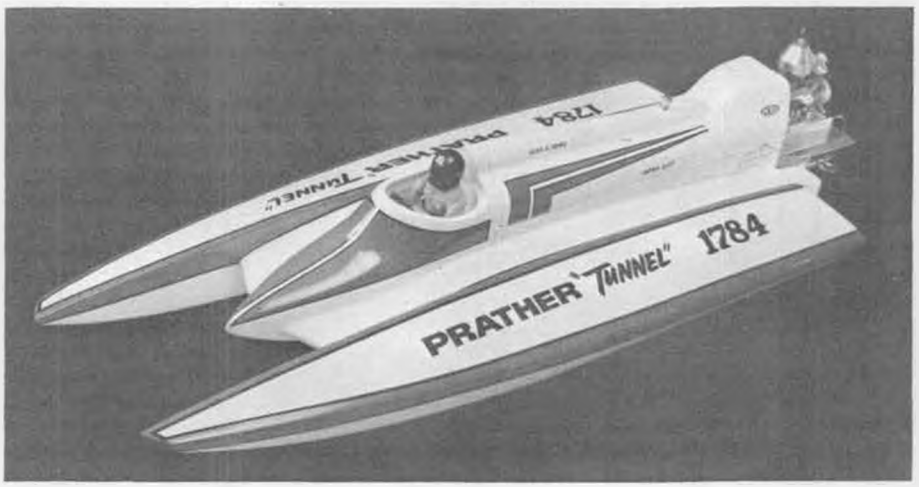
★ ★ ★

LOCTITE Corporation, a major supplier of industrial adhesives for more than 60 years, is entering the hobby and crafts field with what it claims to be the best cyanoacrylic 'instant' glue available anywhere. Loctite glues are available in thin formula CA and gap filling formula CA+. Loctite offers the following important features in its line of "instant" glues: one-year shelf life with one-year replacement guarantee, a non-clogging custom design nozzle, a high density, opaque bottle for ultraviolet protection, and the best price; $4.97 for one fluid ounce. Dealer and distributors are invited to contact the regional warehouse and sales office nearest them. In the West, House of Balsa, 20134 State Rd., Cerritos, CA 90701; in the East its FTE, 127 Fair St., Kingston, NY 12401; and in the Central USA area, contact Robart, 310 N. 5th St., St Charles, IL 60174.

Electronic speed controllers for electric powered R/C boats, by Weyerts Engineering.



Dual strut nose gears by Fults Tooling.



Prather 35 Tunnel for the new K&B 7.5cc outboard.

★ ★ ★

The EAA Air Museum Foundation, Inc. has just released its newest publication, "E.M. 'Matty' Lairds Super Solution." Edited by George Hardie, Jr., the book, containing 60 pages, has 131 photos, of which seven are in color, plus a large, two-page cutaway drawing by Jim Newman. Quite a few of the photos are from the Golden Era of Aviation, while many are of the construction of the Replica "Super Solution." Many exerpts from the logbook have been included, along with biographies of 'Matty' Laird and his favorite pilot, Jimmy Doolittle. Ideal reference material for those wishing to detail that super scale model. A must 'addition' to any aviation library. Price is $5.95 postpaid. Order from EAA Aviation Foundation, P.O. Box 469, Hales Corners, WI 53130.

Keykoder system by Vantec provides 12 new on-off commands of one channel.

★ ★ ★

Vantec has announced its Keykoder system that allows you to expand your standard R/C system by 12 new off-and-on commands, by piggybacking them onto one conventional R/C channel. The 12 outputs from the Receptor (that plugs into the receiver) each control up to 2.5 amps from 4.8 to 28 volts. Six of the functions are momentary-on; the remaining six may be key-on/key-off with memory. Other configurations available. Introductory price of complete system is $289.90. For more information, contact Vantec, 15445 Ventura Blvd., Suite 10-281, Sherman Oaks, CA 91413; or call (213) 993-1073.

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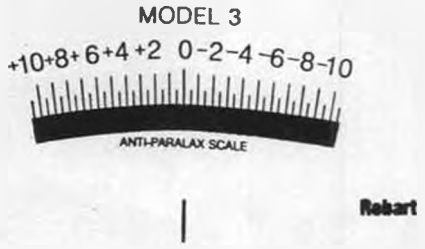


New anti-paralax meter scales from Robart.

The Kioritz Jr., 1.3 cu. in., from Roush Mfg.

Electric powered Airabonita about to settle on the carrier deck, during indoor flying demonstrations at the IMS Pasadena show.

Large scale model of Gossamer Albatross. Parts of original were to be displayed, but high winds prevented loading and transport to show.

R/C WORLD AT IMS PASADENA

Text and Photos by JOHN ELLIOT

● Before we dive into the first major Trade Show of the 1982 season, let's clear the air for our March 'mystery maneuver!' The Man; Jan Zurakowski, a WW II Ace and formerly of the Polish AF. The Manuever; the "Zurabatic Cartwheel!" Jan first started experimenting with twin-engine aerobatics while testing the deH Hornet in 1945 and introduced the 'cartwheel' to the world at the 1951 Farnborough demonstration of the Gloster twin-jet Meteor's low speed control and maneuverability envelope. Bear in mind that this was performed at low altitude, too.

The cartwheel can best be described as, "a protracted 'Hammerhead turn' in which asymmetric thrust (outside engine) carries the descending aircraft through 1-1/2 turns in the vertical plane." Like I say, lots of rudder and twin engines with separate throttles. Would you believe a flat spin in the vertical plane? And you thought the Lomcevak was cute . . .

* * *

IMS '82

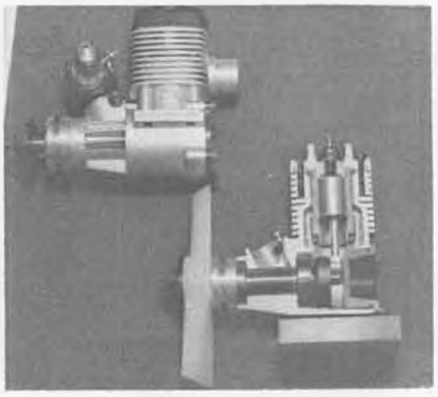
The rush is on; or, in the first five months of 1982, there will have been *six* hobby consumer shows . . . and maybe seven by the end of May. That's a bunch!

Super-lucky Vick Martin, Encino, Ca. won Cannon *and* JR radio systems in Giant Raffle!

The newlyweds, Hazel Sig-Hester and Maxey Hester, drove down from Iowa.

Dave and Caren Litt of DaCa, showing field boxes and model holders of all shapes.

George Steiner can fly his balloon up, down, and sideways, with 3-channel control.



HB's potent new .21 engine for cars, boats, etc.

John Tatone, the king of cast aluminum engine accessories.

The Byron Originals A-4 Skyhawk is a thoroughly dazzling ducted fan kit model. We'll be reviewing one in a few months.

Mark Smith was busy all weekend, talking about his new ultralight "Wanderer", and his new International Ultralights company.

Eldon J. Lind explains how to do it without extra hands!

Just after Hall of Fame presentations at I.M.S. (l to r): John Worth, AMA Executive Director; Irwin Ohlsson, past AMA Pres.; John Brigg, current AMA Pres.; recipient Mel "Spitfire" Anderson; recipient Bob Palmer; and Dist. 10 Vice President Jim Scarborough.

Randy Linsalato (beard) and Jim Arnold in the RJL Model Engines booth.

Wally MacAllister (tie) and George Steiner, showing Mac's Products mufflers, pipes, etc.

"When are you coming out with a radio for Peanut Scale?" Even Bill Cannon doesn't know!

Hobby Horn's Bob Sliff. Many O.T. kits and electric power supplies.

Frank Vier, California Hobby Distributors, had fascinating display of oldie kits and radios.

Jimmy Walker put on a great live show with indoor models from Two Worlds International.

Sylvia Good and 'Corky' Burden, with the Good Aero Engines 5 x 60 radials.

Al Wolff (facing camera) and Carl Tendick show Caltronic line of fine tools.

Tony Naccarato's rubber powered R/C model on a figure-8 course in the exhibit hall.

It takes a toll of a manufacturer's time (when they would like to be busy producing their product) and budgets. This year, the IMS show expanded in several areas, Outdoor R/C helicopter demos by teams from Heli-center West, Orange Coast Hobbies, and American R/C Helicopters, also demos by RCH Hobby Marketing of R/C off-road vehicles. R/C scale indoor flight demos by Tony and Addie's Hobby shop, R/C blimps by Peck-Polymers and Tony Avak, and electric C/L models taking off from and making arrested landings on a carrier deck delighted the huge crowds on Saturday and Sunday

Coverage by several T.V. stations undoubtedly enhanced show attendance, as spectators were still arriving Sunday as late as 4 pm, one hour before closing time! Forgot to mention George Steiner flying his 'simulated' hot air balloon around the area, would make a neat project for dull club meetings; George said he would consider a 'construction' article

Inducted into the AMA Hall of Fame were two modeling greats, Bob Palmer of control-line stunt fame and Mel 'Spitfire' Anderson, noted engine man of a bygone but not forgotten era. Great moments.

What do you do when you walk into a candy store or hobby show (only difference is your age!)? Personally, I like to take a fast lap of the arena to see 'everything all at once,' thus satiated, go back to the beginning and digest each and every thing of interest. Possibly one of the big hits of the show was the big "Wanderer" (34.5 feet span) by International Ultralights, a very well executed ultra-light (designed by Mark Smith) that was more 'plane' than an assembly of aluminum tubing and plastic film or nylon covering. Very well done and the modelers loved it! With Mark and Rod busy answering questions, this left Paul

John Gorham and Louise Cummings, of Heli-Center West. He and son, Bob, flew numerous outside demos.

Fokker Eindecker E-111 by Ron Karwacky has had many successful flights.

Joe Zingali's ghostly image watches over one of the new J&Z pusher props.

Chris Anderson, Lew Morris, and Simon Smith in the 32nd Parallel booth. Subs are fully operational.

Jerry Nelson shows John Pond how to Jet your fingers to Ceconite covering material.

Vortex Model Engineering's John Converse discusses hull design with interested spectator. New '60' is a beauty!

Dave Robertson displays neat 'foamie' rubber ships, Kobe-Kiko Hughes 300 helicopter, and other goodies.

Marty Barry and Ron Gilman in the colorful Circus Hobbies booth. Showing many new Kalt helicopters.

Rasys to handle the Marks Models booth featuring 'conventional' model airplanes.

Along these lines, Gossamer Ventures displayed materials of the Gossamer Albatross, a large scale model of same, and a video tape of its historic flight. New on the scene of the R/C Hobby industry are Flo and Bob Irwin of Aircraft Spruce & Specialty Co., a firm well known for over twenty five years in the homebuilt aircraft market, with beautifully cut spruce, plywoods, dopes, adhesives, composite materials, tools, covering materials, and other items perfect for modelers usage. With all of these 'do-it-yourself' materials right next to the Quarter-scale booth, well stocked with R/C giants, what a natural inspiration to build something.

Addis Elmore, of Wandit, was demonstrating his unique sanding tool and accessories. The tool, utilizing a flexible, moving sanding wand, makes short work of sanding sheeted wings, especially glue joints. Two Worlds International was displaying and flying an excellent line of rubber powered indoor models and H/L gliders. The kids, including the big ones, loved it. Larry and Granger, of Williams Bros. fame, had a new display chock full of scale engines, wheels, machine guns, pilot busts, and their line of highly detailed 1/32 and 1/72 plastic scale models. Craft-Air's Marie and Tom Williams were displaying sailplanes, launching gear, test equipment, and their successful line of 'Cowboys' introduced last year at the IMS show. E.M.S. displayed its line of battery packs, receivers, servo reverser and servos, including the EMS Eagle, sporting 156 oz-in of thrust! Perfect for the biggies. Elmer and Sylvia Good, along with cohort Corky Burden, of Good Aero Engines, had

Flo and Bob Irwin, long-time suppliers to home-built aircraft enthusiasts, now getting into the modeling scene. Great spruce!

Larry and Granger Williams, showing all kinds of scale detailing products, and great scale plastic model kits.

Addis Elmore's Wandit sander really caught the attention of the real model builders.

"Round Ralph" Warner explains his interesting line of electronic devices.

Jim Semonian came to California to warm up, and show off his muffler line.

Donna Runge and Rosie Rehling, probably discussing servo mechanics, or, what to wear for the exhibitor party.

Bob Seigelkoff will do anything to get attention! The Ag Cat was built from Model Builder plans.

a table full of 5-cyclinder radials (see Oct M B). What with collector rings, manifolds and such, a Ford Tri-motor sure would look nice

Byron Originals was super-busy, much interest in P-51's, Pitts bipes, the variety of Beech Aircraft, *AND*, their new A-4 Skyhawk, utilizing the Byro-Jet fan unit and low nitro .60's. Other new 'things' coming soon from Byron, watch for 'em. The crew from American R/C Helicopters, most busy talking 'chopper talk, lots of interest in the Mantis and the new Super-Mantis with collective pitch and a collective pitch kit to update the Mantis. Bavarian Precision Products was showing a brute of a .21 engine for cars and planes, boat version due later, plus the complete line of fine HB engines, mufflers, tuned pipes, heat sinks, air filters, and other hardware. Good looking engines. Bob Sliff of Hobby Horn had many of Midway Models' .020 replica old timers on display. Combo kits too, of 30's and 40's old timers; Buccaneers, Long cabin, and Trenton Terror, to name a few. Condor Hobbies had good things, from the 'Magic Muffler' and Rossi engines to the Santa Monica electric racing boat and the Yamaha YZ250, a .10 powered motocross bike.

The newly weds, Hazel Sig-Hester and Maxey Hester, back to work from their honeymoon in Hawaii, Rex Perkins and the rest of the gang from Montezuma's largest industry, enjoyed being away from the cold and talking model matters to many, many modelers. Their 1/4-scale Cub, long awaited, was well received. Al Wolff of Caltronic Labs, tended store, displaying the Emco-Lux line of precision tools and other interesting tools, hard-

Young Curtis Croker, helicopter demo pilot, with his dad, George, and John Simone (l to r) of American R/C Helicopters.

Duane Luypen and Brian Burke in the Champ Model Products booth. They're showing the SST-40.

"What have I let myself in for?" Bart Fury's dad gave a hand in the Robart booth.

Bob McDaniel tells all about the Ni-Starter, for the umteenth time.

Line-up of electric powered C/L scale models on the carrier U.S.S. Pasadena (?)

John Patterson and family, of Strike Force, with "nose art" (WW-II aircraft noses, that is) T-shirts.

One of new Kraft features include the Kraft/Novak servo and receiver packs, especially for the hard knocks of R/C cars.

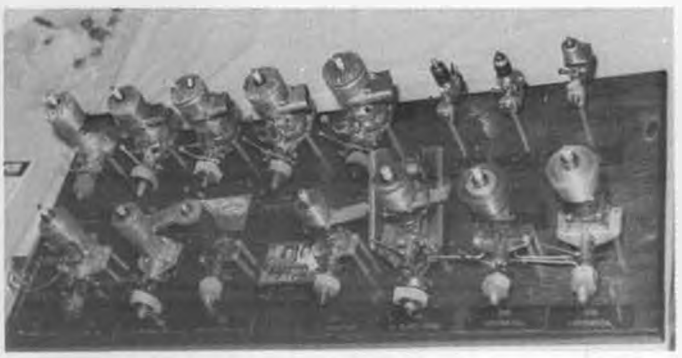
ware, including a neat electronic readout, inch-metric, digital caliper. Super easy to read and use. Rick Lewis and his charming bride Marlene were kept busy in the Repla-Tech booth, selling scale plans and drawings. Another good source of scale info. Tom and Donna Runge, of ACE R/C, brought Fred Marks along to explain, many times, the workings of their fabulous Silver Seven series R/C system. Red Costlow's demo table model (too small to fly!) got a real work-out showing all its 'mixable' features (scotch and water, too?) Jim Semonian, of Semco, had more mufflers, adapters, header pipes and fittings than Midas. All sorts of special concepts for special installations.

For those who are into the off-road racing scene, R/C-wise, R/C Race Prep was displaying quite a line of wheels, tires and accessories. Many neat items. Pete Neuer and son 'J.P.' with help from Mike Greenshields, from Precision Model Products, manufacturer of the Challanger 2-meter sailplane, kept busy answering questions about their newest sailplane, the Thermal 73 and their forth-coming Acro Sportster 40, neat, realistic sport model (featured as a construction article in the February '82 issue of **MB**) C.B. Associates has Kawasaki's for big birds, also displayed some new interplane fittings for big bipe lovers that looked good. McAllister Merchant, of MJM Design, was showing his 'Ravix', a design concept based on Burt Rutans Varieze, suitable for payloads such as still, or movie cameras. Spanning 69 inches and of clean design, it should scoot right along. John Creagh of Premanufactured Products displayed glass fuselages, fuels, foam wings, and foam blocks, and will custom cut foam wings to order from your templates. Excellent for scratch builders. Champ Model Products had a nice trainer bird, also some small

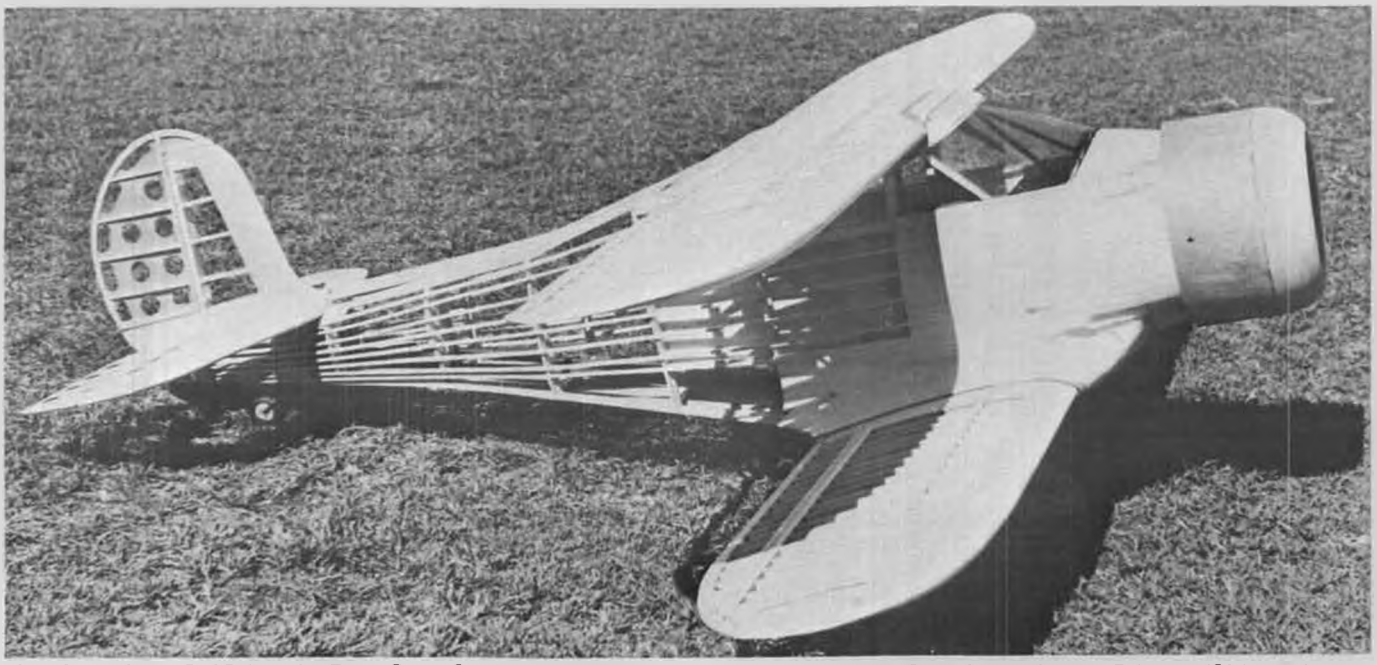
Continued on page 92

Larry Van Osten, R/C off-road race promoter and owner of RCH Hobby Marketing.

Cliff Rausin and Alberto Dona of Condor Hobbies/Exportations. Their warehouse is a gold mine of model supplies.



Mel Anderson's personal collection of the engines he designed, including a geared Baby Cyclone dated 1938.



Magnificent Beech D17S, built by Roger Stern, Salisbury, Zimbabwe, who designed the Liberty Sport featured in our February '81 issue. At two-inch scale, the span is 64 inches and the wing area is 1185-1/2 sq. in. It's expected to weigh about 10 pounds.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• I recall some years ago when there appeared a prolonged verbal assault in various parts of the model press concering the problems besetting the United States and its participation in FAI world competiton. The difficulty in the pattern field was a relatively minor one and revolved about the differences in the pattern which was flown in the U.S. and other parts of the world. There were such things as calculating wing area and loading as well as weight and engine restrictions, however, these posed no great threat since they fell pretty much in line with AMA rules and regulations. All that was really necessary was to bring in line the maneuvers, at least for the class of modelers who are interested in that type of competition. Now, not much is heard about any real problem existing. *(Serious aerobatic pilots are apt to disagree. wcn)*

In scale, the FAI competition has posed considerably greater problems. The differences which exist are growing more significant with each two-year rules cycle. The great disparity which exists on a competitive basis between the U.S. and the rest of the world as far as engine size, weight, and various other classifications has grown steadily. Certainly there has been some upgrading in FAI weight from 5 kg. to 6 kg. (11+ to 13+ lbs.) and some changes have been effected in engine size for multi-engined aircraft, but the process bringing about this change and the *amount* of change has been much behind that allowed in the United States. It is not my purpose here to suggest that all the other countries are wrong and we are right, nor do I feel that we have created a modeling Frankenstein with our very generous engine size and weight requirements. Rather, I would suggest that if the United States is to continue to remain competitive, some effective compromise or incentive is required. I realize that a very significant part of the scale competitive U.S. population has a strong feeling something in the line of, "FAI be damned," or, "Who needs them?" I also recognize that a number of the European countries have policy or law making restriction that preclude making radical changes in their requirement structure.

So we sit with two obviously opposed camps and in between are a very small group of U.S. modelers interested in FAI competition, but also existing in a U.S. competitive world. While scale in general has grown tremendously in the last several years, the corps of FAI scalers has remained relatively constant, with a group consisting of perhaps, at the very most, a dozen scattered about the country. Recent interest in FAI Stand Off has added a few, but percentagewise, it's very little.

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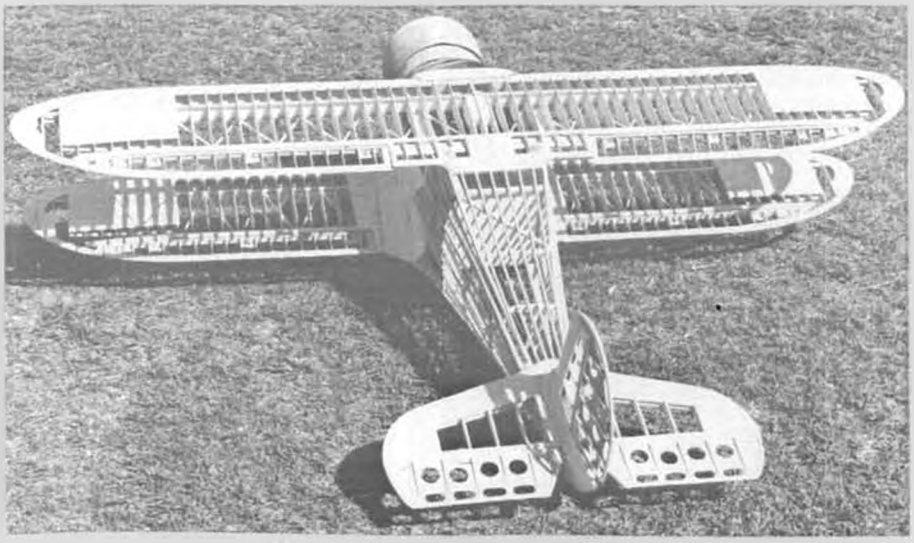
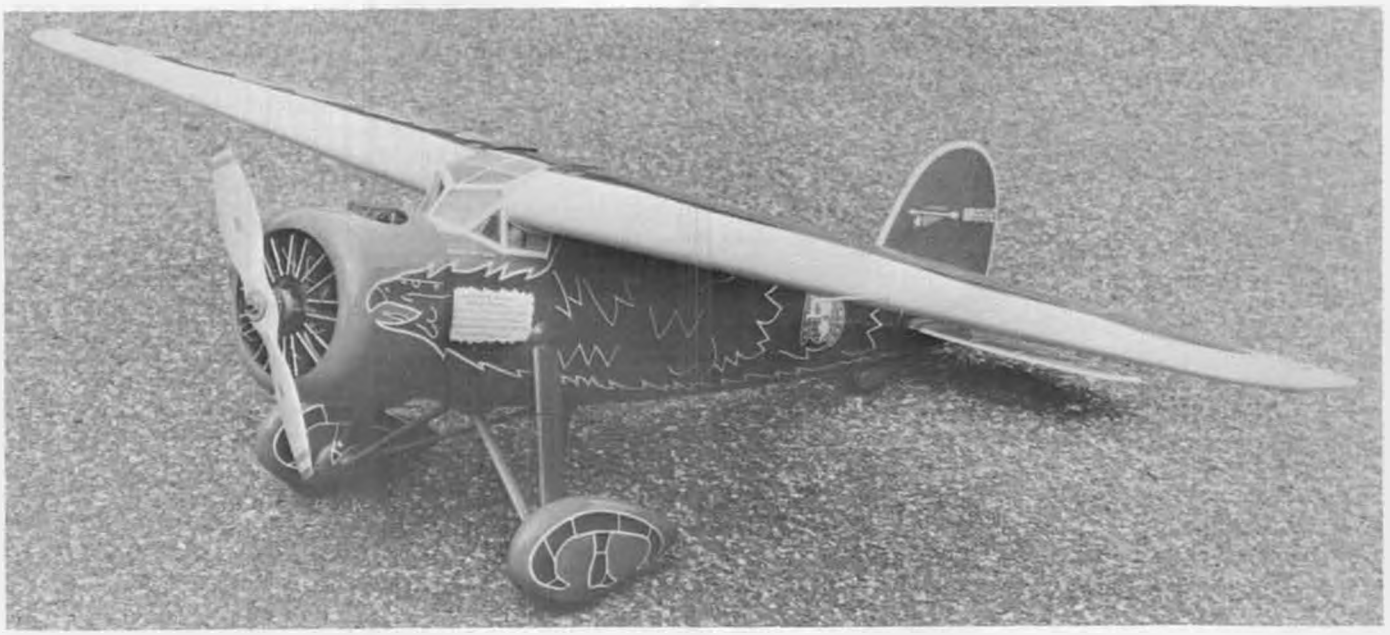


Dazzling view of Roger Stern's Staggerwing. Model now covered with Fabricote, painted yellow. Power will be an HP 61, or an OS 90 if more is needed. Big prop needed to clear 8-inch cowl.



PHOTOS BY
JERRY MARKS

LOCKHEED VEGA

By WALT MUSCIANO . . . A famous modeler reproduces a famous aircraft. Next month, we'll present Walt's fascinating story and photos about Mattern and his Vega, plus more about all of the record setting "Wooden Wonders" built by Lockheed.

●JIMMIE MATTERN'S LOCKHEED VEGA is probably the most beautiful airplane ever conceived. When the dramatic red eagle paint job was applied to the classically simple and timeless lines of the Lockheed Vega the result had to be enchanting, and it was. Mattern attempted a solo 'round-the-world flight in 1933 after he set several trans-Atlantic and inter-continental records during the previous summer. The Vega was the very first Lockheed design, and spawned a bevy of "Wooden Wonders," including the Sirius and Orion. The story of Jimmie Mattern with his Vega plus the other "Wooden Wonders" will appear in next month's issue of Model Builder, and include important photographs for the dedicated scale model builder.

OUR MODEL is scaled to 1-1/4 inch to the foot, which gives it a wing area of about 435 square inches. Power can be in the .35/.40 cu. in. displacement engine range. In view of the fact that the full size Lockheed Vega was not fitted with flaps or slots or retractable landing gear, this model won't be criticized for not having these items. Four channels, operating elevators, rudder, ailerons, and engine speed, are all that is needed to cover all possible operations for this beauty. The construction is very straightforward and conventional, with planked fuselage and sheet covered wing and tail; using balsa, plywood and hardwood materials. Of course foam and other materials can be substituted as desired.

One feature is a bit unorthodox on this model and that is the method of wing attachment. The forward section of the wing in way of the pilot's cabin is cut away because the cabin is part of the fuselage. The flat interface between wing and fuselage is ideal for the application of dowel pegs, however, we refused to mar the top of the wing with nylon screws. Instead, we chose to locate the mounting screws in the fuselage just beneath the wing. This necessitated the perfect mating of certain wing and fuselage components which had to be strong enough to hold the two units together. The two components are Rib No. 2 and fuselage wing support "O"; the latter forming a part of the fuselage structure, while the former slides down along the fuselage wing support inner surface. A nylon wing screw becomes a shear pin as it passes horizontally through both mounting members.

This is our third Mattern Vega. We fell in love with the plan when, as one of the winners of a 1939 scale model plane contest, the author attended a victory luncheon with the judges, which included record smashing Frank Hawks, Jack Knight, and other famous aviators. In addition to the author, one of the other winners was old timer R. C. pioneer Joe Raspante, who had entered a scale Mattern Vega. So enrapt with the beauty of Raspante's model was the author, that he

Walt justifiably admires his handiwork. Pattern on bottom side of wing and stab same as on top. Scale wheel pant blister strengthens joint to strut fairing.

Only one application of masking tape required for three-color paint scheme. Start with white base. Note raised fairing lines. Small lettering is rub-on type.

could hardly wait to get home and start building his own Mattern Vega! The second was built during the immediate post-WW-2 years. Don't let the paint job scare you off, because it is basically simple and only requires one careful application of masking tape. The results of a little patience are very rewarding.

The model should be kept as light as possible without sacrificing strength, therefore, lightening holes should be cut in the plywood as shown. In addition, it is recommended that the balsa sheet be gently sandpapered with a block to remove any non-structural nap and to thin the thickness somewhat prior to tracing and cutting the parts.

FUSELAGE is started by tracing and cutting to shape the keel pieces, plus bulkheads and formers. Notice that some balsa formers are to be cut in two pieces; divided on the vertical centerline. Don't neglect to cut the lightening holes and engine mount openings in the plywood. Be sure the mount spacing fits the engine you plan to use. Assemble the keel by placing the pieces directly over the plan to insure the proper shape when cemented to each other. Hold to the work table with straight pins. Cement the left halves of the divided formers to the keel. When thoroughly dry, lift the keel and former assembly from the table and cement the right side formers to the keel, as well as to the left side formers. Hold in place with pins until cement is dry. Cement the bulkheads and remaining formers to the keel and then re-cement all joints.

Walt opens sliding hatch on his Vega to turn on receiver switch in cockpit. Dummy radial engine is strength member of cowling, dressed up for appearance.

While this is drying, the landing gear struts can be bent to shape, following the plans. Cut holes in the keel for the wire struts. The struts are then loosely attached to the bulkheads with "J" bolts. Now, bind the three struts together with soft, thin, tinned wire similar to that used by florists. Solder the joints thoroughly, applying constant heat so the solder flows deep through the wire binding to the strut. Tighten the "J" bolts and smear with cement or epoxy to prevent loosening due to engine vibration. Note that the spreader strut is not attached to the bulkhead because it must be able to flex as part of the shock absorption arrangement.

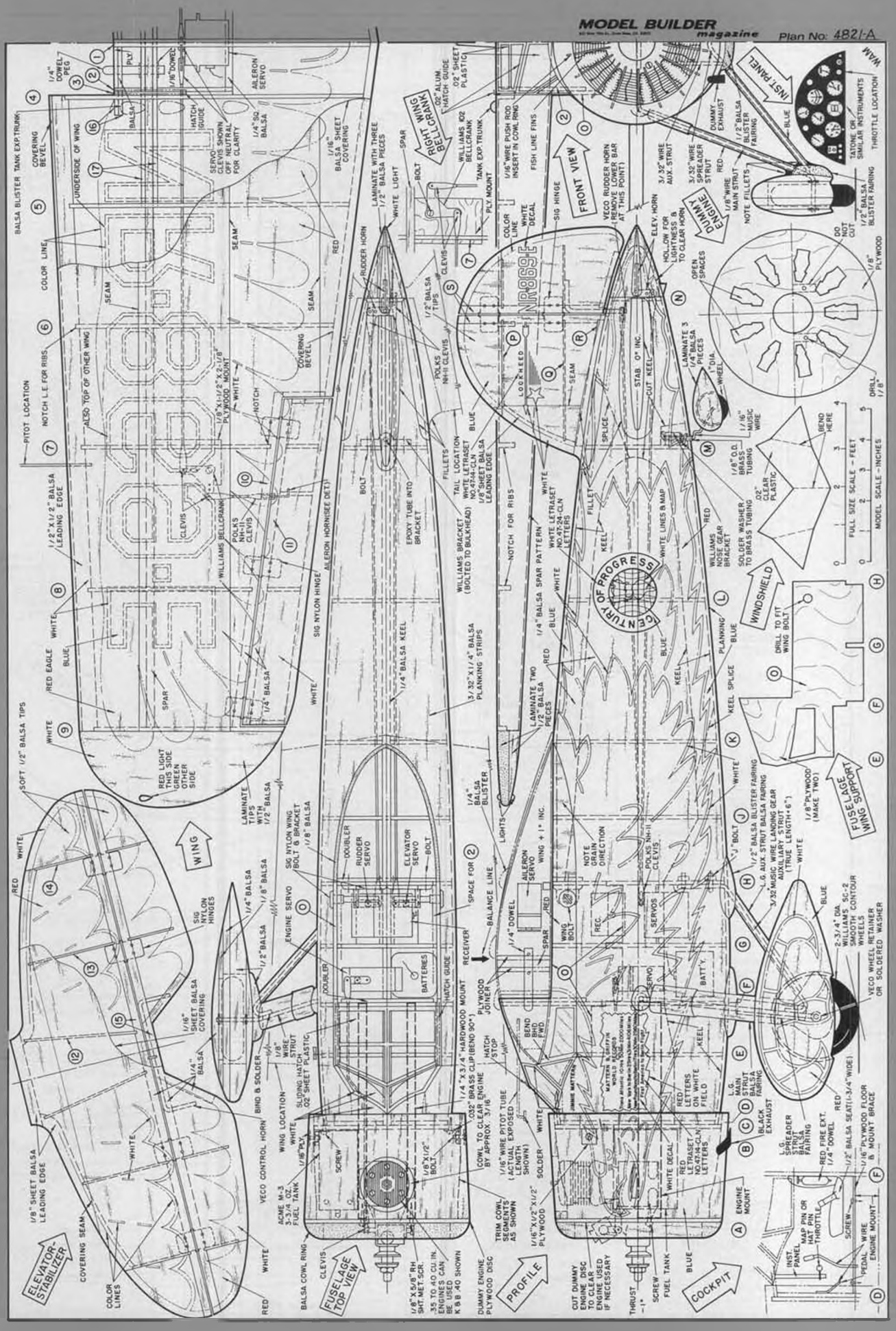
Engine mounts are now cut to proper length and epoxied into the bulkhead holes. A sheet of 1/16-inch plywood is screwed and epoxied atop the mounts and to the bulkheads. This serves the dual purpose of locking the mounts as well as functioning as the cockpit floor. Apply more epoxy to the mount installation.

Bulkhead "C" must be well epoxied to former "D" and the mounts.

Epoxy the plywood wing support, piece "O", into the slots in the bulkheads; egg-crate fashion. When the glue is dry, add more epoxy to this installation. Check the alignment very carefully.

Our model was fitted with a swiveling, but non-steerable tailwheel. The swivel feature makes ground handling a dream. Solder a washer to the brass tube as shown and then epoxy the tubing into the nylon bracket. Bend the lower part of the tailwheel wire strut and insert into the tube. Bend the upper portion and then bolt the bracket to the bulkhead. Do not install the wheel or fairing. Apply epoxy to the bracket bolts and nuts. At this time, it is advisable to install a few planking strips to give the fuselage some rigidity during the next operation. Apply three or four strips to the top, bottom, and sides of the fuselage near the centerline; cemented to each other as well as to the keel, bulkheads, and formers. Tail surfaces should be installed now, so put the fuselage aside while the tail is being fabricated.

TAIL SURFACES consist of a simple sheet balsa covered structure. The tips are soft balsa blocks because it is difficult to sheet cover the compound curves that the tips form. Don't forget to notch the spars for the ribs, and notice that the spars run the full span of the empennage, past the solid tips. These items simplify the assembly and improve strength. When the framework is complete and control horns have been firmly epoxied in place, the leading edges must be trimmed to follow the contour of the ribs. The full size Vega had no exposed control horns and we decided to duplicate this feature on our model. Sandpaper the entire structure with a block before adding the sheet covering. Re-cement the structure and then use plenty of the adhesive when applying the covering. Hold in place with straight pins until cement is dry. We ran the stabilizer and fin covering about 1/16 inch past the spar so this overhang covered the hinge space between the components to improve appearance and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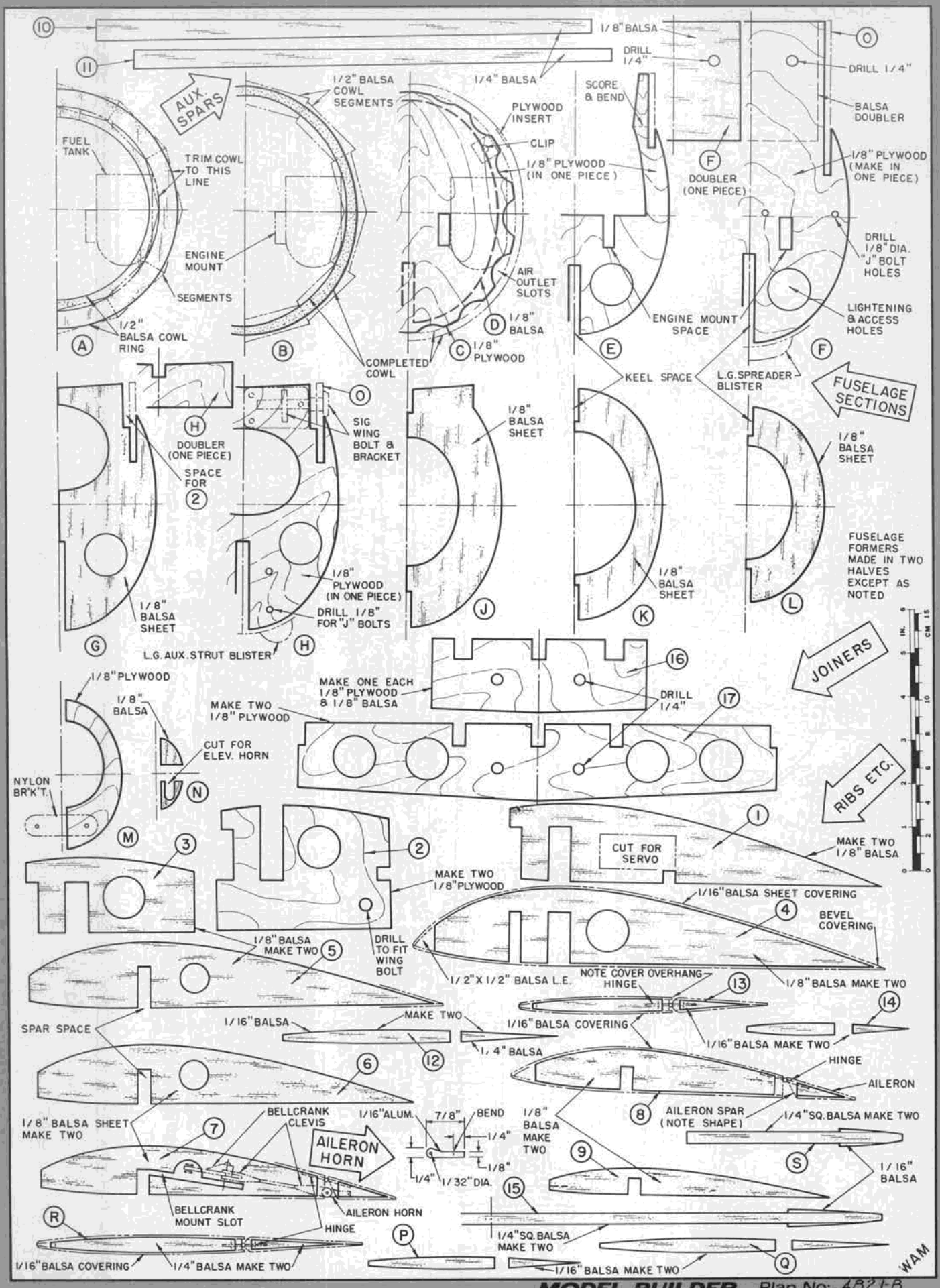
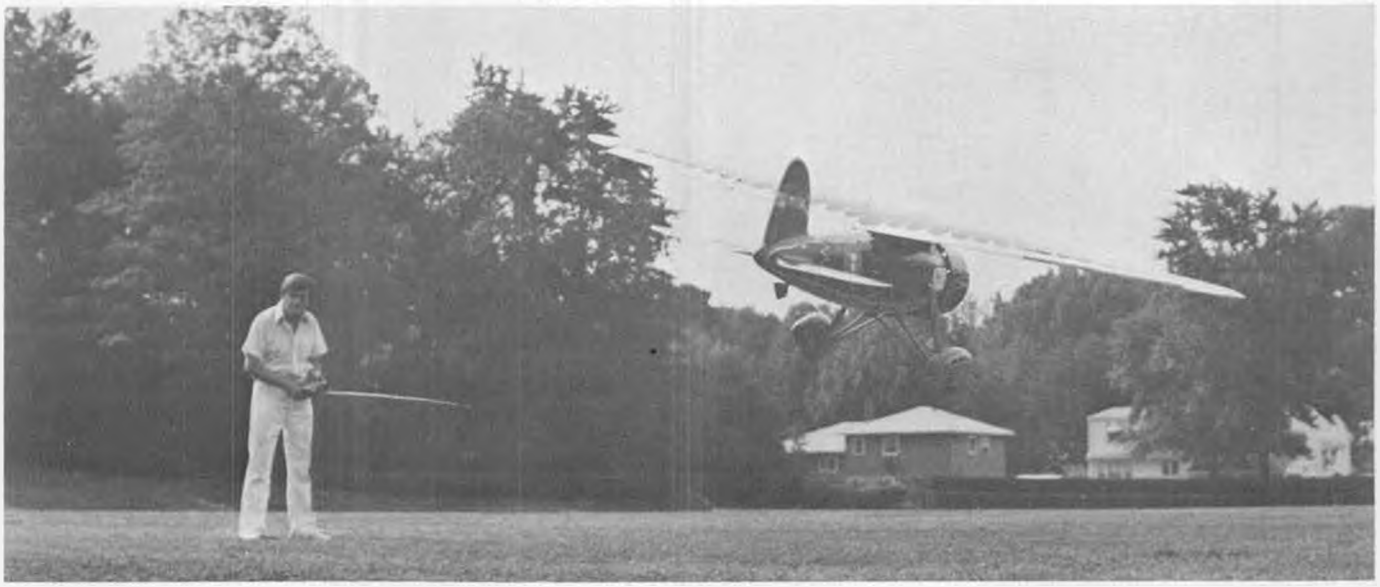
Plan No: 482-A
WING
FUSELAGE TOP VIEW
PROFILE
FRONT VIEW
COCKPIT
FUSELAGE WING SUPPORT
WINDSHIELD
INST. PANEL
DUMMY ENGINE
RIGHT WING BELLCRANK
ELEVATOR-STABILIZER
CENTURY OF PROGRESS
LOCKHEED
FULL SIZE SCALE - FEET
MODEL SCALE - INCHES



MODEL BUILDER Plan No: 4821-B



Walt brings the Vega in close for photographer, Jerry Marks. Paved runway is a must for the heavily panted wheels. A quick removing type might be best if you have a grass flying field.

streamline the joint somewhat. Apply a 1/4-inch strip of 1/16-inch covering material to the tip of the spar to bring it to the same thickness as the covered assembly. Cut the soft tips to outline shape and cement them firmly to the spar and tip rib. When thoroughly dry, the tips are carved to shape to conform to the elliptical shape of the empennage. Sandpaper thoroughly, being certain that the tips fair into the curved area. Check with the tail sections when rounding off the leading edges. Slip the stabilizer into the slot in the keel and trim the keel and fuselage former, being certain that the stabilizer is at right angles to the keel. Hold in position with straight pins as necessary. The fin is then trial fitted to the fuselage top. Trim as needed and cement to the keel and planking strips. Be certain the fin is perfectly vertical; parallel to the keel and at right angles to the stabilizer.

CONTROL RODS should be located in the fuselage before it is planked. Bolt the engine to the mounts temporarily to determine the engine control rod run. Servo, batteries, and receiver mounts should now be fabricated and installed on the keel and/or bulkheads. Install the rods, being certain that the rudder and elevator are in neutral position. All radio equipment is accessible through the fuselage top when wing is removed.

FUSELAGE PLANKING should be completed now, unless the builder desires the fuel tank to be located within the fuselage instead of forward of the firewall. The latter is the preferred location as shown on the plans. Before the actual planking continues, add balsa sheet atop the fuselage to continue the line started by the plywood wing support, piece "O." The grain must run vertically for strength and to facilitate bending to the center as shown in the top view. Cement securely to the vertical sides of the formers and to the wing support. Planking continues by alternating side-to-side and top-to-bottom with each consecutive strip. Use plenty of cement when attaching the strips to the bulkheads and formers as well as to each other. Each strip must be bevelled and tapered to fit the adjoining planking strip. Check the fit before each strip is cemented in place. Do not try to develop the cockpit opening by attempting to cut the planking to exact size prior to cementing in place. Rather, cut the strips extra long in way of the cockpit and trim carefully only when all pieces are in place and cement is thoroughly dry.

The tail cone is laminated using soft 1/2-inch balsa. Be certain to cut the center piece as noted on the plans in order to have a pre-hollowed blank. A slight amount of further hollowing will be necessary to clear the elevator control horn and lighten the cone. Trial fit to fuselage and check the controls to be certain there is no interference with the elevator horn. Cement cone in place to the fuselage.

Carefully mark and cut out the cockpit opening. Sandpaper the fuselage until smooth. Wipe cement into any spaces between the planking strips with the fingers, for strength and appearance. If, when dry, any spaces remain, apply some fillet compound, also wiped deeply with the fingers. Sand again.

LANDING GEAR FAIRINGS are fabricated now. The balsa strut fairings must not touch the fuselage, in order to allow the landing gear to flex without breaking the fairings. The hard balsa fairings are cut to fit the wire struts in two halves; with a semi-circular groove cut into each half. Roughly cut the fairings to a streamline or teardrop section. The streamline wheel covers or pants are laminated with layers of sheet balsa of various thicknesses. The inner layers must be cut out to clear the wheels by at least 3/32 inch before the pieces are cemented together. When the cement is thoroughly dry, the wheel pants are carved and sandpapered to a streamline shape. Consult the drawings and photos for guidance. Carve and cement the fairing block to each wheel pant. Seal and paint the interior of each wheel cover. The wheels must be installed before the wheel covers are fixed in place. Solder brass washers or use commercial wheel retainers to keep the wheels centered on the axle.

The wheel covers are installed first becuase they cover so much of the wheel, the axle pierces the pant fairly high up the side. It will be necessary to cut a 1/8-inch slot in the side of each pant up to the point where the axle pierces. Save the material from the slot if possible. Trial fit the wheel covers and trim as necessary until the fit is perfect; then cement to the wire struts. Be certain the wheel can spin freely inside the pant. When thoroughly dry, cement the slot material back into the slot minus the 1/8 inch removed to allow for the wire axle. When this is dry the strut fairings are fitted and trimmed to meet the wheel covers. Fairings are then epoxied to the wire struts and the pants. Sandpaper the struts to a streamline shape when the glue is dry. Add the strut blister fairings to fuselage sides and bottom and then carefully bind the strut fairings to the wire struts. This can be done with strips of silk and cement or 3/4-ounce fiberglass cloth and resin. Run the strips from the struts onto the pan for a smooth contour and added strength. Apply several layers. It is important to realize that the strut fairings hold the wheel covers in place and generous fillets help.

WING CONSTRUCTION is the epitome of rugged simplicity with a single deep spar and heavy leading edge. Spar halves are cut to shape with rib slots as shown and epoxied between the plywood joiners. While this is drying, the ribs are cut to shape with spar slots. The balsa leading edge should then be notched for the ribs. Cement the ribs to the spar, egg-crate fashion, and add the leading edge to assist in the alignment. Ribs No. 2, 3 and 4 must be well epoxied to each other. The ribs at each station should be the same height as the spar, forming a rigid grid with the leading edge. Check the alignment carefully by sighting along the trailing edge of the ribs; from tip to root. Before continuing fur-

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Full-scale helicopter pilot Ray Hostetler flies his Kobe-Kiko Hughes 300. He found it easy and stable to fly.

The Kobe-Kiko Hughes 300 is available through Orange Coast Hobies, Westminster, California. See Feb. '82 MB for advertisement.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

●Last month I started a review on the Kobe-Kiko Hughes 300. If you missed last month, that's why some of the rest of this material will seem out of place, and I will refer you back to that issue.

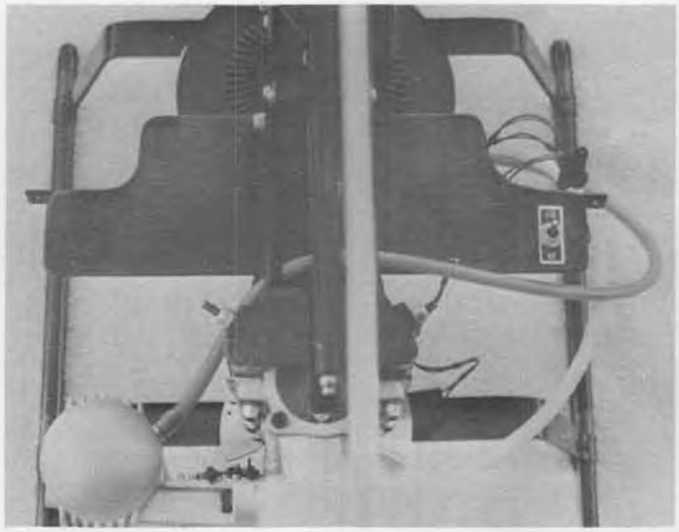
Picking up where we left off, the radio installation is unique. Collective pitch is regulated by a sliding brass sleeve on the main shaft. The fore-aft and right-left servos mount on metal flanges that are attached to the brass sleeve. Since my Variant servos (Dunham mechanics) have such small mounting grommets, I elected to epoxy basswood blocks on the back of the flanges so I could use wood screws instead of the screw/nut provided in the kit. If you have "larger" servos (a 15-II or similar), there is not quite enough room to space the flanges to get a servo between them. In order to make room, it is necessary to remove some material from the collective yoke . . . see photos. Once this is done, the servos will fit fine. The servos go directly to the mixers on the head, resulting in a very nice collective set-up. Everything is out in the open, making it very easy to service and/or adjust linkages.

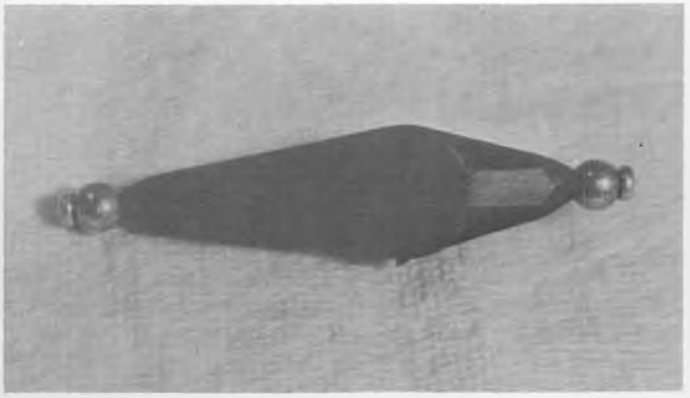
The other two servos, tail rotor and throttle, are shown mounted on servo mounting tape, additionally secured with urethane bands provided with the kit. I have never liked this general type of mounting arrangement, and would recommend that you use "aileron" type servo mounting trays. Screw a piece of 3/16th-inch ply to the metal area of the helicopter

Close-up showing cut-out of collective yoke. Explained in text.

Spring to counterbalance weight of servos. Holes in main frame for access to allen heads.

Ray added 5th servo for independent collective. Mounted on left side of main frames.





Above. Bevel the ends of the mixer arms so the ball links do not rub on them.

Left. Ply plate for mounting receiver and batteries. Note convenient location of switch harness.

where the servo is to be mounted. Then screw the servo/servo tray assembly to this plywood base. (The photos show the tape and band mounting; I did use this until I obtained more aileron servo trays.)

The receiver and battery pack fit in the upper forward cavity of the main frames. I used my usual 1,000 mill. battery pack for the airborne power supply, and it, plus my Rx wouldn't fit in the given space. So I fashioned a 1/8-inch plywood plate, gave it a brush painted Superpoxy job, and screwed it in place as shown in the photos. No. 64 crepe rubber bands hold the Rx and battery to this tray. It also provides a nice place to mount the switch harness. If your receiver and battery won't fit in the given cavity, I would suggest this little modification to make this installation easier.

As all of the servo pushrods are provided, it is easy to complete the rest of the hookups. At this point I must say that in my opinion, the quality of the plastic ball links is adequate, but below the quality of the rest of the helicopter. They fit unevenly and bind more than they should. When you add up several of these in succession, there is considerable drag. If you appreciate attention to the finer points, you may want to replace them. I replaced every stock ball link with Kavan ball links. (Part #3324a, ball links with brass balls, 10 per bag. You'll need three bags.) You must replace the brass balls as well as the plastic link itself, as the Kobe-Kiko balls are larger in diameter than the Kavan balls.

For the replacement swashplate balls, I used Schluter "screw in balls," part #434, two per bag. (You'll need four bags, eight balls.) Before you mount these, chuck the hex portion of each ball in a drill and use 400 sandpaper to take the black coating off and polish the ball. The Kavan links fit beautifully over these balls once this is done. To remove the stock balls from the swashplate, heat each ball's threaded area lightly with a propane torch, then unscrew the ball. Kobe-Kiko uses some type of Loc-Tite, and if you don't heat the ball, you'll twist one off and leave the threaded portion in the swashplate. (I know, I know . . .) Don't forget to remove all ball links and the wash-out control before you heat the swashplate.

Most of the parts in the 300 are metric, but the pushrods are 2-56. If you use the given pushrods, the Kavan link should be drilled out slightly larger with a #50 bit. The other alternative is to replace all pushrods with either Kavan or Schluter metrics. This whole deal probably sounds like a lot of work, but I thought it was worth it for such a vital part of the helicopter.

SET UP

First, place a 1/32-inch piece of plywood under the rectangular plastic flybar block. This will hold the flybar level for you during the rest of the set-up. Start with the swash plate level all around, and the throttle-collective servo set at half-stick. This will position the brass sleeve and

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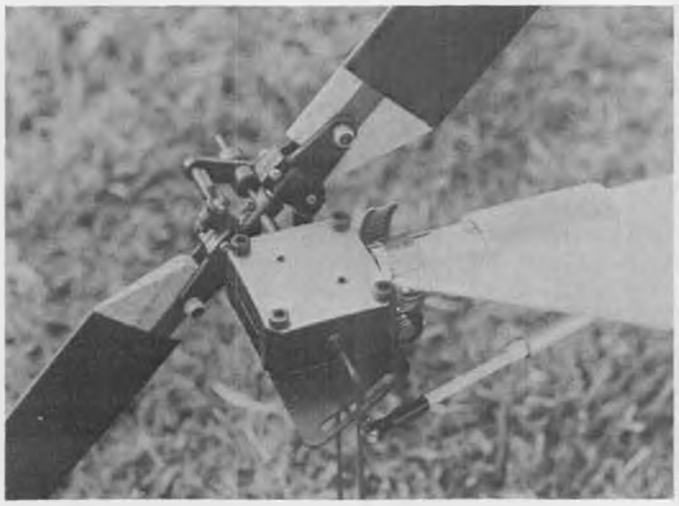
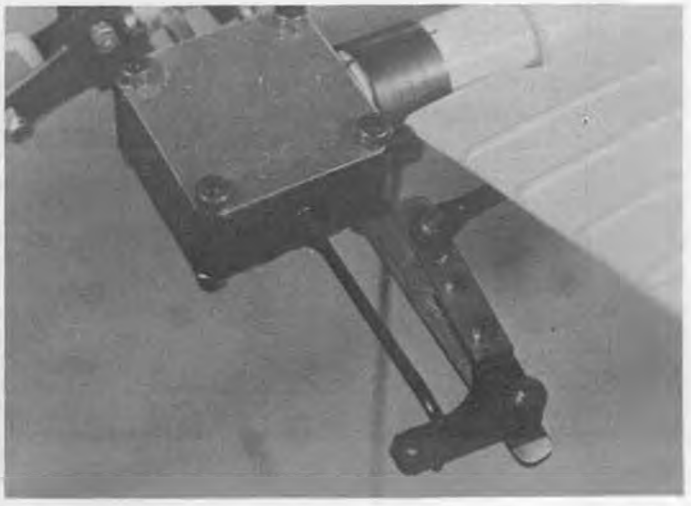
Front view of throttle/collective servo positioned at 1/2 stick, throttle open 5/8 to 3/4.

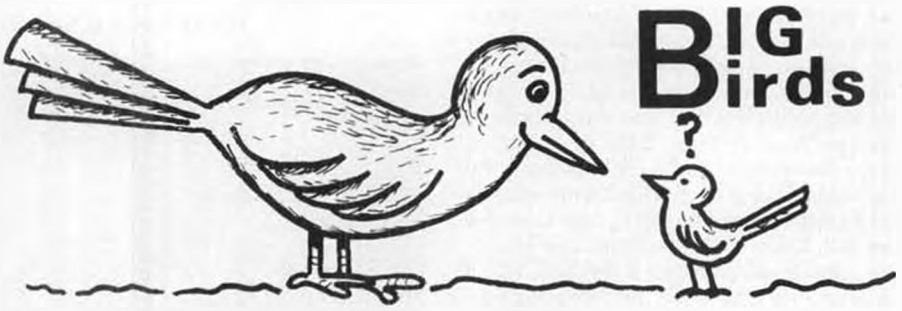


The stock tail rotor pitch change linkage, using the angled slot to transfer motion 90 degrees.



Modified tail rotor pitch change linkage gives broader range, smooth transition of motion. Described in text.

The columnist's Balsa USA Aeronca C3 on final. No longer in production, but a superb scale trainer. Note "Y" exhaust and blond Ingenue in the cockpit.



PHOTOS BY AUTHOR

By AL ALMAN . . . Appropriately enough, the new columnist for our coverage of large, giant, mammoth, or what have you model aircraft, is from TEXAS . . . New to the column, maybe, but not new to "putting it in writing," we expect . . er . . big things from him in coming months.

I never told Mom too much about my formulative aeronautical years. Would she have understood when I launched myself off the top of a barn, Icarus style? I think not, even though I had the foresight to pile bales of hay around and on the most probable impact point.

And since I never told her about that first attempt to fly, my keen analytical mind knew it would be folly to say anything about the planned hang-glider flight tests. I call them hang-gliders now; actually they were nothing more than oversized kites made from brown wrapping paper and orange crates.

I was so convinced of success that I took no safety precautions at all. A brave jump off the top of the (same) barn . . . and I was flying, really flying. Somehow all my mistakes and errors must have cancelled each other out because I actually flew all of 58 feet. I haven't forgotten that breathless feeling of total elation; it lingered for quite a while and I still savor the memory. . .

All of this early BIG Bird building and flying took place 43 years ago, shortly after I began to butcher the ten cent Comet and Continental kits. Had I thought of putting some kind of power into my oversized kites, I could have cornered the ultra-light market and got it off to a very early start.

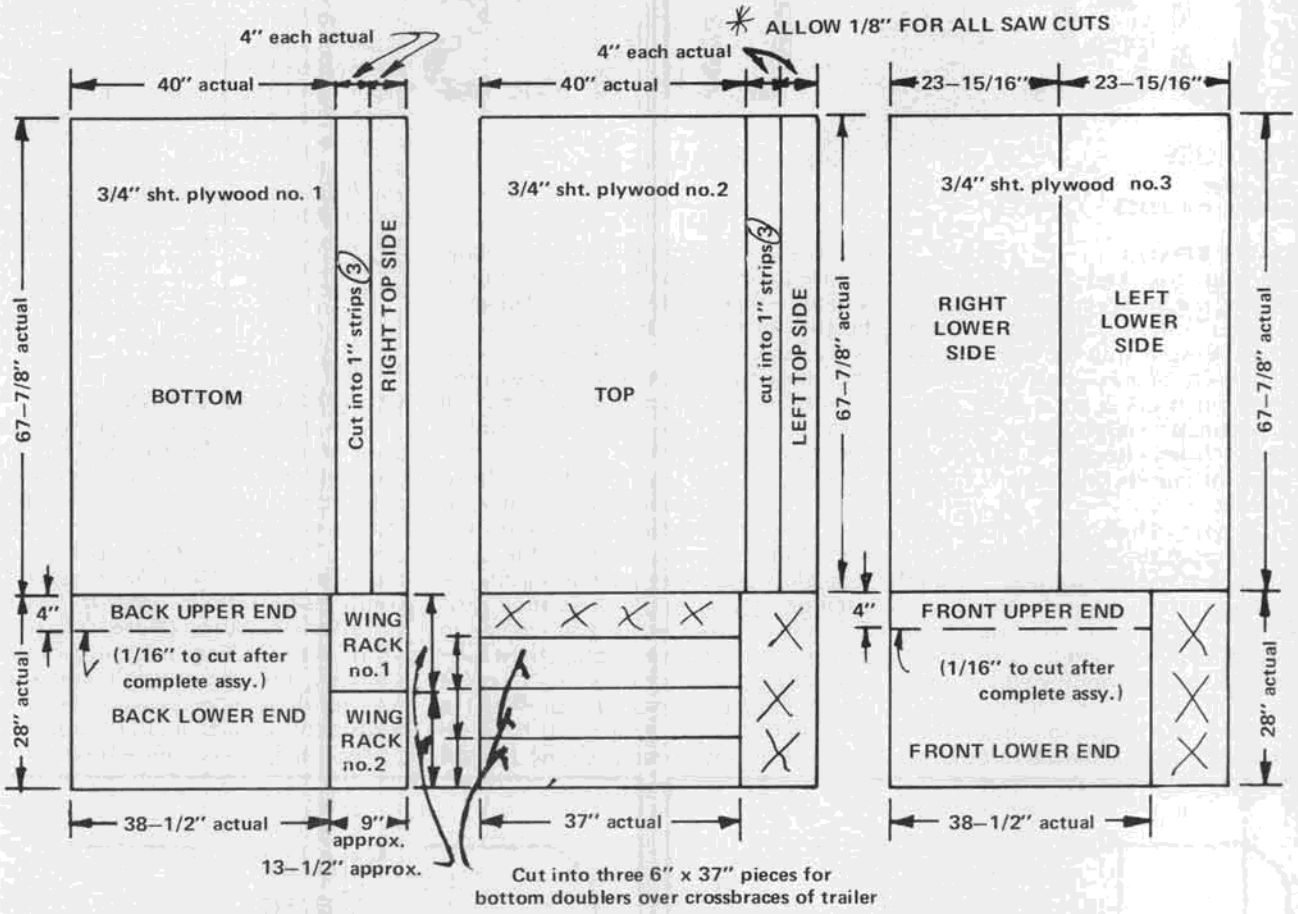
I soon quit the barn-jumping bit but remained an active modeler, even during my twenty years of flying for Uncle Sam, when I frequently took R/C birds with me on flights to England, Spain, and remote areas of the beautiful (?) Sahara Desert (the locals were only lukewarm about my flying ability, whereas the camels showed more appreciation for imported talent).

It wasn't till 1971 that my passion for BIG Birds was rekindled by a Proctor Antic. A Merco .49, swinging a 14x4, pulled that 81-1/2 inch, seven pound, S-L-O-W flying beauty with power to spare; she was a majestic bird and I could walk alongside at a leisurely pace when landing. She looked REAL in the air and I loved every minute of it . . . and so did the crowds of people who stopped to "ooh" and "aah."

This reconstituted love affair snowballed into an obsession and a stable of BIG Birds: The Antic; a Big John, and a Big John OMT (this is called buttering up your editor); a nine-foot, all-foam Fournier F4; and an eight-foot Miss America. These five big aircraft all had two things in common: they were slow, easy flying machines, and light enough to be powered by a sixty.

Although extremely happy with the way they flew, I just couldn't resist the urge to convert a chain-saw engine . . . lured on, I'm sure, by the promise of lower fuel costs and a more realistic sound. So I built a Nosen Champ, having enough sense to use some spruce and basswood and beef up the front end. I couldn't track the prop tips because six-bolt hubs weren't available yet, but I did balance the 18x6 and the magwheel and made sure that the engine was mounted solidly to the half-inch firewall. All of this helped to eliminate some of the vibration.

The Champ's first flight was great, but the second takeoff wasn't. She was just about to unstick when her tail became a blur and then made one helluva loud noise as it disappeared in a cloud of smoke, being reincarnated a few seconds later as pulverized wood and fabric. I was severely bent out of shape at first, but soon realized how lucky I'd been; fortunately that low frequency vibration did a number on her tail *before* she left the runway, which saved the engine, radio, and the rest of the yellow bird. My learning curve and my respect for



airframe integrity had just taken a quantum jump.

And I've kept on learning, with much of it being through trial and error, because most BIG Bird Buffs had yet to "come out of the closet." Like so many others I learned to adopt full scale building techniques, and why not? Our BIG Birds closely resemble full scale aircraft in efficiency, flying ability, and the need for maximum strength with minimum weight.

There's much to learn by anyone just getting into biggies, whether he's been in R/C or not. In fact some "oldtimers" have a tougher time because they've got to be reeducated: the gas engines require different care and feeding; the airframe requires different building techniques; the control systems require stronger servos, mounted solidly on hardwood beams with no slop or play anywhere; and a heavy duty airborne battery pack is mandatory for safety and peace of mind. What this all boils down to is that you've got to think of BIG Birds as *Miniature Aircraft*, and not as big model airplanes.

WHAT'S IN A NAME?

Plenty! At first I came up with some real sophisticated names for this column, like "Behemoth Banter," "Monster Musings" and the ever popular "Jumping To The Jumbos." But "BIG Birds" says it all because it *doesn't* matter if

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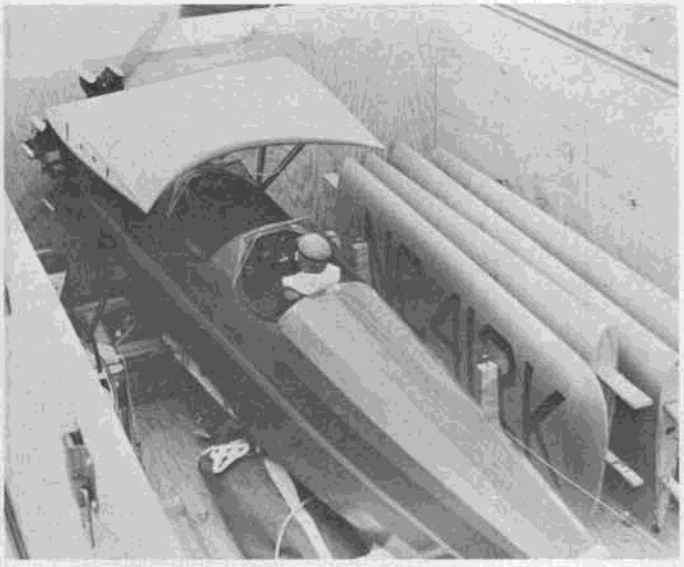
Here's proof that all Mode I fliers are not congenitally inept. J.W. Jones has put 6,000 miles on his trailer without any trouble.



Inside of J.W.'s little trailer. Uses 1/4-inch rubber shock cord to hold everything in place. It's available in most hardware stores.

FUEL LINES

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

CASUALTY REPORT

Have you ever had "one of those days?" Very probably you have. Remember? It usually starts out with a stubbed toe as you sleepily stumble from bed to bathroom. Of course, you cut yourself shaving, and break a shoe lace. Such things continue throughout the day, and sometimes culminate with a flat tire or transmission failure on the way home from work.

Well, guys, I've had four of those days in a row. Forget the individual mishaps. The dominant frustration has been that this is the fourth straight day that it has rained . . . in Southern California! Rain and outdoor dynomometer tests don't mix, and since our friendly editor does not look kindly at late columns *(yea, verily! wcn),* you'll have to wait another month for my promised walk-through of a dyno test. In the meantime, let's review some misconceptions about judging engine performance, and then take a close look at the cylinder head of our two-cycle engines.

PERFORMANCE MEASUREMENT

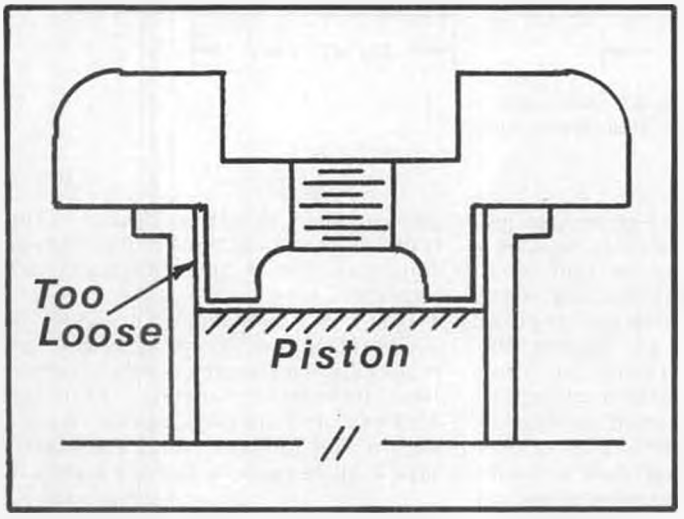
Since my initial report on the use of the dynomometer about five months ago, I've had many calls and conversations about measuring the performance of an engine. Everyone agreed that the dyno was the ideal device to use. Everyone also pointedly let me know that very few people have one, and not many more are about to invest in one. At this point, about half of them asked how the same thing could be done in a much simpler and less expensive manner. The other half usually told me their method which they thought was ideal. Usually it was expressed something like this. "Just get one prop for each particular size engine. Use only that prop, the same fuel and a good tachometer, and you'll be able to check power." Others allow as how their pylon times tell what's best, and some free flighters have said that the heighth of the climb is the way to tell. Sorry guys, but I've got to check mark the little square that says, "None of the above." The reason is simply that all those methods have too many variables. Let me explain further.

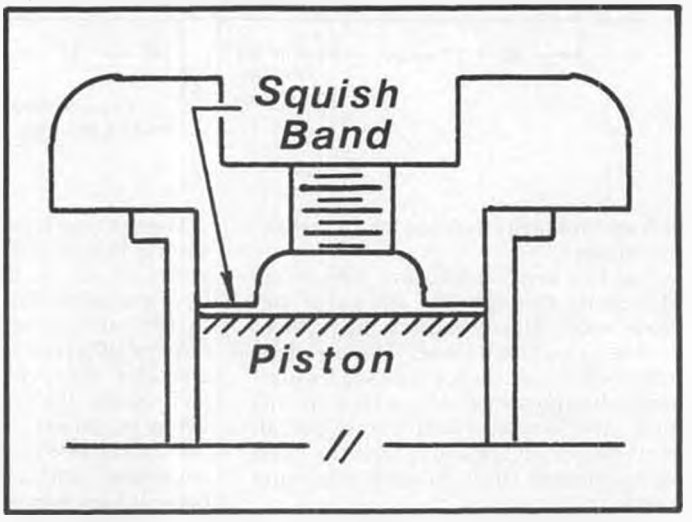
Let's assume that you have three engines . . . all the same displacement. If you test run and tach them all on the same fuel, with one prop and the same type glow plug, within a few minutes of each other, then you'll know their *relative* power. Note that if you change to another test fuel and/or plug, their relative ratings could change. If you test a fourth engine the next day or week, in all likelihood the results will have no meaningful relationship to the tests of the first three engines. The reason is simply because atmospheric changes have probably occurred. Such changes will affect tachometer readings. As an example, on at least three occasions, I have seen 1000-1500 RPM changes within half an hour. They were all due to the passage of a fast moving weather front which significantly changed temperature, dew point, and barometric pressure. The same thing can happen from one day to another.

The above three atmospheric variables unquestionably affect performance. Thus, even when a dynomometer is used to test an engine, each brake horsepower (BHP) computation must be mathematically corrected to a single standard. Otherwise, tests under different conditions would bear no meaningful relationship to each other. For simplicity, they are corrected to a "standard day" which arbitrarily has been chosen to be: Temperature 60 degrees F, pressure 29.92 inches of mercury at sea level, and dry air. If this sounds complicated, it really isn't. Correction factors from physics tests are simply multiplied against the test readings, and the corrected "standard day" information is then recorded. When you think a bit about these scientific facts, I'm sure you'll agree that pylon times, which are so variable because of pilot technique, and eyeball estimations of free flight climbs, are not very meaningful. Although they're not very meaningful, we all still tend to comment about them. They're good hangar talk . . . especially at happy hour.

CYLINDER HEAD DESIGN

Without going into lengthy explanations of why it happens, relatively high cylinder head pressures usually result in more horsepower. This fact has not been lost on many modelers who want more power. Thus, the first hop-up technique that they often try is to increase the compression ratio in order to increase cylinder pressure. (Note: There are other ways to vary pressure besides changing the compression ratio.) This may result in more power, and it also frequently results in detonation. It's pretty common knowledge that detonation is about as welcome as leprosy. In fact, about seventy years ago it was enough of a problem that concerted scientific research was conducted on detonation and ways to prevent it. One simple solution that evolved was the squish band. Today the squish band type head is very common . . . especially in two cycle high performance engines.





Take a look at the first cross section drawing of a cylinder head, sleeve, and piston at top dead center (TDC). As you'll notice, the combustion chamber is concentrated over the center of the piston and there is very little clearance between the crown of the piston and the squish band. After combustion begins at the glow element, the flame front has a relatively short distance to travel through the chamber. This results in less radiation heating of the unburned fuel/air mixture. If there's less time for radiation heating, then there's less chance of the

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Pattern Flying

By DICK HANSON . . . A dissertation on what to look for in the new radios aimed to satisfy the needs of precision aerobatic fliers.

• This month I thought you might be interested in the latest equipment available from our radio manufacturers. Every R/C radio manufacturer in the world seems to be in the race to see who can offer the most gadget ridden system. Some of the stuff is incredible-mixed exponential functions, automatic high to low rate shifting . . . WOW!!! We've been watching this race to see who comes up with something that would offer a clear-cut improvement in systems for Pattern flyers.

Frankly, the new radio systems are in my opinion, far improved, and a much better buy than systems were just five years ago. I know some flyers feel that the old systems were more "Quality Built".

Some of the mechanical bits and pieces were very good on the popular "professional" type sets offered during the '70s, but when it comes to performance, i.e. torque, speed, centering, etc., the new systems, many of which are inexpensive, are superior. Here is a list of the features available from various suppliers . . . we probably missed some.

1. Dual rates (and also triple rates for aileron) for aileron, elevator, rudder.
2. Exponential rates . . . aileron, elevator, and rudder.
3. Reversal switches for any servo direction.
4. Variable trim sensitivity.
5. Total servo throw adjustment.
6. Servo re-centering at the Tx.
7. Push-button actuation of any or all servos (rolls, snap rolls).
8. Mixed functions . . . any two (or three).
9. Adjustable stick length, tension.
10. Adjustable X-Y axis. (You can rotate the stick assembly.)

The electronic devices that make most of these features possible also enable the manufacturers to make the basic radios better. As an example, the encoder functions can be adjusted by any careful hobbyist. Also, the adjustments to one channel don't affect other channels. (You *too* can be an electronics expert.)

The breakthroughs in electronic hardware are coming so fast that new devices are technologically obsolete as they enter the market.

We haven't seen L.C.D. displays added to our Tx's yet, but be patient, someone will probably add a display that shows voltage, R.F., servo throw, etc., or maybe a space invader game that we can play with the sticks when we crash.

One of the interesting things we found in looking at the new systems was that the two systems which had the most features were not at all similar in design, shape, or price. One, the Ace system, is designed to make electronic tinkering practical to persons who understand nothing about electron flow, vacuum tube theory, etc. If you can read and follow directions, you can handle their electronics just as you would any nuts and bolts device.

The other, the J-R propo, keeps all the goodies away from your chubby fingers, but with only your little screwdriver you can turn screwslots and slide switches until you're happy as a clam; the neat thing is that you can't set up any "scrambled" combinations. The thing just hums along. Fascinating!!!

Okay, the $24 question is . . . will gadgets really make me a better flyer?

Well, if you really look at the systems with an open mind you will see where the benefits are. First, let's just run through the four basic radio functions.

1. Engine throttle control. You can now adjust the low speed trim without affecting the high speed trim *if* you choose a system with adjustable center and throw or exponential trim. The linkage setup also becomes much easier, as reversal switches and adjustable throw allows the rod to hook up from almost any angle.

2. Rudder. A soft center plus a wide throw is easy as pie with an exponential setup or an automatic high-to-low throttle couple. This smooths up rudder applications at high speed or on take-offs.

3. Elevator. High/Low throw control with dual rates and/or an exponential setup makes minute corrections easier and allows all the throw necessary for slow speed maneuvers.

4. Aileron. High/med./low throw controls by rate switches and/or exponential setups allow the choice of sensitivity which suits you best, *plus* assuring a pre-determined roll rate.

Interested? Okay, let's look at the "Exotic stuff". How about coupled flaps? A very light model really doesn't need 'em, but coupled flaps can provide that little extra lift to keep the model flying *flat* in rolling maneuvers.

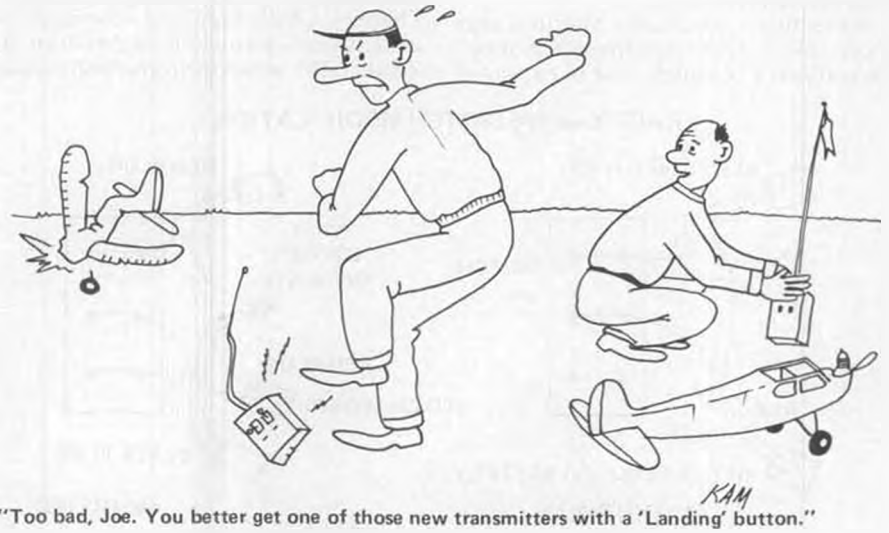
The elevator pumping we do on rolls is to hold the altitude against the speed and lift lost as the model transitions from upright to upright. Anything that we can do to keep the nose level helps prevent speed loss.

How about Elevons? In our opinion, these are really slick, but the model must be straight (no aileron trim) or the "flap" action will cause heading shifts. The benefit is a lower angle of attack in pitching maneuvers due to improved lift. This means less speed loss because there is less skidding, which uses up energy. Scale buffs should appreciate the advantages of this feature.

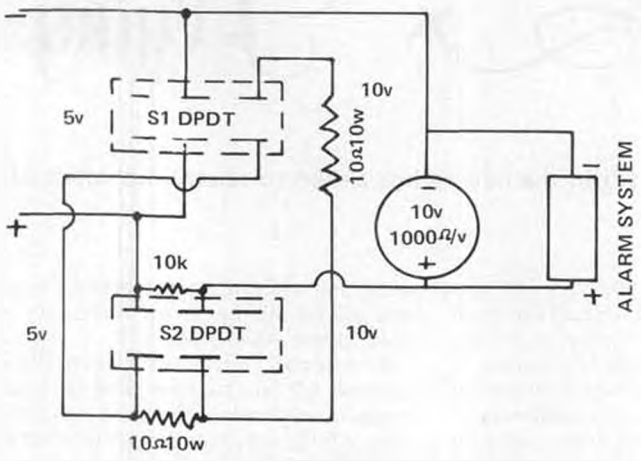
How about spoiler coupled with flaps? This setup apparently works for some of the Europeans and Japanese, but I don't see any widespread use here except on sailplanes. Basically the arrangement permits a rapid loss of lift plus an increase in drag. This can improve spot landing and slow the vertical dive speed, but it's kinda complex mechanically.

How about snap rolls by push button? This really works and if you are a push-

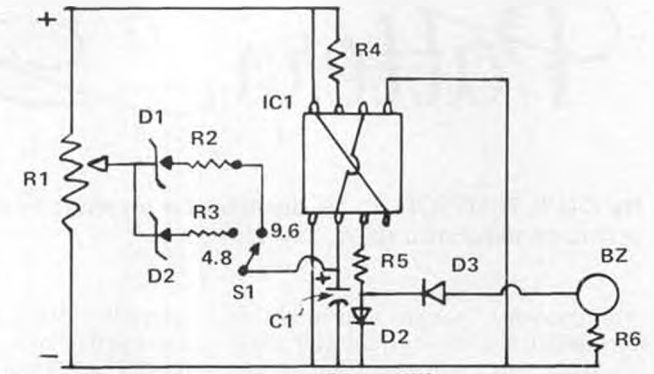
Continued on page 72



"Too bad, Joe. You better get one of those new transmitters with a 'Landing' button."



UNCLE BEN'S SUPER SEMI-CYCLING SYSTEM



IC1 – NE 555
C1 – 10 MF 10v TANTALUM
R1 – 10K TRIM POT
R2 – 10K
R3 – 4.7K
R4 – 10K
R5 – 470
R6 – 1–5K, FOR DESIRED VOLUME
D1 – 9.6v
D2 – 3.3v
D3-D4 – IN4148
BZ – PIEZO ELECTRIC BUZZER
S1 – SPDT SWITCH

AUDIBLE ALARM RECOMMENDED FOR ADDITION TO UNCLE BEN'S CYCLER (CAN ALSO BE USED BY ITSELF)

the Electronics Corner

By ELOY MAREZ

• My lead item this month is of a somewhat unusual subject, being completely non-electronic in nature — unless we consider the electric personality of the person involved.

I would like to extend my sincere congratulations to my friend Kathy Martin upon her election as 1982 President of the Sierra Madre (California) Radio Control Modelers. This must be a first, or close to it. . . I personally have not heard of any R/C club lady officers other than Secretary or Treasurer. Kathy handles both sailplanes and power planes with skill and confidence, a manner in which I am sure she will also handle the reins of the SMRCM. Besides, she is better looking than the rest of those renegades. . .

Incidentally, Mr. Kathy Martin is also more than slightly into the R/C hobby; he markets a complete line of excellent sailplane kits of all types, which incorporate many modern design and construction features. Glider guiders should do themselves a favor and ask for a catalog from: Bob Martin's R/C Models, 11178 Penrose St., Unit 4, Sun Valley, CA 91352.

PRO LINE PIECES

Pro Line is back! Actually, it has never been away, just going through some ownership changes. However, since the present owner, Ace R/C, has been in the R/C business for some twenty-eight years, I would think that Pro Line has at last found a permanent home.

The present Pro Line Electronics, a division of Ace R/C, announced a few weeks ago that it is now in production of Pro Line replacements, including 225, 500, and 550 mAH battery packs; five-channel Challenger and Competition, and seven-channel Competition receivers. The servos in production include the PLS-1, PLS-14II, PLS-15III, PLS-21, and the PLS-180. New, completely upgraded Pro Line systems will be available in 1982.

Address your inquiries to Pro Line Electronics, Division of Ace R/C, Box 735B, Higginsville, MO 64037, or call them at (816) 584-7121.

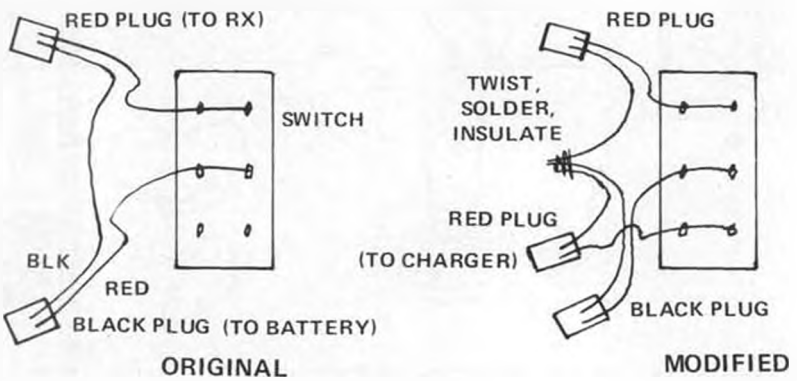
IMPROVED KRAFT K-LINE CHARGING CIRCUIT

The Kraft K-Line flight pack is charged in a rather unconventional manner, through a short pigtail connected directly to the battery instead of through the switch as is normally seen. The system works, however, it is possible to charge with the receiver being "ON", and is physically inconvenient at times when the battery is installed under the tank; the receiver must be removed before the charging connection can be made. It is a simple matter to remove the charge harness from the battery, and to reconnect it through the switch, in the more common configuration.

Notice on the sketch that the switch used is a double-pole double-throw-switch, wired in parallel for extra reliability. Switching breaks only the positive, or red lead. What we will do is to merely connect the red lead from the charge harness to the unused terminals of the switch, and connect all the black negative leads together.

Notice that the two leads originally coming out of the battery pack are identical, either one can be removed for attachment to the switch. Be sure that you leave a secure solder connection on the lead remaining on the battery. The switch is protected with a plastic cover

KRAFT K–LINE SWITCH MODIFICATION



over the rear contacts, which can be pulled off after removing two small screws installed through its rear. Cut the black wire right at the switch, and unsolder the red one going to the center terminals, after which the harness can be pulled through its hole in the switch cover. This hole now has to be enlarged sufficiently to permit both the original and the additional harness to pass through it.

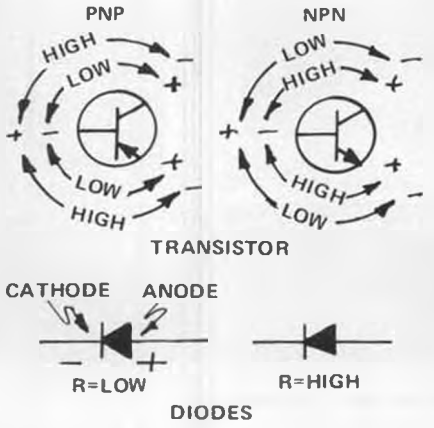
After the hole has been enlarged, pass the original lead through it and resolder the red wire back on the center terminals of the switch, making sure that the other end has the black molded connector on it. Now feed the lead removed from the battery through the enlarged hole, and solder its red wire to the two previously unused switch terminals. Strip, twist, and solder all the black leads together, and insulate them with a short length of shrink tubing. You will find that your Monokote heat gun does a super job of pulling down the shrink tubing.

Reassemble the switch, install and go fly . . . providing, of course, that you had charged your batteries previously, if not, you can now do so with a bit more safety and convenience.

Incidentally, never do this type of work with the battery plugged in, or on an otherwise hot circuit. The slightest short will ruin the wiring, possibly the battery, and definitely your disposition.

BASIC COMPONENT CHECKING

Had a flying field question about checking transistors!



Ohmmeter testing of components. See text.

Like so many other things, there is transistor checking, and then there is transistor checking, some of which requires special equipment, plus the ability to use it and to interpret what it is telling you. However, there is a simple GO, NO GO, test which requires only an Ohmeter, and which works for the majority of transistors used in R/C equipment. Note that this test will not tell you the gain of a transistor, which is important to know in some cases, but it will definitely determine whether it is dead or alive, which is all that is required at other times. Conveniently enough, this test can be made with the transistor soldered into a circuit.

The first thing that you need to know is whether the transistor in question is a PNP, or NPN device. If you have a schematic of the unit, you've merely to locate the diagram of the transistor, and look for an ingoing (PNP) or outgoing (NPN) arrow on the emitter lead, see our sketch. If the schematic is not available you'll have to read the number etched on the side. Generally it is a three or four-digit figure, preceded by a 2N, or possibly MPS. However, there are countless possibilities, such as 2SA or 2SC in the Japanese equipment. A transistor manual or catalog will then tell you whether you are dealing with a PNP or NPN device.

Now, with your multimeter set to read Ohms, at it's lowest range, check the resistance from the base of the transistor to each of the other two leads, the emitter and the collector. Referring to our second diagram, notice that there is a large variation in the resistance reading between any two of the test points as the leads are reversed. In other words, with the positive lead on the base, and the negative lead on the emitter of a PNP transistor, you will get a low reading, while reversing the multimeter leads will get a high reading. We are speaking here of an average difference of half scale tc no reading at all; it is a definite high or low.

Study the diagrams, you will see that the whole test is based on polarity, and

Continued on page 81

Highly recommended, the only up-to-date book of its kind currently available. See text for review and source of availability.

The only true 6-meter transmitter in captivity! Built by the columnist, it shows what only Mode I fliers are capable of.

The Prather 35 Tunnel, being urged along by the new K&B 7.5cc outboard.

R/C POWER BOATS

By JERRY DUNLAP

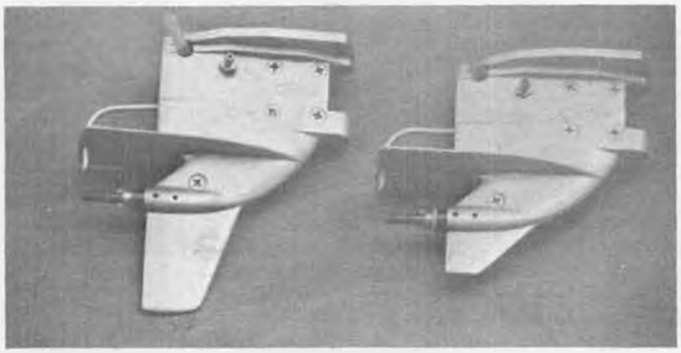
PHOTOS BY AUTHOR

LOOKING AT THE NEW 7.5 OUTBOARD

After two years in development, the K&B 7.5 Outboard is now available. It reached our local hobby stores around the first of December. At the time of submitting this article, I've been running my 7.5 Outboard on different boats for the past three Saturday mornings. Our local pond has restricted running times, and if you don't get it done Saturday mornings, you're out of luck. Luckily, the pond hasn't frozen, and I'm still in the process of sorting out boats for this new outboard offering. The main theme of this article will be my impressions of the engine and of a couple of boats that we have used with the engine.

First, some comments about the engine. The main reason K&B took so long in developing this engine was to eliminate the need to keep developing improvements for it once it was released. The K&B 3.5 Outboard has gone through something like a half-dozen improvements or updatings since its original release back in 1976. All of these developments on the 3.5 Outboard have served to increase reliability and improve performance. However, it has become somewhat of a headache trying to figure out what is a "stock" 3.5 Outboard after an engine has been updated a few times. Hopefully, the 7.5 "transom twister" will not need to be improved upon in the immediate future. My initial runnings with a production engine would indicate that K&B has sorted out the problems that plagued the 3.5 version initially.

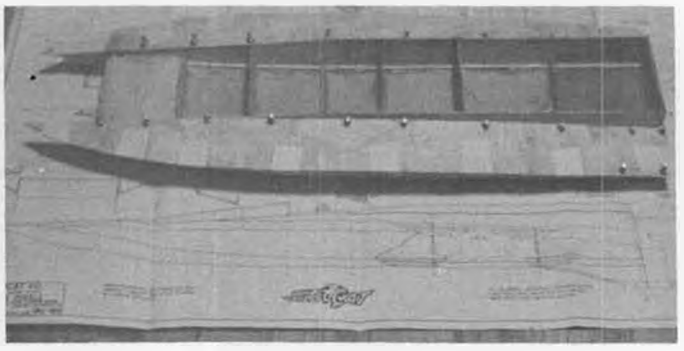
However, there appears to be one possible problem in the area of the shaft cable. On my engine, the flex cable was cut about 3/16 inch too short. When the engine was started, the shaft disengaged. We solved the problem by using 1/8



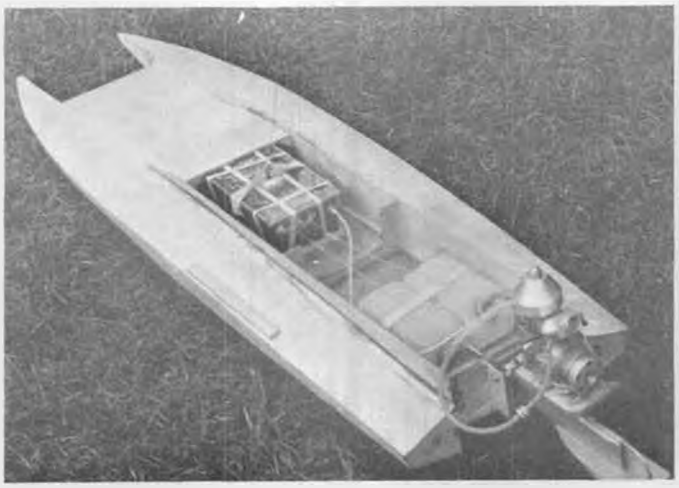
The new K&B 3.5 lower end on left, compared to the previous version. Has screw-in stub shaft and lower skeg.

J.V.S. 7.5 tunnel running down the straightaway. Excellent scale appearance, a fine running boat.

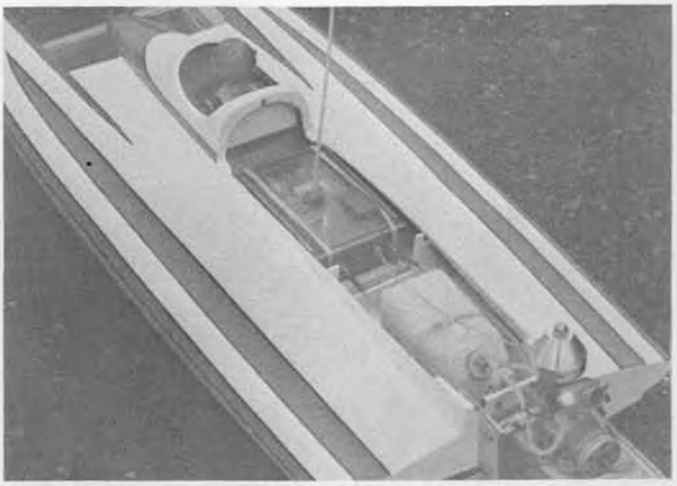
Part way through construction of the Octura Wildcat Tunnel. Sponson side clamped and pinned in place.



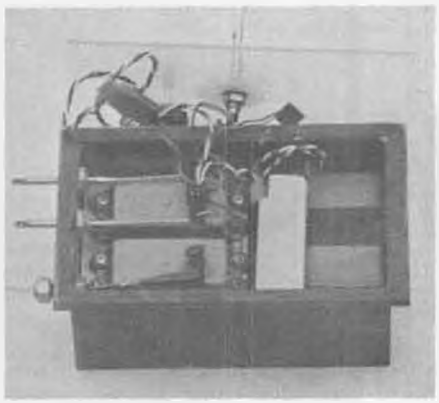
Decking pinned and taped in place on Wildcat Tunnel. Designed for inboard power, but adapts well to outboard setup.



Octura Wildcat with G&M Radio Box installed, twin 8-ounce tanks, K&B 7.5 Outboard, and K&B throttle linkage kit.



The J.V.S. 7.5 Outboard Tunnel. G&M Radio Box, 12-ounce Sullivan tank, Teague Model Marine motor mount, K&B 7.5 Outboard.



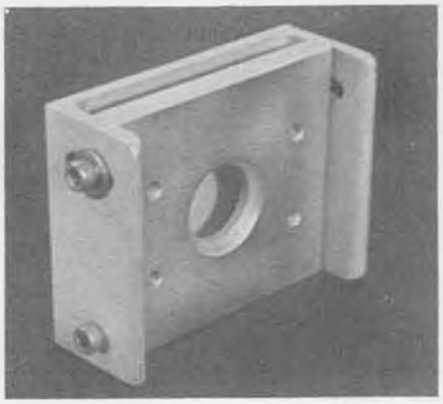
G&M Radio Box includes box, seals, and push rods.

spacers in the stub shaft assembly and backplate housing. I mentioned this to Bobby Tom, K&B's service manager, and he said they will replace any flex shaft that is too short. This might not be a problem on all engines. A friend has run his 7.5 and not experienced this problem.

Prior to running the 7.5 Outboard, it is a very good idea to completely disassemble the engine, clean the parts, then reassemble, making sure to tighten all the bolts securely. One area to give special attention is the carburetor. Use Loctite or Hot Stuff on the set screws that hold the carburetor in position. Make certain the locking nut that holds the carburetor barrel adjustment bolt in position is tight. Seems like the carb is especially susceptible to vibration. Never use a bondus head speed wrench to do the final tightening of engine bolts. One of my friends took his 7.5 apart, carefully cleaned it and put it all back together using only the bondus head wrench. The engine shook itself apart in less than 10 seconds after initially being started.

Take the time to read the instructions that come with the engine. Especially read the parts dealing with the setting of the high speed and low speed needle valves. With some adjustments, it is possible to achieve an excellent idle with smooth response to full throttle. However, it will require some experimenting with the low speed adjustment.

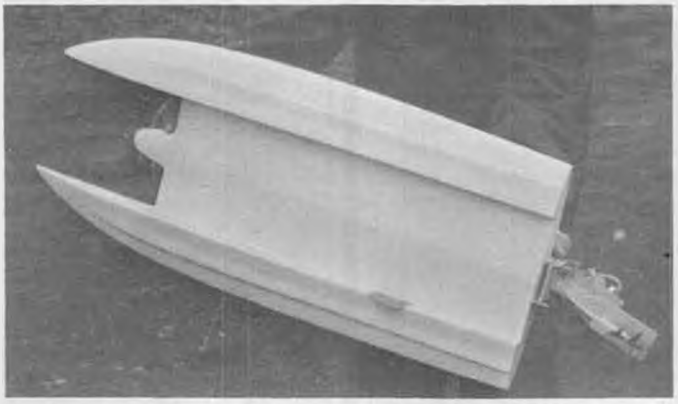
In our February column, the McDaniel Bo-Starter was mentioned, and is that ever a great device for starting the 7.5 Outboard. This particular engine has one bunch of compression for sure. Being able to release the compression when starting the engine really makes the engine easy to fire. Since that article, McDaniel R/C Service has moved from Nebraska to Virginia. The new address is 13506 Glendundee Dr., Herndon, VA 22071. Another item mentioned in an earlier column that I really think is helpful with the 7.5 Outboard is the adjustable motor mount. Such a mount is available from either Teague's Model Marine Products, 8027 Genesta Ave., Van Nuys, CA 91406, or Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744. Both mounts sell for $24.95.



The Prather 7.5 Outboard Motor Mount.

Before discussing a couple of possible boats for the engine, let me summarize a bit about the performance of the 7.5 Outboard. Because a lower timed sleeve is used in the outboard and the exhaust is restricted by the muffling effect of the lower unit, the outboard does not turn up the "Rs" like a piped 7.5 inboard. The engine does develop plenty of power, and prop selection will be most important to tap the full potential of this engine. Using the Bo-Starter, I have found the engine to be easy to start and very responsive when the carb is set correctly. The screw-in prop shaft as-

Continued on page 69



Bottom view of J.V.S. 7.5 Tunnel, showing sponson side strakes, tunnel bottom vee, and turn fin.

Octura Wildcat Tunnel in action. With addition of cowlings, the boat would have scale-like appearance.

1. Frank Macy, spark plug behind efforts to preserve Jim Walker memorabilia. Couple of Fireballs . . . what else?

3. Heidi Piland, Stunt-A-Thom Queen for a Day at All Stunt contest for Jim Walker. Sleek seaplane version of Fireball.

PLUG SPARKS

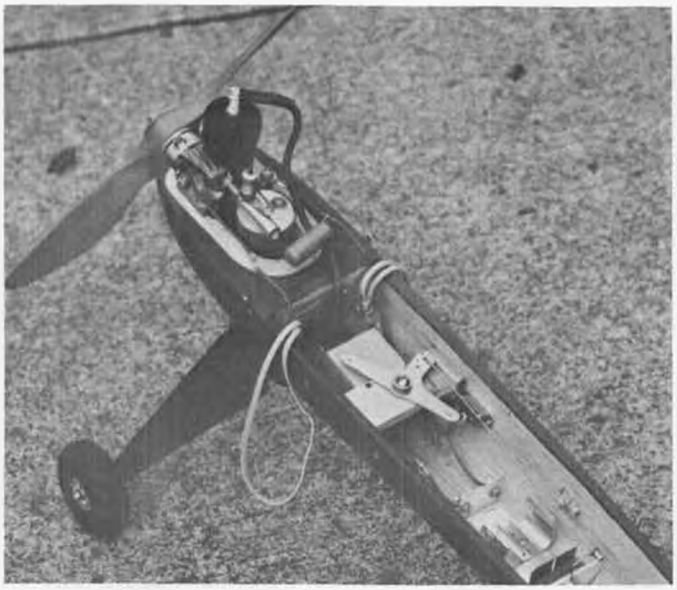
By JOHN POND

• "U-Control", "Jim Walker", "Fire Ball". All these words are synomous with controline flying. It has been proven many times, some other fellow ahead of Jim Walker thought of the idea of controlling a model by wires, but it remained for Walker to popularize the controline model. His dedication and constant plugging of this form of flying finally resulted in a tremendous outpouring of controline flying directly after the war.

Properly introduced by Jim Walker, controline flying was the biggest shot in the arm to model flying. No longer did the modeler have to worry about losing that large free flight flying field to the encroachment of the real estate builders. Now, he could fly every Sunday and only be gone two or three hours at most. Did that ever make points around the home!

When Jim Walker died of a heart attack sometime in 1957, the company he had founded continued on until it was overtaken by its competitors. Eventually the firm closed its doors as everyone had adopted all of Jim's ideas in packaging gliders, all balsa R.O.G. models, helicopters, etc. Of course, the big blow was when Leroy Cox broke the Walker U-Control patent.

Frank Macy, a dedicated enthusiast of controline and an ardent admirer of Jim



4. Above. Do you remember this classic ignition setup for the Fireball? Ohlsson and Fireball like ham and cheese.

5. Right. Alex and John Drobshoff at 1942 Fresno Annual. Alex seen with recently S.A.M. approved "Little Diamond".

8. Tom Rice with Lanzo R/C Stick. Is flown in both R/C and F/F competition. MB has plans.

Walker, became quite interested in what was to become of all the legacy that Jim Walker had left. Singlehandedly, Frank has been able to contact the Walker family, relatives, workmen of the American Junior Aircraft Co., and friends who all had artifacts, parts, etc. that directly related to Jim Walker.

The more Frank got into the life of Jim Walker, the more amazed he was at the prolific ideas that came from Walker. It was then that Frank decided to write a book on Jim Walker's life, to be called "Fireball in the Sky".

With the cooperation of all the people contacted, Frank was able to amass enough items to form a Jim Walker Museum display. A typical example is shown in Photo No. 1 of Frank Macy. Arrangements were made to donate the items to the Oregon Historical Society and the Pacific Museum of Flight, Seattle, Washington on Boeing Field. When the artifacts were offered to the Russ Barrera National Model Airplane Museum, this writer came into the picture.

To commemorate Jim Walker and to award the various items to all museums concerned, a "Stunt-A-Thon" was organized by the Nor'westers and scheduled to be held on October 4 at the Jim Walker Memorial Field (the Delta Park paved circle in Portland). Standard PAMPA events were offered with two rounds. Of course, the special feature was the presentations to be made to the museums by Frank Macy, acknowledgements to the Walker family and demonstrations of team flying of Fireballs. *(Sorry, Photo No. 2, of Walker family, could not be reproduced. wcn)*

To help liven up publicity, Photo No. 3 shows a good friend of Frank Macy at Westmoreland Park, with a hydro version of a Fireball. Heidi Piland was the unofficial "Queen" of the Stunt-A-Thon, as she did more than her share to attract the modelers.

This writer had no recourse but to show up for this spectacle. Taking the trusty brown Chevrolet Impala station wagon, our hero proceeded to drive to Portland, Oregon, arriving at 11:30 a.m., just in time to see the noon time festivities.

The display of Fireballs was nothing short of astonishing, with all sorts of Fireball variations; seaplanes, biplanes, old type and new type, and we didn't even mention the table displays! Too bad the photos didn't turn out good!

In that same line, we simply couldn't resist publishing a photo (No. 4) of the ignition wiring setup in a Walker Fireball. More than one modeler did it exactly as outlined in the instruction sheets.

Everything went off like clockwork: the flight demonstrations of team racing Fireballs, the presentations to the widow of Jim Walker and her daughters, and the presentation of memorabilia to the Oregon Historical Society.

The writer was so busy chumming with some of his Northwestern friends that he was a little startled to hear his name called to accept the Jim Walker items being donated to the Russ Barrera National Model Airplane Museum. Even this went off smoothly as the "old politician" was equal to the occasion with an impromptu speech.

Loaded to the gills with Walker artifacts, the trip home seemed to be an anti-climax. The gear was delivered just in time to find that the Academy of Model Aeronautics was taking over the Barrera Museum and packing it up for shipment to the Washington D.C. headquarters. Jim Walker would have loved this!!

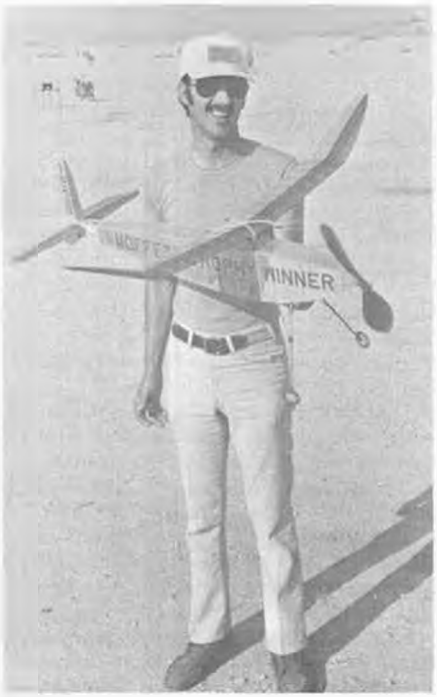
ENGINE OF THE MONTH

In 1947, most every modeler was looking for a way to get around the weight and trouble of the ignition system. One method, as marketed by Art Hasselback of Consolidated, was to sell a nitrated fuel known as "Liquid Dynamite".

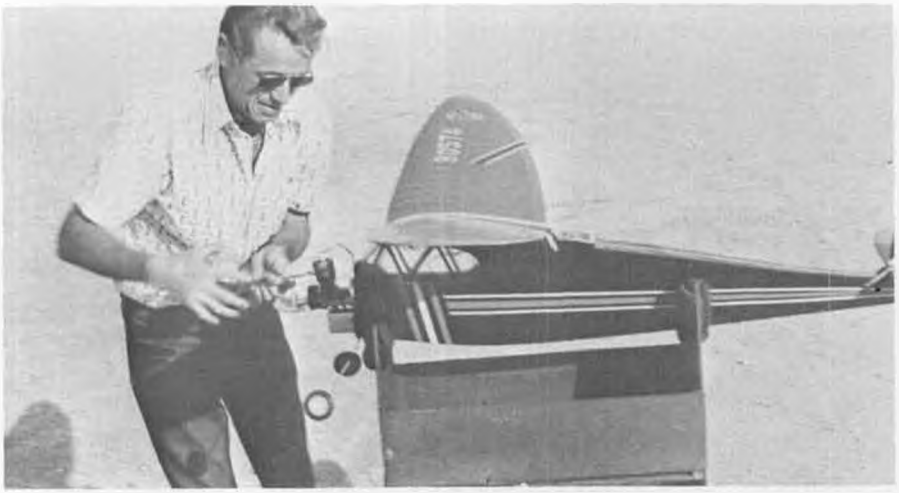
Here, the motor was started on an external ignition pack. When the motor had warmed up, the unit was disconnecyed and the electrode of the spark plug would glow. This eventually led to the production of the glow plug by Ray Arden. Surprisingly, the annoucement of this revolutionary way of running a motor was rather quickly announced in the lower section of that advertisement

7. The late Ed Cadwell, seen in better days. Winner at 1968 NCFFC nostalgia meet.

6. Another Bruce Lester photo goodie! Frank Kiewicz's powered glider was actually entered in the Berryloid Best Finish Event.



9. A Nelder Moffet Trophy winner by Bill Crovella. Another plan available from MB.



10. Don Weitz has the hottest ignition engines we have ever heard. Here with Comet Clipper at VAMPS Annual.

featuring engines and parts in the November 1947 issue of *Model Airplane News*.

Another school of thought, based on the European success, thought diesel engines were (or compressin ignition engines, as they really are) the way to go. This was thoroughly exploited by Leon Shulman with his Drone Diesel engine.

Many other companies thought this was the way to go and started producing various versions of diesel engines. In the February 1948 issue *Model Airplane News*, the Gotham Hobby Co., 107 East 126th St., New York, announced a new engine called the "Deezil".

This Class A engine was competitively priced with the Ohlsson 19 and 23, as the O&R firm had just dropped the prices of its motors by over 40%. This action not only caused a rumble with hobby dealers who were stuck with engines at the old price, but immediatly undersold all the rest of the engines on the market.

The Deezil was Gotham's answer to both problems; i.e., ignition and price. At $12.95, this engine was instantly accepted as a real bargain. Incidentally, not many collectors know, but a ball bearing version was offered at $17.95, but was never produced in quantity as the lower priced engine commanded the modelers purse.

Gotham was flooded with orders and production of engines mounted. As production increased, quality fell off badly, something that cannot be tolerated in a diesel. It didn't take long for the modelers (the competition oriented flyers) to sort out this engine and proclaim it a "turkey" on the basis of poor workmanship and resultant poor performance.

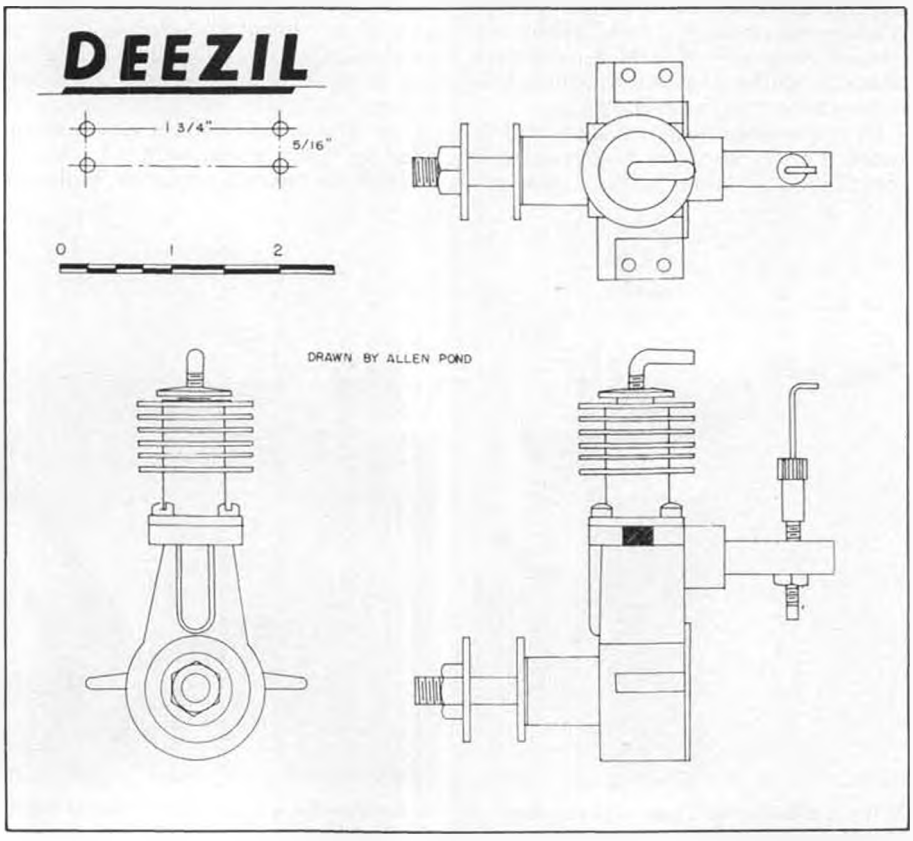
However, Gotham had invested heavily in this engine and in an effort to recoup its lost sales, the price of the motor was abruptly dropped to $2.95 in the November 1948 issue of *Model Airplane News*.

This succeeded in prolonging sales until the word finally got around to even the newest tyro in the modeling game that this engine was a bad investment. In some respects, the sale of this engine was quite similar to the drop suffered by the GHQ Loutrel. The latter was saved by four years of war where no engines were available and consequently many a modeler got burnt.

Sales went on for about a year after the price drop, but the handwriting was on the wall. Eventually, sales stopped completely and the engine dropped into obscurity.

The Deezil engine was simplicity itself, with only a variable compression lever to set and a needle valve to meet the flow of fuel. Also offered with the engine was a flock of accessories ranging from propellers at 50 cents to a gamut of items consisting of shut-off valves, spinners, a vibro-tak (!), flywheels, boat couplings, fuel, and many miscellaneous tools.

For the benefit of the technically minded, the Deezil featured a bore of .473 in. and a stroke of .708 in., giving a displacement of .125 cu. in., which stamped it as a Class A engine. Weight of the engine was five ounces, with an overall height of 3-1/2 inches. The cylinder, piston, crankshaft, and connecting rod were made of alloy steel, while the crankcase was die-cast aluminum. The latter, in many cases, were produced so quickly, the flash was still on the casting.



12. SCIF "Newsletter" editor, Ken Sykora, is a prolific builder. Ohlsson 19 powered Don Foote Westerner, at SAM Taft Champs. Johnson photo.

The manufacturer claimed 8000 rpm using a ten inch propeller for free flight. Controline flying called for an 8-10 prop (no rpm figures given) which gave a claimed 1/6 HP (same as the Baby Cyclone!) Rather extravagant claims!

The writer is indebted to Karl Carlson for the use of his engine to produce the accompanying drawing of this article.

THIRTY YEARS I AGO, I WAS. . .

This month's commentary was brought on by this columnist's remark that George Aldrich was the originator of the slow pattern featuring a large airplane with a small motor. Not so, says Joe Wagner, of 135 Waugh Avenue, New Wilmington, PA 16142 (formerly of San Fernando Valley).

Matter of fact, Joe may be right, as this writer remembers George commenting on Bob Palmer's Fox 35 powered Chief at the 1949 Nationals. Anyway, Joe says the origin of the small engined stunt model came about like this:

In the late forties, practically all the controline stunt fliers in the Los Angeles area (Davy Slagle, Donnie Gulotta, Bob Palmer, J.C. Yates, Louis Nordlinger) and the active modeler engine makers and kit designers (Duke Fox, Hi Johnson, Johnny Brodbeck, Lud Kading) would congregate every Wednesday evening at the San Fernando Baseball Park where night flying under the lights took place every week. A lot of truly fabulous flying was done there.

Besides the great names, there were quite a few run-of-the-mill modelers and even some rank beginners who showed up not so much to fly, but to admire the masters and learn from watching. One of these beginners was a pestiferous kid who kept hanging around the champ fliers, asking questions, bothering everyone, and in general, always getting in the way. Palmer, Yates, Johnson, and Nordlinger bore the brunt of the constant questioning despite all attempts to ignore him. Finally, a little plot was hatched to get the pest off their backs.

One Wednesday evening, they took the bore aside and told him, "O.K. We'll help you! Go down to Bob Enright's Hobby Shop and buy a 'Go-Devil' and an Ohlsson 23 along with the required accessories. Bob will fix you up." (Enright was in on the joke.)

The victim said, "An Ohlsson 23? You guys are all flying with Orwicks, Atwood Champions, and Super Cyclones in your models."

"Yes," admitted the plotters, "But you are just starting in stunt flying and you need a low powered airplane to start. After you get used to that, you can go to the larger engine."

"But how will the Go-Devil balance with the Ohlsson," asked the younger doubtfully (fully realizing a tail heavy controling model won't fly).

To which the tricksters replied, "Don't worry about that. Just add lead to the nose under the motor mounts. This will also help you learn to fly by making the model more controllable."

The hotshot flyers had the idea this would keep the pesky kid out of their hair while he was building the model. When he finished it, of course he would bring it to one of the Wednesday evening flying sessions. They would help him to get the engine going, send him out to the center of the circle to grab up the handle. Then when he gave the signal to release the model, they would laugh their heads off when the model

13. There truly is a Czech Team! Note official banner. Names added as accepted.

11. Rudy Calvo with the inevitable Playboy Sr. with classic engine power, a Super Cyclone.

would just sit there with the puny .23 motor roaring away and the big stunt model just sitting there.

Well, give the devil his due. He did get the model built with Bob Enright's help, and sure enough, he showed up with the Go-Devil ready to fly!

That Wednesday evening enjoyed an unusually large turnout. It seemed everyone was in on the joke and came to see the fun. The boy showed up and the flying circle was quickly vacated. He was next to fly! Boy! He didn't lack for help! They ran out his lines, solicitously checked the model for proper hookup and correct neutral settings and even fueled his plane. Even the booster batteries were provided so that the Ohlsson would start easily.

A few flips of the prop, proper manipulation of the needle valve and timer with some good words of advice, "Keep your arm stiff all the time and just point it where you want to go." Then the experts sent him out to the center of the circle for his debut.

The kid was probably shaking in his boots as he picked up the handle and made his arm as stiff as a poker. After a bit of nervous hesitation, he gave the signal to let go . . . and all the experts got ready for the big belly laugh.

But, lo and behold, the airplane flew! The model took off like a real airplane, smoothly and slowly, went up and around (the stiff arm and low power really helped!). As all the hotshots stood amazed, the kid went around and around flawlessly, in his first controline flight!

When the engine stopped, the model

14. A Chicago design, the O.O.S. by Herb Wahl (MB has plans), one of the most dedicated O.T. free flighters.

16. What a beautiful flying field! Dave Shakeshaft of South Africa, with Shulman Skyrocket B.

sort of pancaked in (the experts hadn't told the victim how to land), but the long legged landing gear, designed to give clearance for the larger prop of an Orwick, just spread a little and the airplane was not damaged.

Everyone was absolutely flabbergasted. Bob Palmer was the first to recover and hollar, "Hey! Let me try that ship."

After refueling, Bob flew the 23 powered "Go-Devil" and found it more responsive and capable of tighter and smoother maneuvers than any 60 powered stunter he had flown. After watching Palmer wring out the model, J.C. Yates had to try it . . . then Donnie Gulotta, etc.

When the caretaker turned out the lights at the San Fernando ballpark that night, a lot of expert modelers went home that night with a lot of new ideas in their heads. Duke Fox's .35 stunt engine had its beginning that night. At next year's Nationals, Bob Palmer flew a Fox 35 in a slightly modified "Go-Devil" that was later kitted as the Veco Chief. George Aldrich observed this and the rest is history with his famous "Nobler".

From this you can draw a comparison to the inside frosted light bulb, a major development in a rather technical field that had its origin in the same thing; a joke the experts tried to pull on a novice. Truth is stranger than fiction!!

MORE 30 YEARS AGO

While we are on this nostalgia kick, this columnist would be remiss if he missed presenting Photo No. 5 taken of John and Alex Drobshoff during 1941 at the Fresno Annual, which was just in its infancy then!

One of the main reasons for running this photo is to show what Alex Drobshoff's "Little Diamond" looks like. This recently approved old timer design could be regarded as a pylon version of the John Drobshoff "Challenger" design (seen on the ground).

Unfortunately Alex died several years later of cancer of the stomach. Surprisingly, John had the same ailment two years ago, but the medical technology had advanced in 30 years to the point where they were able to save John. John, who was very close to his brother, regards this as truly ironic.

BRUCE LESTER GOODIE

We're going to run those photos at the rate of one a month until we run out. Hopefully, Bruce will be recovering to the point where he can dig a few more up. This month features Photo No. 6, showing Frank Kiewicz's glider that was also entered in the Berryloid Best Finish Event. Bruce recalls the fuselage and wing trim scalloping were a light Berryloid Orange. *(Put on your glasses, John, there's an engine up front! wcn)*

Kiewicz worked for Dallaire Brothers, Joe and Frank, in Detroit. As friends of theirs, when Bruce had a business in Sarnia (for less than a year), he handled the Dallaire line. Bruce doesn't have any kit plans in case you are wondering. Lester liked to design his own stuff in a regular evolutionary manner from observation, and scratch build.

SAM RUBBER POWER CHAPTER

As we mentioned in the last issue, the Marin MAC is filing for a SAM Chapter status for rubber only. Bill Hurley writes to say the last Pacific Ace contest was rained out (yes, Hugo, it does rain in California). They are now planning to have a Joe Ott contest based on plans published by Joe Ott over a 30 year span. The best one appears to be the scale event of under 20 inch w/s and over 20 inch wingspan. Joe Ott (incidentally, Ott was derived from Otto) will be pleased to read about these events.

OBIT NOTICE

This is getting to be too darn regular to suit this columnist. Another good old boy gone!

Just got a call from Charlie Critch, bosom buddy of Ed Cadwell, 10 Kuhl Ct., Walnut Creek, CA 94596, notifying me that Ed finally expired. He had been suffering from heart troubles, circulatory troubles, and other miscellaneous problems, like smoking and attendant respiratory complications.

Ed passed away on December 14 at the young age of 57. He is survived by his wife and children. As can be seen in Photo No. 7, Ed was also a good competitor, even to the point where he could really blow his top at a seeming injustice.

Cadwell dearly loved hot engines. The more they screamed, the better he liked them. When he was down in Houston

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15. Brand new scaled up Trenton Terror, by Richard Geer, SAM 29. F.W. Planesmen Labor Day meet. Red silk, K&B 35.

TIGER SHARK !

By HAROLD LANSER . . . Here is a truly historic model, brought back in R/C form, but retaining all the smooth, graceful lines that have made it a classic. Even R/C modelers who do not date back to the mid-thirties should be attracted to this beauty!

PHOTOS BY AUTHOR

• Well, for you "young timers", this is a 50% enlargement of a 1938 Victor Stanzel design. We old timers have all probably built one of Vic's little speedsters . . . the Super 'G' Shark, the Super 'V' Shark, or maybe a Baby Shark . . . . all classics of their day.

The Tiger Shark was the original Stanzel model that led to all of the historic Shark series. It was flown with one line, plus a six-foot bamboo fishing pole to help control climb and descent.

Thanks to John Pond, I got a copy of the Tiger and 'V' Shark plans to build control line models, but I got into R/C before I finished. One photo shows the difference in size between the original and the enlarged R/C version.

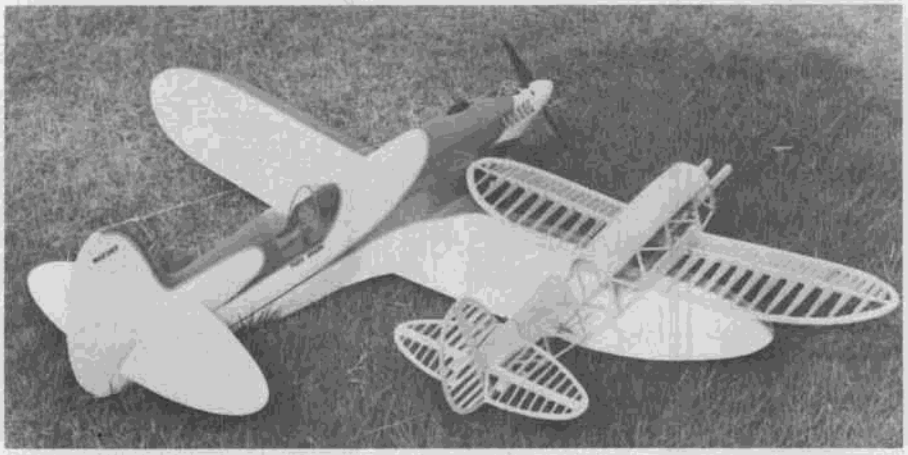
Construction of the R/C version is very much like the original. The fuselage could be built of sheet sides, but it just wouldn't be a Tiger. Incidentally, the Tiger was selected from all the Shark designs because it seemed to enlarge better into an R/C configuration. I used the Falcon 56 wing as a base because it cut down on construction time and also was better proportioned for R/C. Thanks, Carl Goldberg!

CONSTRUCTION

I suggest you build the horizontal stabilizer and elevator first, as the aft end of the fuselage builds around it. Use all hard balsa on the stab and elevator spars, also the leading and trailing edges.

BE SURE to install the 1/4-inch hard-wood dowel in the stab spar and the 1/8 dowel in the leading edge. These dowels are vital! I found out the hard way. On the eleventh flight, I did one of my world-famous vertical rolls with a Split 'S' over the top. I forgot to close the throttle over the top, and she was really smoking on the way down. I heard a buzz, slammed the throttle closed, and *very* gently pulled back on the stick. Was I glad I had gone high doing the vertical rolls, because the Tiger leveled out about five feet off the deck! When I got it down on the ground, I found the stabilizer spar cracked next to the fuselage. Use epoxy to set those dowels. . .

The cover aft of the cockpit is 1/16 balsa soaked in hot water and molded over the formers, taping in place until dry. Lift off when dry and then glue in place.



Harold's R/C Tiger Shark, with the original size control line model resting on its right wing panel. He has an even larger one in the works, with flaps and retracts.

Harold Lanser shows off the checkerboard paint job on the bottom of his Tiger Shark.

The decking in front of the cockpit is done in strips about 3/16 wide, then the under side is painted with Elmers yellow glue, thinned 50% with water. This makes it very strong, as the glue soaks in well. Any small gaps on the outside surface can be filled with micro-balloons and sanded smooth.

The hatch over the engine is carved from a solid balsa block, and the nose is planked with 1/8-inch balsa strips of various widths. The fuel tank compartment is lined with 1/16 balsa, then painted with thinned Elmers, as is the engine compartment. I paint with glue until the surfaces are smooth, without sanding. When dry, this will stand up against most any fuel.

The part under the stab is 1/4-inch medium balsa. The vertical fin is squared to the fuselage, then the stab is squared to all of this. Do it right . . . you can't change it later! The leading edge of the fin is three laminations. The medium hard balsa center piece is installed first, followed by the 1/4-inch sheets over the stab. Now the softer outside fin leading edge pieces are added. Ribs are 1/16 sheet rectangles. Sand to airfoil shape after installation. Stab is built in the same manner.

The landing gear mount is two pieces of 1/16 plywood. The front piece is larger so it lays on the face of the 3/16 square upright fuselage structure; the second piece fitting between the uprights.

The wing fairing cannot be made until the wing is built. The latter is built totally flat and then the trailing edge from the eighth rib from the tip is sanded to form the washout of the wing. After the wing is completely finished and sanded, carefully cut out the ailerons. Trim the ribs of the wing and add the aileron spars. Trim the ribs on the ailerons and add the aileron leading edge. After the planking is on the center section and the wing has been trial fitted to the fuselage, place a sheet of waxed paper between the wing and fuselage and bolt them together. Now fit the 1/16 balsa fairing bases over the wing root, gluing them to the fuselage only.

Remove the wing now, and install the fairing between the fuselage and fairing base. Use two layers of 1/32-sheet, as it is easier to fit and form one at a time. Bond the second layer to the first with Jet, soaking it through the second layer to make a very solid fairing.

The front of the cockpit is formed with .030 music wire, which supports the clear plastic. Use Wilhold R/C-56 glue to hold the two canopy pieces in place. It dries to a transparent clear.

I use Du-Bro large hinges on all of my airplanes, and pin them with round toothpicks and Elmers or Jet glue. Use two hinges at the bottom of the rudder to carry the load of the tail wheel strut. It is important to use the plywood rib at the bottom of the rudder to hold the tail wheel wire. Epoxy and wrap with fiberglass cloth.

I made up the special exhaust/muffler to make the Tiger look like it has an inline engine. It was assembled from 5/8 and 1/4-inch brass tube, using silver solder. It has a real unusual sound, works well, and muffles the engine as well as a production model unit. It also provides fuel tank pressure.

One of the photos shows my radio installation. Everyone has their favorite method, but this worked well for me. This photo also shows the firmly installed landing gear wire, using plenty of nylon holers.

I never weighed my Tiger, but it is light . . . or was. I added ballast, because

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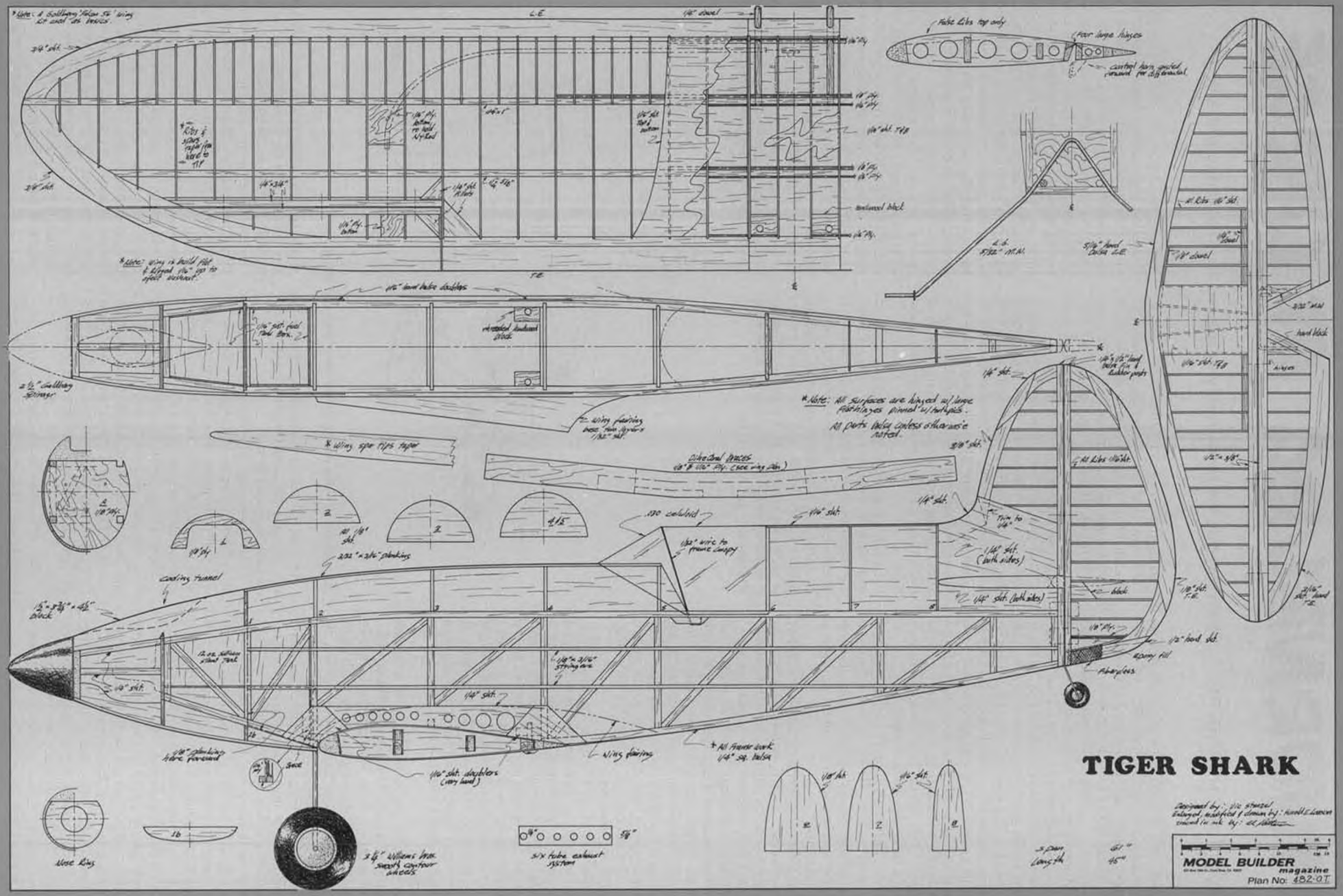
Harold's R/C installation in the Tiger Shark Wide wing fairing really shows here!

The home made exhaust system, with six stacks, to give the appearance of an inline engine. Also includes a tap for fuel tank pressure.


TIGER SHARK
MODEL BUILDER magazine
Plan No: 482-0T

THORNBURG AT LARGE

By DAVE THORNBERG . . . Rediscovering the temporarilly misplaced art of covering with silk . . . . . .

• Well, it's the old Covering Dilemma. Here sits a new pair of Bird of Time wings: built, sanded, ready for covering. What do I cover them with?

I know . . . the answer is supposed to be Monokote. Not Econokote, or one of the less expensive films that don't enhance structural stiffness; glider wings need all the torsional rigidity the covering can provide. Monokote is the obvious answer . . . and two years ago I would simply have plugged in my iron and gone to work. But that was before I got back into sport free flight. And before Old Timer R/C models began taking over our glider field.

Free flight and Old Timer have complicated my life. They've forced me to take another look at the virtues of some of the "old fashioned" covering materials. Like silk.

For years I covered with silk and paper exclusively . . . and hated it. I was an early convert to Monokote, and I never went back. Monokote went on easy, with just a sealing iron. No dope, no brushes, no water-sprayer. Sure, it took a little longer to apply the plastic film than it did silk or paper, but once the film was in place you were through. No more *dope it, let it dry, dope it again.* You could cover a plane this morning, fly it this afternoon.

I liked that; it fit my particular madness to a tee. Ten years ago I could design and build and fly and destroy a model all in the same weekend . . . and love it. Ten years ago I resented every minute spent in the workshop . . . all I wanted was to fly, fly, fly. I hated people who went to the flying field to talk; if you didn't have a plane in the air you might as well be home watching TV. Or be dead.

Well, I've mellowed out in the last couple of years. Not on the flying field, understand. Bull sessions out in the sunshine still bore me to tears. I still want an airplane in the air from the time I hit the field till the time I leave. And not the same plane, either. Without at least three or four models in the car, it isn't worth the drive to the field.

My mellowing has taken place in the workshop. Suddenly, I no longer resent the time spent there. After 30 years of balsa butchering, I've finally begun to *enjoy* building model airplanes! Flying is no less important, but now I find myself taking pride in the *quality* of my models. To build light, to build strong, to build well; I find this pleasing.

One of the bonuses of light, strong, well-built models is that they fly better. And last longer. In fact, for the past few years, most of my models have been outlasting their Monokote finish.

Thus the Covering Dilemma.

I know that silk is toughter than any plastic film. It won't tear as easily. It won't puncture as quickly. It won't sag or bubble. It won't get brittle in the sunshine. It won't let the wing flex and twist the way plastic film does.

In short, my new Bird of Time wings will last a lot longer if I'm willing to take the trouble to cover them with silk. And it is more trouble, no doubt about it. A good Monokote job will take about an hour per wing panel, a good silk job about three (including doping time, but excluding all the waiting while the dope dries).

I pick up one of my Bird panels and examine it. It's very light . . . just over five ounces. Nice clear C-grain wood in the sheeting. Cap strips sanded smoothly into the sheeting and the trailing edge. Flush joints on the underside, where ribs meet spar. Even the joints in the wing sheeting are nearly invisible, thanks to cyanoacrylate.

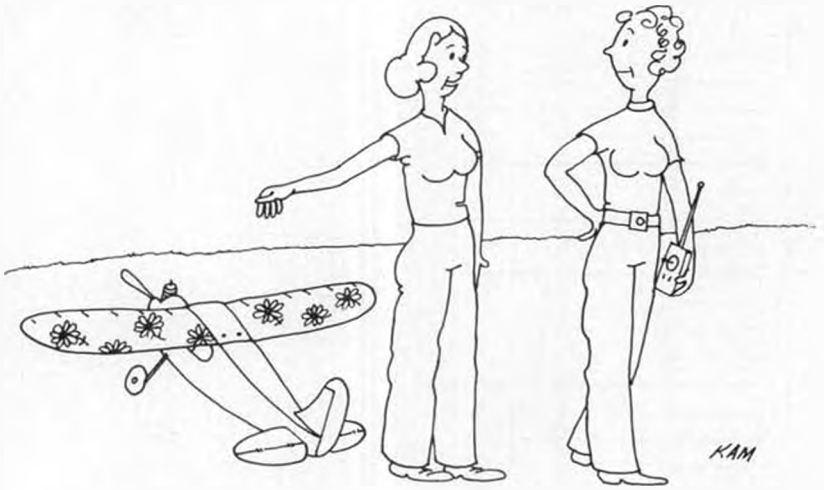
In short, it's a darn good building job. I'm proud of it, and I want it to last. So I decide to go with silk.

Even a year ago the decision wouldn't have been so easy. Because a year ago I was still following the directions on the silk package, and still hating every minute of the silking process.

Then along came my freeflight guru, Buzz Averill, and told me how to apply silk painlessly. And paper too, for that matter. Pull up a chair and we'll go through the process on one of these Bird of Time panels, so you can see how easy it is.

The first step is to throw away any instructions that tell you to wet the silk before laying it on the framework. Covering wet was my big mistake for 20 years. Wet silk sticks to itself, to the workbench, to you left elbow, to anything it touches. Wet silk is heavy, so it snags on the least burr when you're trying to pull out the wrinkles. Wet silk is limp, so it's impossible to apply it with a perfectly straight "grain." Wet silk is full of excess water, which is sure to find its way into your framework, no matter how carefully you may have doped it beforehand. Wet silk is going to "blush" (turn milky white) when you dope it down around the edges, and you're going to spend a lot of time trying to get rid of this blush, and not quite succeeding. And finally, wet silk is going to rush you through the covering process, because it's always threatening to dry out in strategic spots before you have the edges sealed.

In short, wet silking sucks . . . and why I was taught to apply it that way I'll never know. Dry silking, by comparison, is a snap. For covering wings and stabs and the flat parts of fuselages, it can be almost as easy as Monokote.



"Sure glad I decided not to throw away that old silk dress."

Step One is preparing the wood. Whether you're silking or Monokoting, this is the crucial step to a good finish. If you're not willing to spend an extra 20 minutes filling gaps with balsa and sanding everything flush with a sanding block, then you might as well buy the cheapest old plastic film you can get, in the most opaque color . . . anything that will hide your structure. But if you've built well . . . and sometimes this means replacing kit parts that fit poorly . . . this step will be a pleasure.

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R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY SANDRA COOK

• Dave Cook of San Diego, California, is in the forefront of RCBG . . . that branch of R/C soaring devoted to model rocket powered boost glide. He now holds the National Association of Rocketry record for altitude in another event; Class E altitude, at 1123 meters, and is intent on other achievements in this special area of interest. Dave is twenty-four years old and has been in model rocketry for the past fourteen years. I asked him to tell all in just a few words.

"In the boost glide event, you want to obtain maximum glide time after using a near vertical rocket-propelled takeoff. The various engines are rated according to their total amount of energy. The greater the energy the higher the launch. For the FAI S4D event, you can use any combination of engines that totals between 10.01 and 40.00 Newton-seconds of total impulse. For example, two Estes D engines (rated at about 17.0 Newton-seconds each) are perfectly legal, while a single C engine (rated at 10.00 Newton-seconds) is unacceptable.

"But, the greatest challenge in RCBG design and performance is the stress of the very high speed boost . . . up to 150 miles per hour . . . and the low weight limits. Until recently, RCBG was almost impossible due to the large radio mass. Even now it is only practical using the larger engines where there's enough energy to reach a decent altitude with a four to five-ounce model. Ultralight 15 gram pulse units have been successfully flown with engines as small as the Estes C, but a D engine or better . . . in fact, is required, to launch all but the lightest two-channel ships.

"The favored engine for the S4D event has been the Flight Systems, Inc. F7-4, which produces two pounds of thrust for eight to ten seconds. This takes a four ounce ship to about 900 feet, yielding a dead air descent of 300 to 400 seconds. The S4D event max time is 300 seconds, so in theory, things work out fine. Unfortunately, boost phase piloting still remains very much a black art. It's easy to get an erratic boost that tops out at only 500 feet, making it impossible to achieve max time.

"And construction of such planes is tricky. Structural disintegration on boost is very common. Everything has to be strong . . . light . . . and straight. Super-clean laminated balsa/plastic hinges were devised by members of the M.I.T. Model Rocket Society. If you're careful, you can build a hinged surface that's only 1/16 inch thick at the hinge, has no hinge gap, works symmetrically ± 30° and is quite strong. Light wood and good tissue are important, as are the light-weight pushrods and linkage. The nose block is hollow. The wings are sheeted with 1/32 inch balsa!

"You can expect to learn a lot . . . from the first flight about loose connections, breakaway parts, and flutter. It takes a number of attempts before you reach a satisfactory design. Construction of my first Stormbringer required about fifty hours. The second one has taken only 35, but it's not finished yet. Some claim they can build such a plane in twenty hours, but that's going some!

"Launching is normally from a 3/16 inch by three foot launch rod, with extra rods to keep the ship from rolling as it lifts off. Launch lugs are located on the pod. To prepare for launch, the pod, a finless model rocket, is loaded in the usual manner, the rocket is placed on the launch rod, and the glider is hung on the rod just prior to ignition.

"Now about the bird itself. As usual, each new design is an attempt to correct the remaining deficiencies of other successful designs. The Stormbringer is primarily based on a design by Bob Parks, used in the fly-offs for selecting the 1980 U.S. Model Rocketry team. I 'cloned' one of his original ships, making various improvements in the process. The span is now 30.4 inches; root chord is 4.5 inches; and the aspect ratio is 6.5 to one. The all-up glide mass is 130 grams (4.3 ounces). I use a Cannon Super-Micro receiver with a custom battery built of Ni-Cd cells taken from a standard nine-volt battery. Full charge provides about 45 minutes of flying time. The pushrods are Sullivan GRC-3. The airfoil is a modified Clark Y. The wing is built up and detachable. Note that solid wings are frequently used when light wood is available. The finish is dope over Japanese tissue. For test flights, I recommend the Estes C6-3 engine. For higher test flights, you might use the Estes 12-3. For contest events, you might use other engines, such as the Flight Systems, Inc. F7-4.

"Construction is entirely through the use of cyanoacrylate glue, with 3/4-ounce fiberglass cloth used sparsely and bonded with the same glue. Build the triangular fuselage, then straighten it out by wetting it down and letting it dry under weights."

Dave Cook and his Stormbringer Rocket Launched R/C Boost Glider, which is fully described in the text.

The Stormbringer is not a beginner's bird. It's not very forgiving, but it can be hand-launched to fifty feet altitude. Here's a plane for those who seek a challenge and want to try something new. To learn more about RCBG, join the National Association of Rocketry (contact Mrs. Doris Mayer, 182 Madison Drive, Elizabeth, Pennsylvania 15037),

Dave takes a last check-out of his RCBG just prior to launch. On a good flight, it reaches 900 feet in eight to ten seconds!

Blast off! Ship can reach 150 mph during rocket boost climb. Not for thermal soarers!

and read its journal.

★ ★ ★

Last month I tried to anticipate some likely (and some not-so-likely) technical advances in R/C soaring. Now it's time to crystal ball some of the social aspects of our sport/craft/hobby. Obviously, it's equally important to consider the "person" side of this "man/machine interface."

Participation in R/C soaring has grown in the last decade, and that trend seems likely to continue unless certain things get in the way. For example, the frequencies are becoming overcrowded *(There is relief coming . . . wcn)* and suitable soaring sites are growing scarce. It's discouraging to get it altogether, go to the field/slope only to wait while others use your frequency. You could, of course, have multiple frequencies, but that's at a cost, and there's the danger of confusing frequencies and their designation. (Don't laugh. It happens!) Suburban development promises "green grass and open space for recreation areas." But all too soon these thermal sites are used for picnics, baseball, soccer . . . you name it. Soon the site is ringed with buildings. As they grow in height, the land loses value . . . from our point of view. You shorten the high start, cope with the turbulance, and every landing becomes an exciting adventure . . . not the place to teach beginners the joy of R/C soaring. So you travel further into the countryside in search of rural school yards, fallow farms, and empty dirt roads.

Good slope sites have always been in short supply. You've got to find an accessible hill that faces the wind, with a place for landing, preferably near the top. And nowadays there's competition for these sites. Hang gliders claim their right to fly and demand "air safety". It's hard to judge the distance between your plane and the hang glider. You can't expect them to get out of your way, so you follow the rule and keep blue sky between you and *all* other aircraft. But that restricts your maneuvers, the available flying space . . . the remaining freedom of the sky.

There are very few good slope/thermal sites . . . places where you can launch from a hillside and expect to find thermal lift in the valley. Clearly we must try to preserve the remaining R/C soaring sites and to generate new ones wherever possible. How? By using what we have in a careful, consistent and cooperative manner.

Some European clubs operate under closed membership. You can't join the club unless there's a vacancy. Here's evidence that the soaring scene is reaching saturation over there. We're not at that stage yet, but that time may not be far off.

On the positive side, such limited participation encourages the authorized pilots to be more careful, perhaps more congenial, and more appreciative of the privilege of R/C soaring. In the future, more clubs will manage and even purchase soaring sites. Flying them becomes a bigger "investment." For example, the Torrey Pines Gulls presently holds a Use Permit from the City of San Diego that obligates them to monitor flight safety and enforce other regulations at the flying site. Perhaps this *is* the best time to invest in land for soaring . . . and its appreciation. But what happens to youngsters on a tight budget?

And what about the image of R/C soaring? It looks so easy. It seems less difficult than powered flight. The magic, the beauty, and the freedom of soaring attracts many who invest a few hundred dollars only to crash the lot in the first few flights. Most beginners fail to appreciate the subtle problems of flying and so don't see the need for instruction. A few look upon instruction as demeaning. They have to "make it on their own."

Then they blame the radio, not recognizing the danger of improper installation; or blame turbulance, rather than flying in a situation beyond their level of skill. In my view, beginners need and deserve the watchful eye of an experienced pilot *before* and *during* their early flights. Each kit should include the safety rules and an introduction to the local flying club . . . how to find a friend who can keep your plane from meeting the ground in an uncompromising manner. And the clubs should hold their responsibility and indicate their willingness to cooperate with the local hobby shops, offer show-and-tell demonstrations for the public, and encourage R/C soaring clubs at schools and colleges. We must build better public acceptance, inspire new members, and guard against unnecessary crashes. Single channel almost-ready-to-fly sailplanes are inexpensive, but these are harder for the beginner than a two-channel rig. Why start with a handicap?

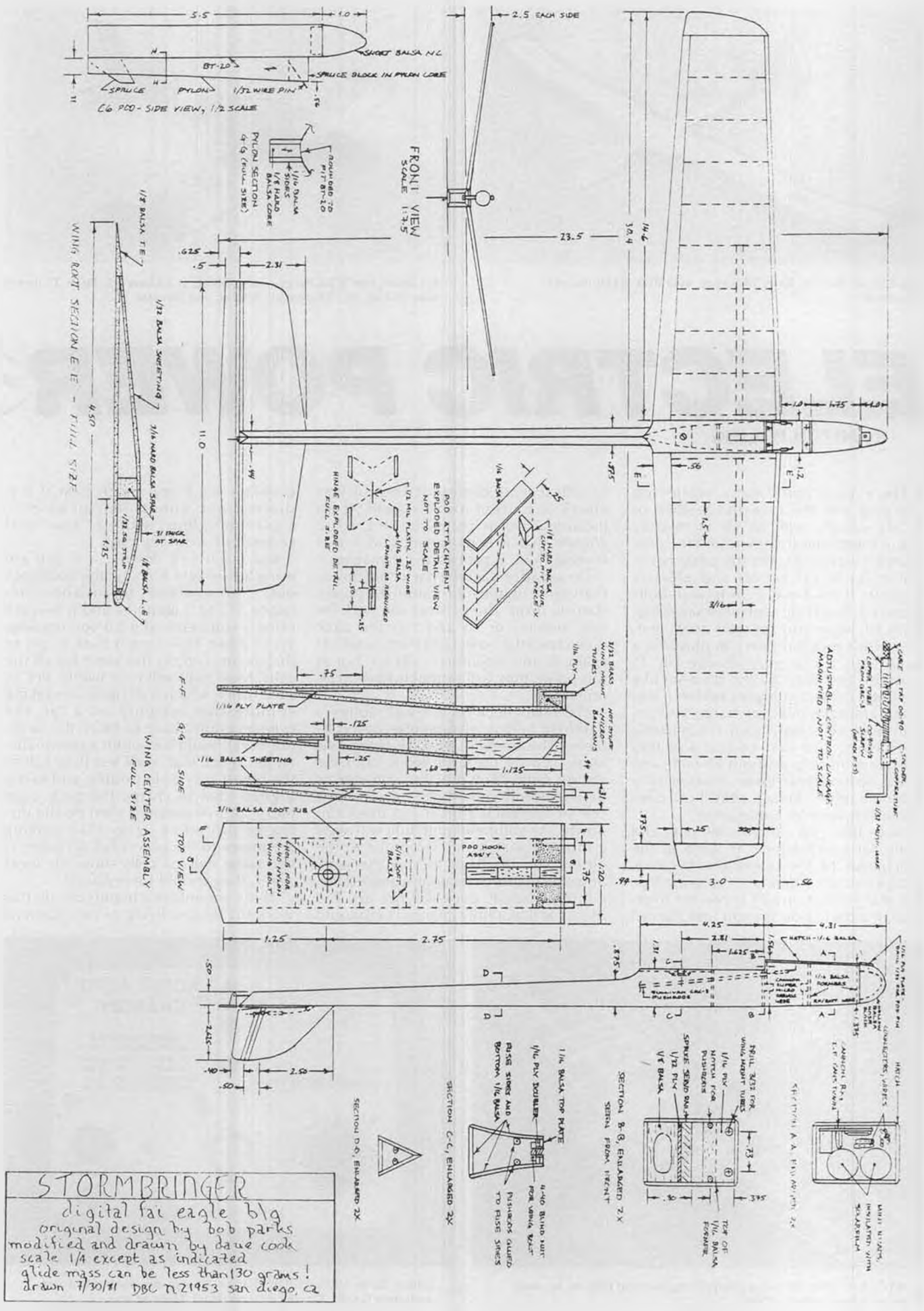
Sure, R/C soaring looks simple, but we must get across the notion that, in fact, it requires considerable skill and knowledge.

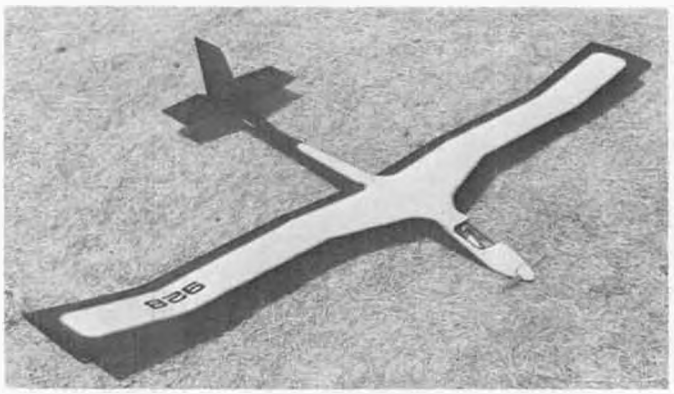
To see this in perspective, look at the chart. The vertical axis, labeled "strategy," is the amount of thinking, planning and cogitating, while the horizontal axis, labeled "tactics", is the amount of time and effort spent in doing the task. Briefly stated, strategy concerns what, why, how and the like, while tactics consists of coordinated hand/eye motor skills. Each scale ranges from zero to ten, where ten indicates full time and effort, five is about half that, while zero indicates no effort whatever.

To illustrate, consider a few board games. Clearly chess falls in the upper left corner. Thinking is what it's all about. You spend almost all of your time and effort planning what to do. Practically no skill is required for actually moving the pieces on the board. In contrast, checkers requires much less strategy, and again no skill is required for the movement of the pieces. Tic-tac-toe falls much lower in this column, while bingo is in the lower left corner.

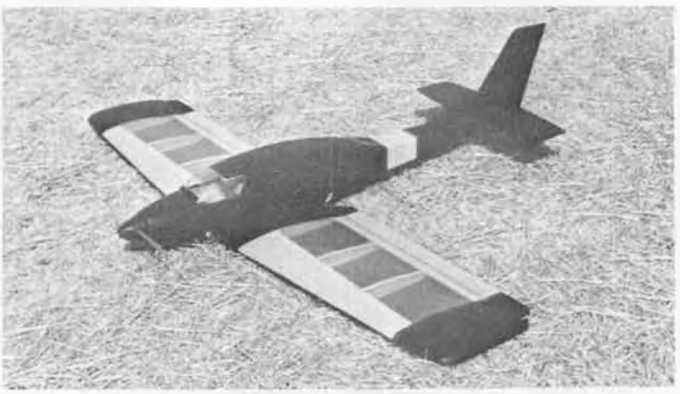
Sports generally require a considerable amount of skill. Football is a thinking sport. Each player must understand the developing situation and perhaps re-direct his efforts accordingly. He exercises his skill during most of the

Continued on page 71


STORMBRINGER
digital fat eagle b/g
original design by bob parks
modified and drawn by dave cook
scale 1/4 except as indicated
glide mass can be less than 130 grams!
drawn 7/30/81 DBC 11 21953 san diego, ca
FRONT VIEW
SCALE 1:7.5
C6 POD - SIDE VIEW, 1/2 SCALE
WING ROOT SECTION E-E - FULL SIZE
WING CENTER ASSEMBLY
FULL SIZE
POD ATTACHMENT
EXPLODED DETAIL VIEW
NOT TO SCALE
HINGE EXPLODED DETAIL
FULL SIZE
ADJUSTABLE CONTROL LINKAGE
MAGNIFIED - NOT TO SCALE
SECTION C-C, ENLARGED 2X
SECTION D-D, ENLARGED 2X
SECTION B-B, ENLARGED 2X
SECTION A-A, ENLARGED 2X



The 928, by Parker. Span 74 inches, area 655, flying weight 32 ounces.



Lil Joule, hot 1/2A Pattern with 05XL or Leisure 05. Span 37 inches, area 273 sq. in., 28 ounces. Aileron and elevator.

ELECTRIC POWER

By MITCH POLING

• There have been many articles on charging and the care and feeding of NiCds, usually with an air of mystery about them, and usually from the "slow charge" viewpoint. On the other hand, the electric car racers and electric airplane fliers have a nuts and bolts approach that I find a lot more satisfying. After all, when you get right down to it, there isn't much mystery in plugging a pack into a charger, charge for 15 minutes, and then go fly; it's a lot like starting a car and going for a drive. If you make a mistake and overcharge, you can ruin some cells, but, again, this is hardly a disaster, you can go out and buy replacement cells at about $3 each, and that is no more than three sheets of balsa at todays prices. In fact, a NiCd cell costs about the same as a magazine!

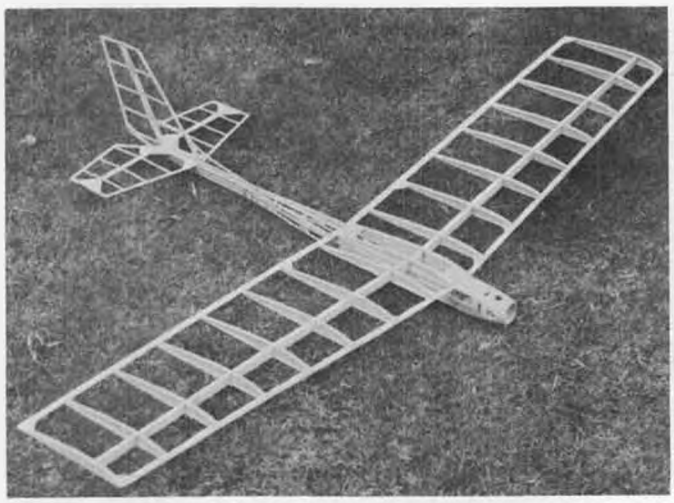
Now that I've said it's all nuts and bolts, let's take a look at some of the mechanics of the operation, because, just like a car, sometimes it just won't go for that routine drive! If you do overcharge a pack, how do you find the cell or cells that are damaged? The quickest check is by feel and by sight. If an individual cell is really hot, there is a *chance* that it is damaged, and if it is leaking fluid, it probably *is* damaged.

Go ahead and let the pack cool down, then run it on the motor until the power starts to drop. Then charge the pack for five minutes or so and run the pack down until the power just starts to fall off again. If any individual cells are hot at this point, they will probably have to be replaced.

The final check on this will require a flashlight bulb or an ammeter, or a voltmeter. The ammeter on most chargers is ideal; just rig up some leads from the charge plug. Now put the ammeter or flashlight bulb or voltmeter across each cell of the pack after it has been run down. The voltmeter and bulb will need a shorting wire from one probe to the other. You do have to run the pack down first before you do this procedure; a "fully loaded" pack will not do. The reason is that a fully charged cell would generate much too much heat if it is shorted out, almost like an electric cigarette lighter, while a "low" cell generates hardly any heat.

Run each cell down . . . if you are using a flashlight bulb, till the bulb goes out; if an ammeter, to anywhere between 1/2 to 1 ampere; and if you are using a voltmeter, at a 1.0 volt reading. Write down how long it took to get to that point, and do the same for all the cells. Most cells will read within 30% of each other, which is all right. Like taking compression readings on a car, the cylinders don't have to be all the same, but they should be within a reasonable range. A cell that reads less than half of the others may be in trouble, and so it is a good idea to charge the pack once more for five minutes, then do the discharge procedure again after running the motor to the power fall-off point. If the same cell or cells show up short again, they should be replaced.

There are only two brands of cells that work for electric flying or cars, General



Parker's R-1, only 25 ounces with 3-channel and 600 sq. in. area. Note very light construction.

Latest Astro 4005 AC/DC charger. Charge any pack up to and including 8 cells. Charge info on panel. More in text.

Electric and Sanyo. Almost all the General Electric cells have a "188" stamped on the bottom, the Sanyo cells have either "SANYO" or "JAPAN" stamped on the bottom. In either case, replace the cells with the same brand and size. The charge and discharge characteristics of the G.E. and Sanyo cells are slightly different, so it might not work to mix them. Other brands, by the way, do not work because they lack the fully welded internal connections that G.E. and Sanyo use. Instead, they use small tabs for the connections inside, which just can't handle high charge and discharge currents. The small internal connections generate a lot of heat under those conditions, and the cell gets hot and starts to leak. So, stick to G.E. or Sanyo!

It would be nice to avoid overcharging altogether, though all of us are guilty of it. The easiest way is to scrupulously follow the directions for the charger, but who ever does that? The other problem is that, given enough charge cycles, some of the cells get out of step, and the low cells run the danger of becoming reverse charged during the flight, and the high cells run the danger of becoming overcharged when the pack is charged up. The way to avoid this is to do a slow charge overnight to even up all the cells, or to discharge each cell when the pack is low to get them all to the same charge, as described before for finding bad cells. This should be done about every two dozen flights.

There are times when you would like to know how much charge you have put in, and how "safe" it is. Now comes the awkward point in the electric business. All the cells are rated in Ah (amperes times hours), which is really clumsy for our purposes. If I had a New Year's wish that could come true in the hobby, it would be that manufacturers, retailers, and all the rest of us would start to use Am (amperes times minutes) instead. This will never happen, but it would make life a lot easier. The conversion from Ah to Am is easy though, as there are 60 minutes in an hour, there are 60 Am in one Ah (profound!).

All right, so what is the advantage of Am? First off, the common capacities we deal with in electric flight are the AA cells, which are 30 Am, the sub-C cells, which are 60 Am, and occasionally the 1/2AA cells, which are 15 Am. So, all you have to do is pick a charge rate, then multiply by the minutes you need to get the pack full, that is, its Am rating. As an example, if you have a sub-C cell pack (Astro 05 XL, Leisure 05), and charge at 4 amperes, you will need 15 minutes to get a full charge of 60 Am (4 times 15). This method, to work right, has to start with a pack that has been run down so you can be sure there isn't much charge in it to begin with, otherwise the pack will overflow, and get hot and leak. When the motor starts to drop in power the pack is at zero as far as we are concerned. Most fliers are conservative and put in about 10% less than the capacity of the pack to be sure they are safe. The most reliable check is the touch test, if the pack is getting hot, stop the charge.

There are a couple of other things to notice in this though. One is that the charge rate drops during the charge. The way to handle this is to note the charge rate after 30 seconds of charging (the first 30 seconds are too high for the method to work out), and the charge rate at the present moment. Average the two readings and multiply by the minutes up to then to get the Am that have gone in. As an example, if the charge rate on a sub-C pack is 4.5 amperes after 30 seconds, and is 3.5 amperes after 15 minutes, the average is 4.0 amperes, and the total Am is 60, so it is time to stop! The other way to do this is to write the current reading down at the end of each minute, and keep a running total. When the total reaches the Am of the pack, or a little below, stop the charge. Some typical values might be 4.5 amperes after one minute, 4.0 amperes after two

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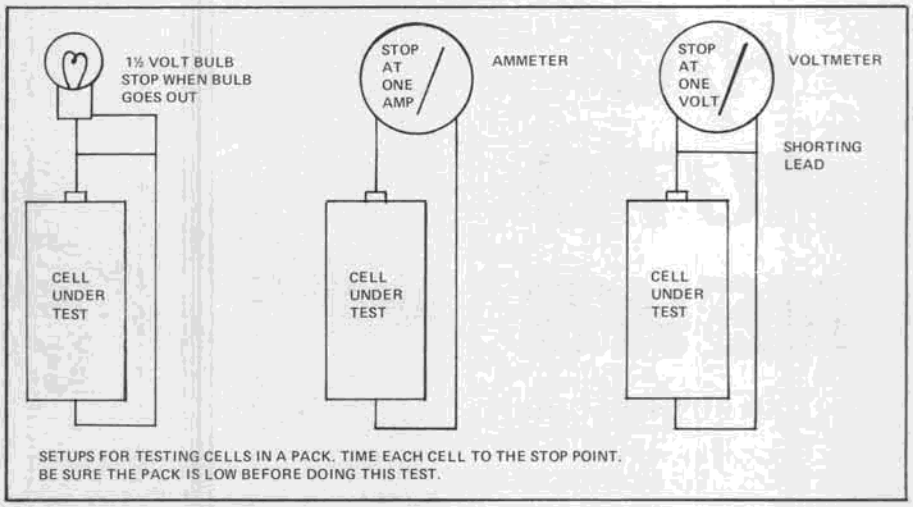
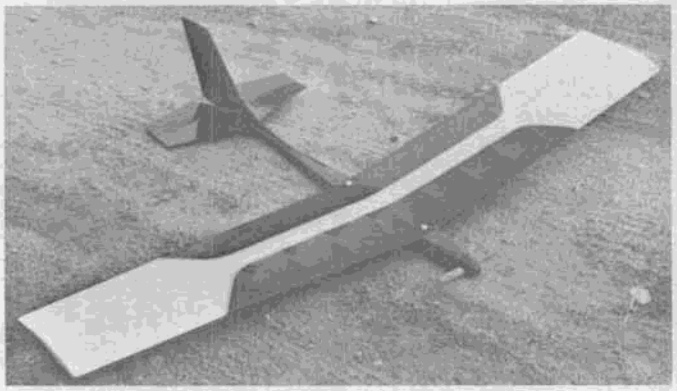
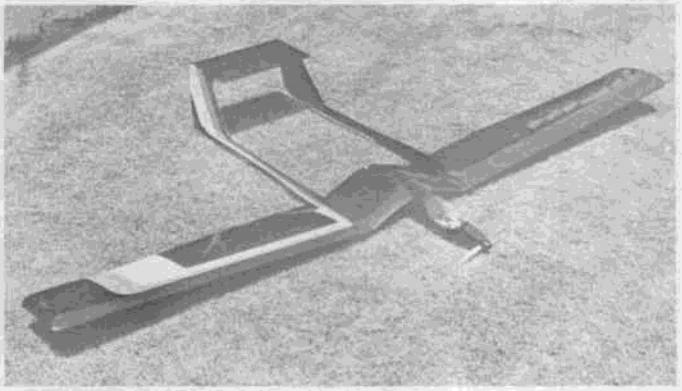


SETUPS FOR TESTING CELLS IN A PACK. TIME EACH CELL TO THE STOP POINT. BE SURE THE PACK IS LOW BEFORE DOING THIS TEST.

The Corvette by Parker, span 70 inches, wing area 630 sq. in., 36 ounce flying weight with Astro 05XL or Leisure 05.



The R-1 covered and ready to fly. Looks like the indoor R/C planes, but much hotter with an 05 motor.

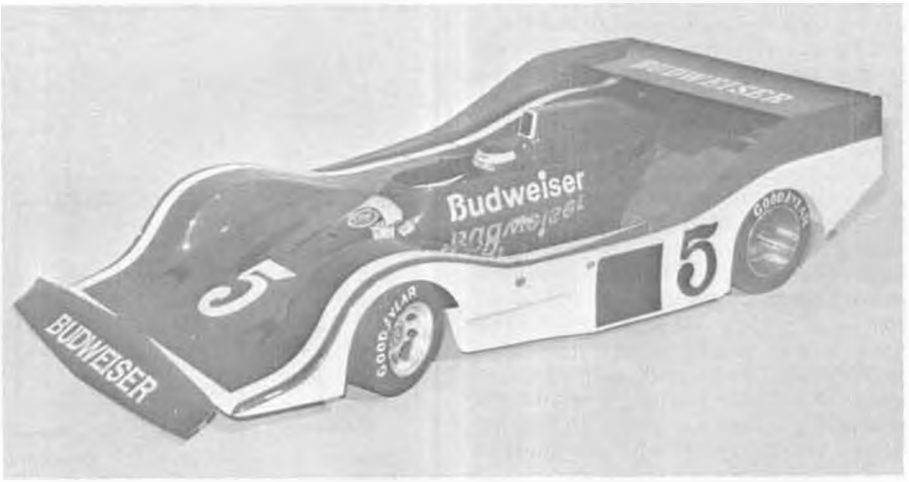


No, not a hard landing! The Sorcerer design by Parker, for 075 motor. Span 92 inches, 815 sq. in. area, 43 ounces flying weight.

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR



Bob Welch's rendition of MRP's Budweiser Spyder, the Dirty Racing Team's favorite body for 1/8-scale racing.

●Hot Tip. Oh, yes, such a Hot Tip have I got for you this month. You don't even have to race RC cars to love this one, all you guys who are into electric-powered models of any kind will think this tip is a bit strange, but I just know you are going to try it!

First, the Story-That-Goes-Along-With-The-Hot-Tip and there is a purpose to relating this, so just hang on . . .

It all started back at the big indoor race for 1/12 electrics held in Cleveland, Ohio. A prestigious race to win, so the Factory Guys are all there and additional heat is on, as this is one of the very few races to be used as a qualifier for the 1/12 World Champs to be held in '82. So the shoes who need to get qualified are there and (evidently) the shoes who are already qualified are there in part to help insure that the riff-raff independent racers don't get qualified.

First up is Stock class and, as usual, the stock motors are passed out at random to the racers. The motors cannot be opened up, all you can do is try to get them broken-in. There is little time for a long break-in period, and as you should know, these Igarashi motors we use take *forever* to seat the brushes. Forever, as in hours and hours of running.

Kent Clausen a couple of years ago, just before getting top-line Associated sponsorship.

Kent Clausen and Mike Lavacot, representing Team Associated, are there, and the motors they are using in Stock class are legal, but are also real fast. Fast enough to look like rewinds. Fast enough to send some of the independents packing, feeling that, once again, the factory team is putting it to them. Fast enough to make it a foregone conclusion that either Lavacot or Clausen will win and the fight will be over 3rd to 10th and who cares about anything except 1st place? Well, I do, too. But here we are talking about Factory Warfare and 1st place is all that counts.

Sure enough, one of them wins, don't know who, wasn't at the race myself. At tech inspection, everybody is interested in seeing if the motors really are unopened, legal numbers . . . and somebody convinces the Tech Guy that the motors are going to have to be opened up, as something smells funny and to just let it go will result in too much controversy. It is agreed that the motors get their tops popped, but they won't be dewound, as if they have a funny wind on the arm it is a quality control problem at Igarashi and not the fault of the racers.

Don McKay, hero of this story and owner of JoMac, makers of the Lightning 2000, is there looking, and relates that the motors had the labels removed, the brushes were seated to perfection, the comms looked good, a few parts were discolored, and there was rust inside. Hmmm, super break-in job, no labels, they had obviously been hot at one time, and had also been wet. Now what do you make of that? Nobody else could figure it out either, and the Associated guys . . . well, they weren't talking. See, there really is such a thing as a Speed Secret!

Took McKay and most of the rest of Team JoMac awhile to figure out what has happened, in fact maybe they never did get it exactly right, but what they assume Associated did was to clamp a heat-sink on the motors, hook them up to 24 volts, and put the whole assemblage in a bucket of ice water. For a heatsink to be as efficient as possible, the labels would need to be removed from the can. The 24-volt input power would be easy, two 12-volt batteries at hand, no doubt, and the ice water would carry away the huge amount of heat that would be generated and otherwise fry the motor. The rust came from the water, of course, and the discolored parts added strength to the theory that the motors had been run hard and fast, as if the seated brushes weren't enough proof, although there are no doubt other, more mechanical ways to do the same thing.

Back home, McKay kept after it. He and I have been known to have some long, drawn-out "discussions," but when it comes to attacking a problem, I will admit that Don just won't give up until he gets the answers.

It was about this time that I got actively involved, as I had stopped by to chew the fat one afternoon and Don took the looonnnngggg way 'round, bringing me up to date with what I have just told you about.

Next time I saw Don was at the JoMac Christmas party, an annual happening locally, where I drink their booze, in exchange for telling rude jokes and kissing all the female employees . . . repeatedly.

Chuck August, a real crazy in car racing, in unusually clean pit area. Must be over.

Two hours, twenty-seven jokes, an unrecallable number of drinks, half a plate of baked salmon and a few trips to the mistletoe later, I found myself in what they call the radio room, trying to pick out two stock motors that were very close in performance and had a half case (50) to choose from. Meanwhile, Don is getting a glass of, ugh, regular old tap water.

With the motors selected, one is kept as a control and not run any further, except for comparison. The other is hooked up to a 12-volt output on this sophisticated power source they have and dunked in the glass of water. It runs for a bit, but Don isn't happy until some grey/black junk starts to show up in the water, he then lets it run for another 10 to 15 seconds, pulls it out of the water and pronounces it as fully broken-in. Some contact cleaner is squirted in a mounting hole, just to clean up the comm, and when hooked up to the power source, the motor is very definitely better in power output than it was before getting a bath. I can't recall a percentage increase of power, mainly because I could hear the difference in rpm and feel the increase in torque without relying on high-zoot meters and such. Back and forth between the control motor and the dipped one I went, still not believing the difference.

Then we took the dipper apart and the brushes were seated 100%, but had an odd-looking feature, that of flashing at the trailing *and leading* edge of the brushes, where I would expect to see this flashing only at the trailing edge. Equally surprising was that the comm was as perfect as you would ever expect to see in an unmodified motor, no bluing, and not even a groove worn in it.

Back home in the shop, I played with the technique some more, using old as well as new motors and a plain old 12-volt automobile battery as the power source. It is important to use clean, clear water for each motor run-in, as that stuff coming out of the can is worn-off brush material, and its appearance signals the start of the wearing in process, which, if allowed to go too long will completely wear the brushes out.

Parma's Zakspeed Capri in 1/12-scale, and mounted on an early Associated RC12E.

Each motor seems to vary a little. When the junk comes out, run it for about 10 seconds longer and then open the motor up to check on brush seating. If not fully seated, give it another run and check again. You want to get the brushes seated fully across their face, but that's all.

Although we don't know if it makes any difference, both Don and I try to get water in the motor, but not so much that the motor gets bogged down from making like a Maytag. You have to listen carefully, some water in the can will slow the motor slightly, a full load will slow it quite a lot. Someplace in between seems most effective.

When the brushes are seated to your satisfaction, the motor should be completely disassembled and cleaned thoroughly. The comm doesn't wear noticeably in this process, and can be cleaned easily with a simple wipe or two with 600 grit wet-or-dry sandpaper and will come out sparkling. I use alcohol to clean the rest and blow it all dry with compressed air. The motor is then assembled, lightly oiled and is ready to race. For a modified class motor, fitted with ball bearings, you probably ought to take pains to get the bearings super clean.

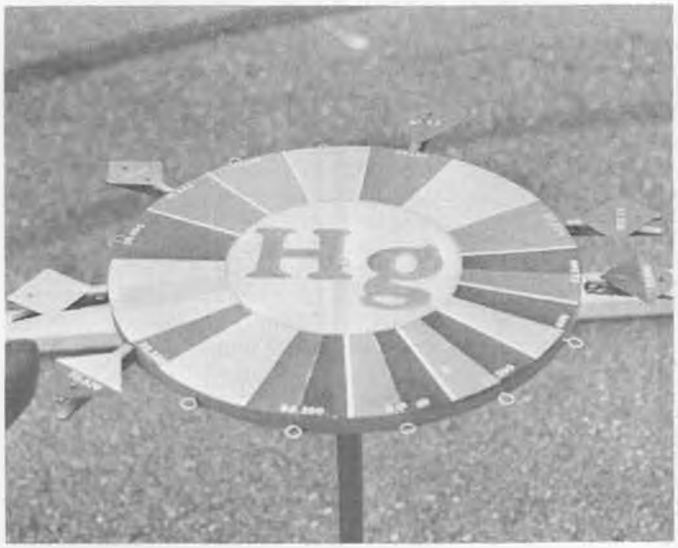
To use this technique at "stock motor" races where you are handed a motor and cannot take it apart, the same procedure is the hot tip, you just have to rely on past experience to know how long to run the motor in the water, in effect doing it blind. A good flushing with a mild solvent should get the brush residue out of the motor. Spray some contact cleaner in a mounting hole to be sure the brushes and comm are cleaned as well as possible, oil the oilite bearings and you should be ready to fly. *DO NOT run the motor while immersed in, or even close to, a flammable liquid, such as the solvent just mentioned.* Everybody wants a barn-burner for a motor, but not literally.

If you have access to one, the magnets can be "zapped" with a magnetizer, another Factory Trick that has been in use for a couple of years now, but a magnetizer is a little out of the reach of average racers!

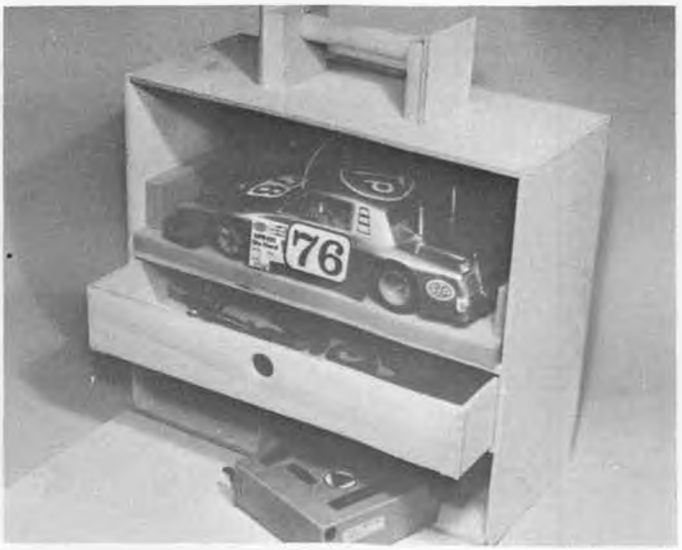
From there on, you are on your own, as fiddling with gearing and drag-cheating tricks are the only way to go faster.

In case it isn't already obvious, the water-method of motor break-in was a trick known to the JoMac Racing Team and Don McKay, who recently got some undeserved bad press in the RCM Pit Stop col-

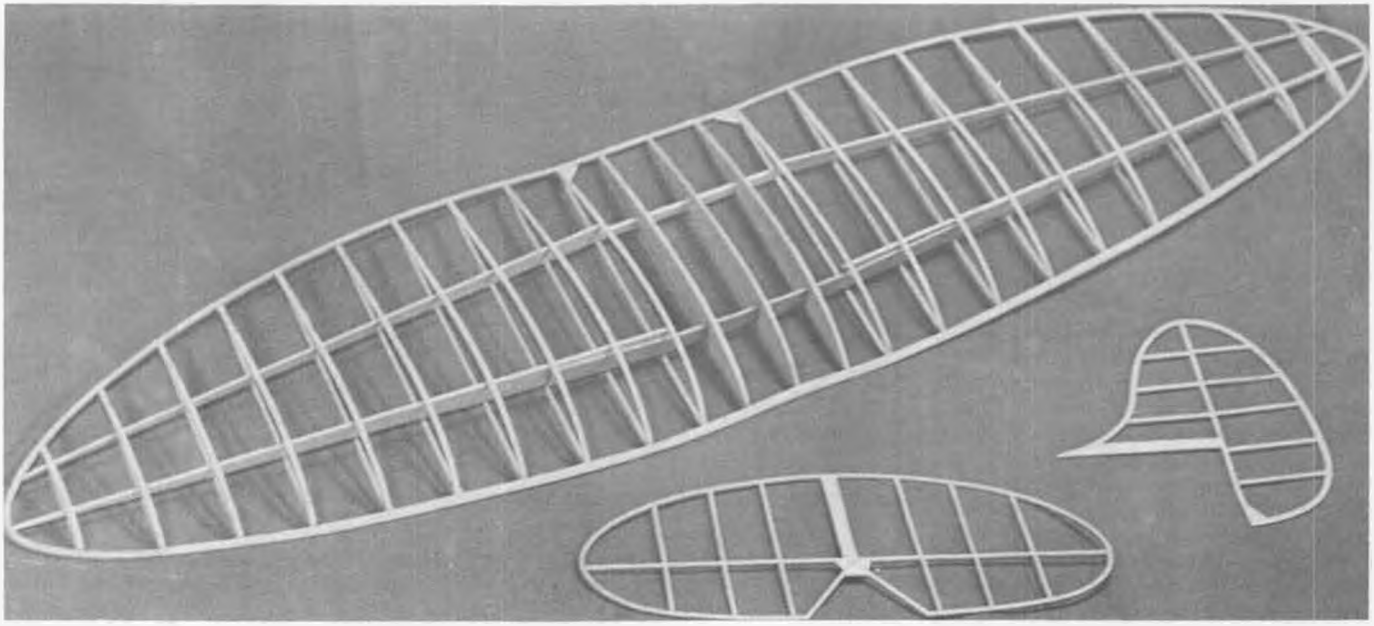
Continued on page 76



Monterey club's neat frequency pin board. Heavy base prevents tipping, top spins for easy access to pins.



A little thought and some pieces of 1/4-inch ply can result in a handy pit box for indoor racing.



Super-light modified flying surfaces of the Guillow Spitfire. Not really modified, it's all new.

FREE FLIGHT SCALE

By FERNANDO RAMOS

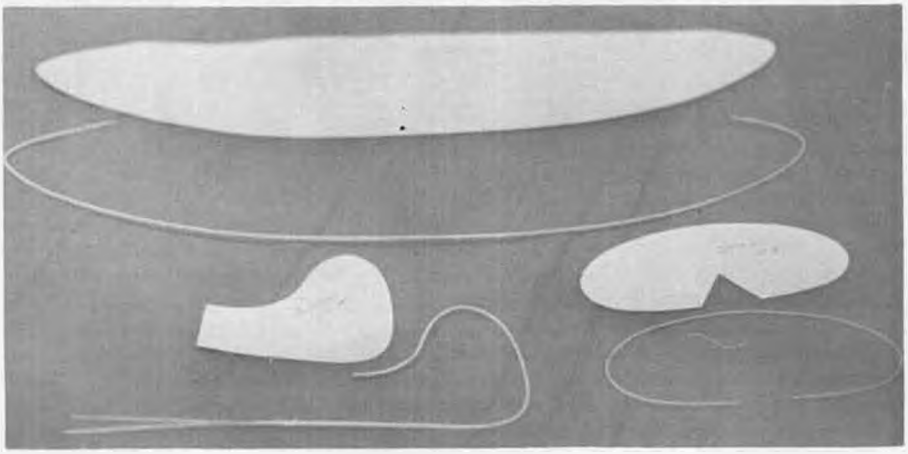
PHOTOS BY AUTHOR

• I want to conclude the article I started last month on the modification of a fairly typical kit. Before going on to the actual covering of the model, I need to mention an important point regarding the vacuum formed cowl. If you follow the directions on the installation of the cowl, there will be no way to remove the rubber for winding other than to remove the thrust button. If you go this route, you're in trouble. The opening provided by the thrust button is not large enough to give adequate winding of the motor. In other words, the knots will not slip past the small opening.

The solution is an easy one. Before physically mounting the cowl to the fuselage, a small modification must be made. I took some 1/8 medium-hard sheet and cut out a piece that would fit snugly on the inside front of the cowl. A 3/4 inch diameter rocket tube as previously described in the July '81 issue of **MB** was made. I like this type because all kinds of adjustments can be made by simply rotating the button.

Preparation for covering is next. If you are used to doping all of your structures with several coats of dope, this is the time to do it, sanding between coats. Since I prefer to use thinned-out white glue, this previous step is not necessary. Because of the delicate nature of the structure of the stab and rudder, I choose to cover them on a frame which has been covered with tissue paper. Simply stated, I make a frame large enough to accommodate the stab and rudder. It is usually made up of 1/4 x 1/2 inch pine stock, plywood, scrap, or whatever is available. The frame is covered with the dull side of the tissue up. The paper is water shrunk. When dry, I give it a single coat of clear dope, doping from the underside. When this has dried, the stab and rudder are coated with the thinned-out white glue, then placed on the taut tissue. When the glue has dried, the structures are cut out and the excess paper removed by using fine sandpaper. The rest of the paper on the frame is removed, it is recovered, and the cycle repeated for the other side of the tail. When finished, you will note how straight, warp free, and wrinkle free the structures are.

The wing is tackled next. Actually, there is no set procedure. I prefer to cover the bottom first, because it's flat and easy to do. The top of an elliptical wing usually cannot be done in one piece due to the compound curves created by the elliptical shape of the wing and the curve of the ribs. Several segments of paper have to be used to cover the upper surface. It's not much of a problem, but it is time consuming. Normally, doing it right, I will wet the tissue first, then apply it to the wing. This gives the best covering results, but much care has to be taken. With the type of structure used on the wing, distortion is quite possible using this method. However, the recommended approach, especially for beginners is to apply the tissue dry, using thinned-out *"White"* glue (about 60% glue, 40% water) using the largest pieces possible without getting any wrinkles. When completed, the best way to water shrink is to spray on a fine mist of water over the entire wing, using an airbrush. Once the water has been applied, the same airbrush should be used to blow air only, to help evaporate the water quickly. What this does is to prevent the water from soak-



Laminating forms and finished wood outlines. Simpler, lighter, stronger than old-fashioned sheet outlines. Now even easier with cyanoacrylates.

ing through to the structure and cause warping. It's a bit slow, but well worth it.

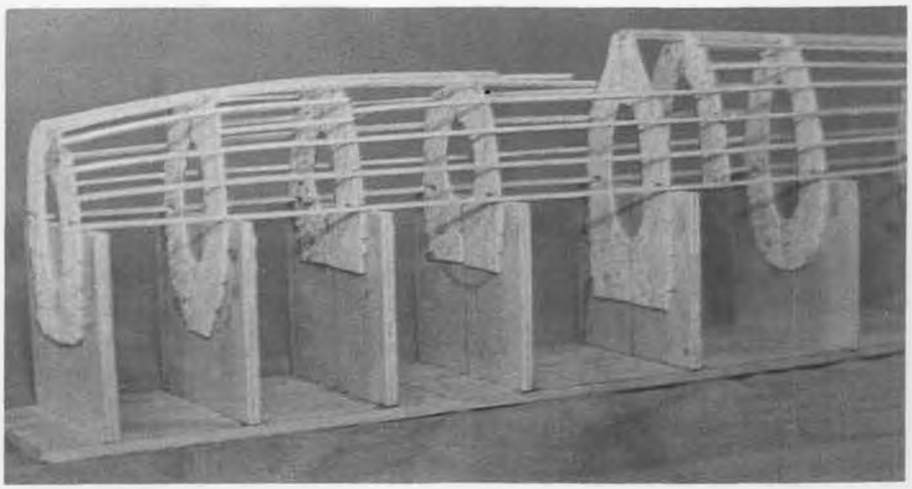
Now for the fun part! Covering a fuselage like the Spitfire is very tedious, due in part to the many compound curves. Japanese tissue is not well suited to compound curves. So, in order to get a super job, care must be taken. I have found a way that I believe gives me the best covering possible with the least amount of effort. The object is to cover the fuselage using many single strips of tissue covering between a pair of stringers only. Sometimes you can do a section between two pairs of stringers, but not often. Start at the bottom with a single strip of tissue just a bit wider than the pair of stringers it has to cover. Attach using the white glue. When dry, water shrink this single strip, again using the airbrush, or a device that can finely atomize the water *(See "Thornburg at Large." wcn)* When this has dried, clear dope the strip.

At this point, the beginner may wonder what the heck I'm doing. Well, hold on. I found this system to be the easiest way to cover these types of fuselages. Trim the strip of tissue. Next take a length of 1/4 inch drafting tape (tape with a low tack) and lay it mid-way on the stringer (or down the middle of the stringer) which has the tissue attached to it (see photo). Brush on the glue on the taped stringer (only 1/32 is exposed) and the stringer next to it. Lay on the second strip of paper letting it overlap the tape. When this has dried, water shrink, and let dry. Coat this section with a single coat of dope. When the dope has dried, the excess tissue is trimmed. Actually there is no problem on the taped side either. Take a very sharp razor and run it carefully right next to the tape's edge. It acts just like a straight edge. When you've gone the length with the blade, pull the tape off by pulling it over itself until completely removed. Voila, nothing to it. These simple steps are repeated until the fuselage is completely covered. On occasion, a rough edge could be left as the result of the tape's edge. If this happens, simply take some 400 grit sandpaper and hit it lightly. When doped a couple more times, the edges will be unnoticeable.

The fuselage and wing were given three coats of plasticized dope, the tail only two. When doping the wing, I only do one half (top and bottom) and pin it down to dry with the "washout wedge" propped under the wing's trailing edge. This assures that the wing will remain true. When this has dried thoroughly, the other half is done and pinned down the same way.

The canopy is fitted onto the fuselage. The area from the instrument panel forward and under the canopy should be marked, then painted with a flat black paint. Trim the canopy on the sides and back so that it only overlaps the fuselage about 1/16, otherwise it doesn't look very good after painting. Then the canopy can be glued in place using R/C 56 glue.

The model is now completely assembled. The wings are glued to the fuselage, making certain that they are square. This is followed by the stabilizer and the rudder. Generally, it is much easier to paint models in pieces, then assemble them later. Since the Spitfire has very large wing fillets, it is necessary for the wings to be attached first. So, I just put on the tail as well.

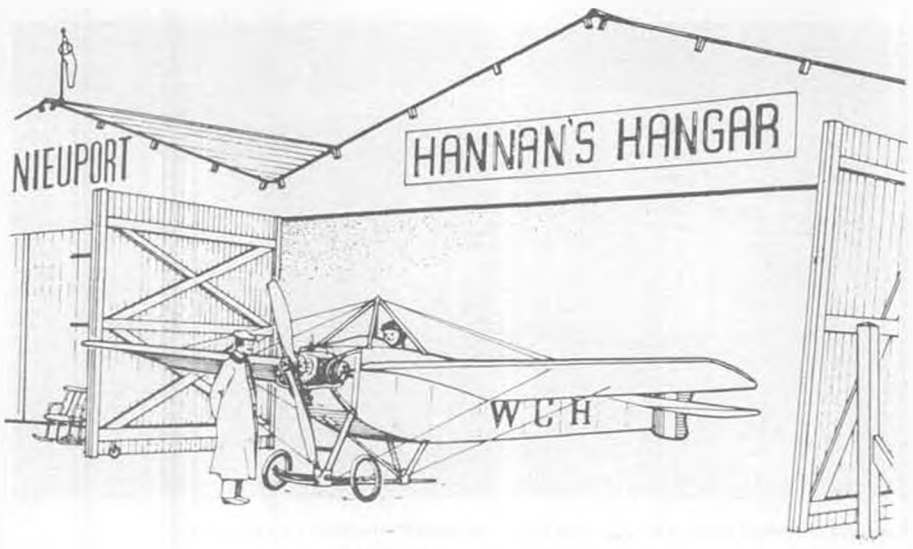


Fuselage mounted on building jig which assures correct alignment of all parts.

Using a color chart for WW II aircraft available at most shops that cater to the plastic modeling fraternity, I mix different shades of Floquil until I get the colors I want. The Floquil in turn is mixed with clear dope and thinned out with lacquer thinner for spraying. (Floquil does not mix with butyrate dope!) The underside of the model is painted first, as it's the lightest color. Apply one *even* light coat. You are not trying to make the surfaces opaque! The bottom side is easy, as it is only one color. For the upper part of the model, decide what your color patterns are going to be and where they will go. I used the example on the box for speed and simplicity. The bottom of the fuselage has to be masked in order to prevent overspray. Spray the dark green wherever it belongs. Don't worry about overspraying into where the brown color goes. I used more of the 1/4 inch drafting tape and formed a wavy line as depicted on the box. The rest of the area was covered with paper. The green was then sprayed lightly over the designated areas. While the green was setting up, patterns to cover up the green were cut out. These were made from old typing paper. These patterns were cut out to different shapes, then coated with One-Coat Rubber Cement. These in turn were layed over the green areas. The brown was then sprayed at right angles to the surface, using only enough color to color evenly. The stencils were removed from the model with no fear of tearing the tissue. That's the advantage of the one-coat rubber cement.

Continued on page 86

"Ain't you never seen a P-38 before?"



"Good Planets are hard to find."

• Amen to that thought which appeared on the North County Rayne Water Conditioning company sign. While the world's politicians seem bent on keeping everyone in a perpetual nervous frenzy, let us take pause to appreciate our fellow model builders and our stabilizing and gratifying hobby. But let us not overlook those less fortunate than ourselves who would gladly exchange positions with us. As Buckminster Fuller has long pointed out, we are all passengers on this Spaceship Earth, and we must all strive to preserve it.

FEEDBACK

Dave Stott, of Bridgeport, Connecticut, wrote in to comment upon Walt Mooney's delightful little CO_2 powered White Monoplane recently published in **MB.** He points out that there was an even earlier White Monoplane, circa 1917, and sent along an advertisement for it. A canard type, the tiny (18 foot span) machine was intended to be powered by a twin-cylinder motorcycle engine, at a speed of 30 to 60 miles per hour. Working drawings "showing all details and dimensions in a simple manner so you can easily understand everything", were offered for $2 a set, by George D. White, of Los Angeles, "designer and owner of sole rights".

Does anyone in our audience have these drawings? If so, we'll bet Walt Mooney would be happy to convert them to flying model form!

HANDY HINTS GALORE

Also from Dave Stott, this idea: For a lightweight finish on a small model, apply one coat of clear by drawing a sheet of dope-soaked toilet paper across the surface. The dope stays suspended atop the tissue rather than soaking in, and results are comparable to 2 or 3 coats brushed on.

Gerald Meyers, Redway, California, passes on several tips: "Sharpy", marketed as a tool for honing model knife blades, by Peck-Polymers, works equally as well for razor blades. Gerald discovered this one holiday evening when down to his last blade during a model-building project. As he put it: "Desperation is the mother of invention".

Gerald says that a bamboo skewer, priced at about 75 cents per hundred in supermarkets, makes an ideal "parts pusher". Being about 8 inches long and pointed at one end, it is an efficient tool for positioniong those little fuselage cross-pieces, for example, which seem to get smaller every year.

Gerald's friend, Will Bosco, suggests that broken jig or coping saw blades should not be discarded. Rather, break off a small 1 or 2 inch long section, round one end slightly with a file, and use in a modeling knife handle as a micro key-hole saw. Very useful.

WHAT'S YOUR INSPIRATION?

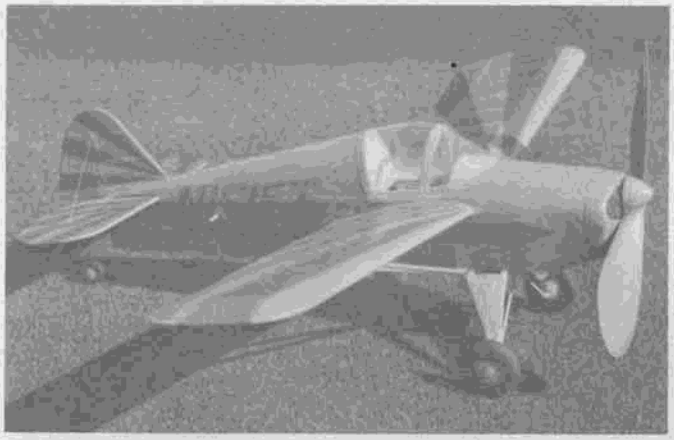
How do you go about selecting a new scale modeling subject? Several have said the very existence of Hungerford

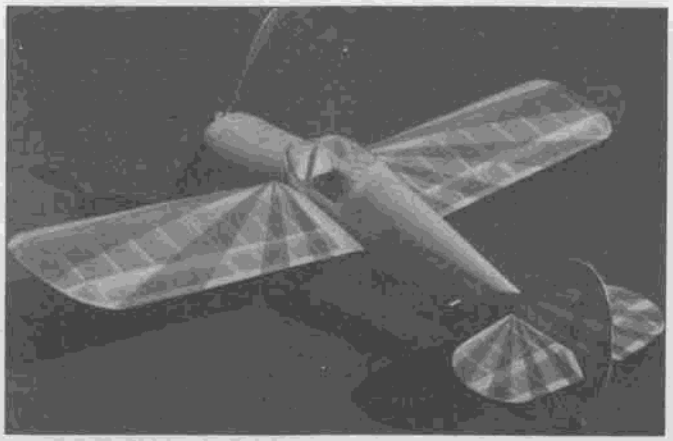
Continued on page 79

Magnificent rubber-powered DH-4A by Dave Stott, Bridgeport, Connecticut. Dependable flyer is 3/4-inch scale.

Avro G by John Whatmore, England, is Brown Jr. CO_2 powered. Plans in July '72 MB. Photo by Alan Callaghan.

Howell "Pete" Miller, aerodynamicist for original Gee Bee R–1, admires Henry Haffke's 1/4-scale R/C version resting in his living room.





KELEHER LARK

By WALT MOONEY . . . Our "Peanut Perfesser" is at it again, bringing us a neat little single-seat lightplane that has proven to be a fine flier. Only minor mods from full scale required.

FOTOS BY PHUDO

• This little model is a very stable flyer and an interesting configuration. It is a little more complex than the simplest of the Peanut scale designs, but should not present any constructional problems to anyone who has built a couple of Peanuts before.

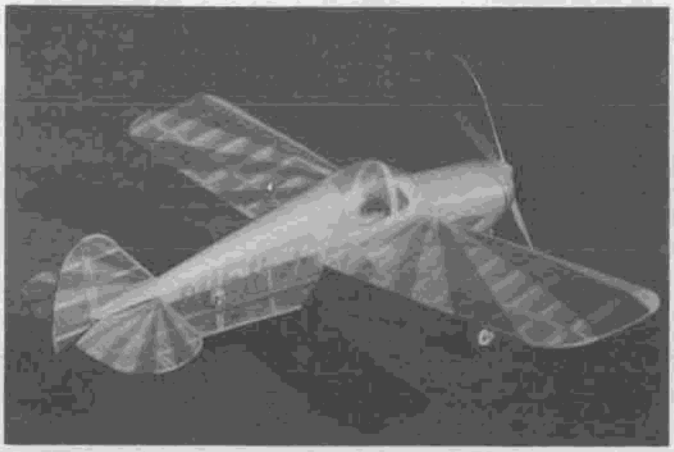
The original airplane is a single place, strut-braced, shoulder wing, fabric covered lightplane. It has conventional wing and tail structure and is a "tail-dragger", that is, it has two main wheels and a tail wheel. The airfoil used has a slight reflex, the wings are braced with "V" struts, and the tail is wire braced. The model is built with scale rib spacing and deviations from true scale are limited to an increase in horizontal tail size, increased dihedral angle, and a larger than scale propeller.

The drawing shows separate control surfaces, that is, the elevators, ailerons, and rudder are shown as separate entities. It is easier to build them as an integral part of the horizontal tail, wings, and vertical tail respectively, with the intention of separating them after assembly, especially with respect to the laminated tips which look so much better than sliced sheet balsa tips. Readers may note however, that while the model in the photos was built according to the plan, the surfaces were not separated. This is a lazy decision of the author justified by a wish for more consistent control adjustments (commonly known as "none").

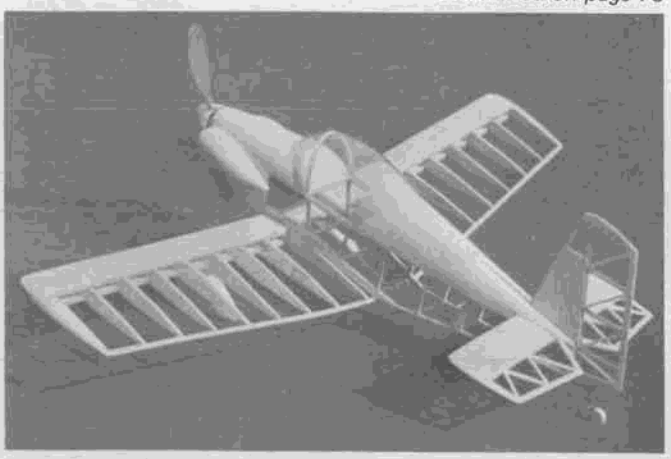
The model in the photos weighs 17 grams with a 19 inch loop of 3/32 rubber, and will average about 27 seconds with a Peck-Polymers 4-3/4 inch diameter propeller. It is a very stable, easy-to-trim model, and required only a piece of 1/16th balsa as a downthrust adjustment to eliminate a slight tendency to stall under the initial high power.

All the model structure is conventional practice for scale rubber powered airplanes, except that some of the techniques are more commonly seen on larger models than Peanuts. The laminated tip outlines are one example. Tip material is 1/64 by 1/16 basswood. Three laminations are used for the tail surfaces and four are used for the wing tips. Most people using this approach seem to make a sheet pattern to wrap the strips around to obtain the correct curvature. The advent of modern cyanoacrylate adhesives like "Hot Stuff", "Zap", "Jet", etc., make this effort much quicker and somewhat simpler. Instead of making a form, just cover the plan with waxed paper on your workboard. Then make a row of straight pins along the inside of the outline with the pins about 3/16 of an inch apart. Take three strips of wood and pin them in place against one end of the row of pins. Then carefully wrap the strips around the pin row and pin it in place at the other end of the row and wherever such pinning appears necessary along the row. Now take the instant adhesive applicator and bond the laminations together. In another 10 or 20 seconds the tips can be removed and used in the surface assembly. It works

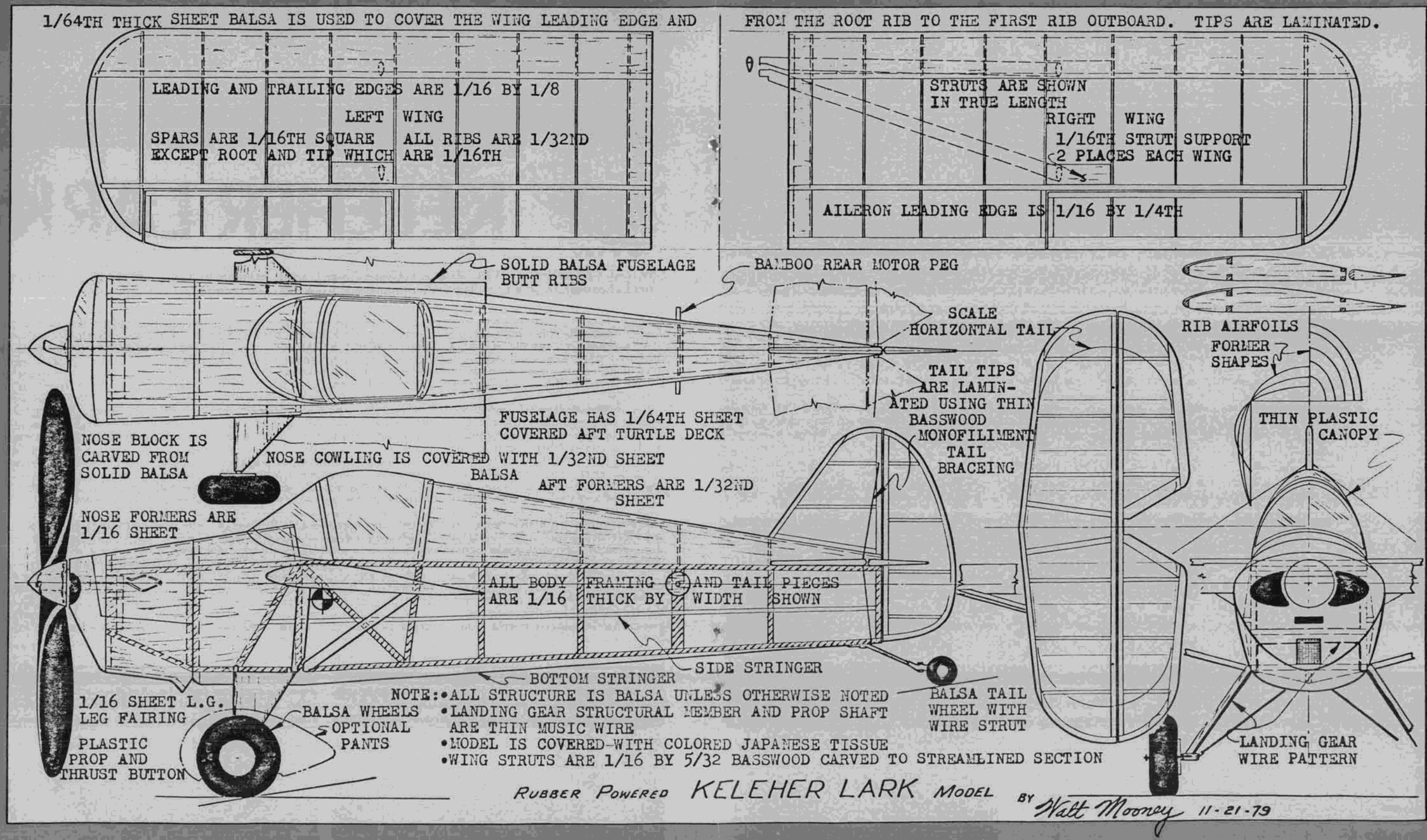
Continued on page 73



Colorful Keleher Lark has generous wing area. Canopy requires vacuum molding, can be left off, using windshield only.



Mooney's next Peanut shows its bones. It's a Corby Starlet. Looks rugged.


1/64TH THICK SHEET BALSA IS USED TO COVER THE WING LEADING EDGE AND FROM THE ROOT RIB TO THE FIRST RIB OUTBOARD. TIPS ARE LAMINATED.
LEADING AND TRAILING EDGES ARE 1/16 BY 1/8
LEFT WING
SPARS ARE 1/16TH SQUARE EXCEPT ROOT AND TIP WHICH ARE 1/16TH
ALL RIBS ARE 1/32ND
STRUTS ARE SHOWN IN TRUE LENGTH
RIGHT WING
1/16TH STRUT SUPPORT 2 PLACES EACH WING
AILERON LEADING EDGE IS 1/16 BY 1/4TH
SOLID BALSA FUSELAGE BUTT RIBS
BAMBOO REAR MOTOR PEG
SCALE HORIZONTAL TAIL
RIB AIRFOILS
FORMER SHAPES
TAIL TIPS ARE LAMINATED USING THIN BASSWOOD
MONOFILIMENT TAIL BRACEING
THIN PLASTIC CANOPY
FUSELAGE HAS 1/64TH SHEET COVERED AFT TURTLE DECK
NOSE BLOCK IS CARVED FROM SOLID BALSA
NOSE COWLING IS COVERED WITH 1/32ND SHEET BALSA
AFT FORMERS ARE 1/32ND SHEET
NOSE FORMERS ARE 1/16 SHEET
ALL BODY FRAMING AND TAIL PIECES ARE 1/16 THICK BY WIDTH SHOWN
SIDE STRINGER
BOTTOM STRINGER
NOTE: •ALL STRUCTURE IS BALSA UNLESS OTHERWISE NOTED
•LANDING GEAR STRUCTURAL MEMBER AND PROP SHAFT ARE THIN MUSIC WIRE
•MODEL IS COVERED-WITH COLORED JAPANESE TISSUE
•WING STRUTS ARE 1/16 BY 5/32 BASSWOOD CARVED TO STREAMLINED SECTION
BALSA TAIL WHEEL WITH WIRE STRUT
1/16 SHEET L.G. LEG FAIRING
BALSA WHEELS
OPTIONAL PANTS
PLASTIC PROP AND THRUST BUTTON
LANDING GEAR WIRE PATTERN
RUBBER POWERED KELEHER LARK MODEL
BY Walt Mooney 11-21-79

Gary James (left) and Chuck Rudner at Merced during Fast Combat. Chuck finished third.

Mike Petri (left) and Neal White just before Rush and Stan Youngblood flew the final in Fast, which Stan won.

Gary Wallace launches for J.E. Albritton during his attempt at FAI Combat at Nats. Had a Nelson in one ship with much power.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

Hopefully, you followed at least some of the advice in last month's column and got your motors and models checked over thoroughly before going out to fly for the first couple of times. Now is probably a good time to start eliminating some of those nuisance things that are usually passed off as simply being bad luck.

But before we do . . . It is important to realize that there are actually only a very few times in a season of contest flying where plain old luck comes into play, be it bad or good luck. The technology involved in flying faster, turning tighter, building light and so on, is not anything strange or new. All the techniques and advice are easy to come by; all you have to do is to make good the execution.

It would be one thing if there were continual radical changes taking place in CL (or FF, or RC), but that simply isn't the case, so your basic equipment, if at least a little successful for you last year, will be plenty good enough in '82. But you gotta get the basics covered and forget about the luck factor.

Fuel can be a major problem, in fact it is for many competitors. Strange engine runs are quite often caused by poor fuel that was either blended differently than the last batch, or is old, or was never any good in the first place. Before tossing out all of last year's fuel, any containers that have been kept full and tightly capped probably hold fuel that is okay, even if needing to be regarded slightly suspiciously. That can that is half full and several times was left open for hours at a contest, contains fuel that is best used for flushing dirt out of engines. Fuel has never lasted for long around here, but have had a couple of cans that were three years old before finally being used, and the brew was just fine. Those cans had never been opened in that three years, however.

Everything but the sound effects . . . a jet at Merced. The racing circle's favorite. "It's bunker time."

Fuel that has been suspect from the first should probably be tossed, although the more conservative among you could consider adding 5-10% of castor oil, just to be sure a light oil mix isn't the problem and then using the fuel to run-in non-ABC engines. So I don't leave you hanging, the ABC engines should always be broken-in on whatever fuel will be used in them at the contests.

For myself, years ago I gave up the Home Brew Habit, switching back to commercial fuel only. I was every bit as careful in blending as any of you are, but could never, *with absolute certainty*, switch from one batch to another and have the motor needle just exactly the same way, regardless of which batch was being used. Sure, many times there was no problem; it was those times when a problem did come up that bothered me. Remember the

Rusty Brown (Denver Threat) with some of his models during Nats break. Had one of neatest looking Slow Rats.

Vic Garner with his high pull Rat. It'll make a man out of you or pull you into another state . . . or both.

opening about bad luck and good luck? Luck has no part in causing you to lose a contest when you are Top Qualifier for the Final, switch to another gallon of fuel that is supposedly the same mix you used to qualify with, and then your motor burns down 10 laps from the start.

Before sliding off the deep end, pulling the unknowing, but trusting-of-what-they-read with me, it needs to be mentioned that I am coming from the gung-ho contest flier side of things. You know, the world where motors are set up just so with a lot of fiddling of head clearance, port timing, nitro content of the fuel, the area of the venturi and so on. A motor that is set up to run WFO on a certain combination is already close to the ragged edge, or should be, and so will be much less tolerant to variables in the fuel. If you are flying models for the fun of it, back off from my ideas a full ten clicks, as sport motors will run acceptably well on damn near anything.

To get back to it, I have had excellent results with Aldrich's Magnum fuel (no longer available unfortunately), Duke Fox's Missile Mist, and Duke's Fuel mixtures. More recently I have also had very consistent results with fuel from Delta, a brew designed for RC cards, which contains only 8% of a secret oil and really does the job in the 21's we use in car racing, although I have been known to also use the Delta fuel in Combat motors with results at least equal to the Magnum fuel. That low oil content, also a feature of the Magnum fuel, really adds up to free horsepower, and if the oil is good enough, as it is in the Delta fuel, then motor life is also super.

If the fuel you're now using is doing the job, stick with it. But don't be afraid to look for something better. Good fuel is worth the expense, which is, admittedly, a good deal higher when buying commercial fuels.

Tanks are another thing that many have problems with, and there really is little reason for this. Yes, sometimes it is a frustrating experience to get a fuel container, whether it is a bladder, pacifier, plastic tank, hard (metal) tank and now the "baggie" suction system seeing use in Slow Combat, to work 100% reliably. It can be done. All it takes is some experimentation, generally using ideas that you can easily rip from the construction articles, some of these articles being years old. What is really dumb, and it has always bothered me to see this, is to come out to contest after contest with a model sporting a fuel feed system that has proven to not work at all acceptably. Most of the time the contestant is simply hoping that, as if by magic, the system will start working properly all by itself.

I first became aware of this when we had Goodyear going hot 'n heavy around here and I had a model that, while not the fastest, was plenty quick and dead-nuts reliable. When it came down to the four-up Final, that model was nearly always qualified, and one of the things we would do was to check over the other models to see who was still using the same tanks that had let them down in previous Finals, it being one thing to run a heat race and quite another to go the full distance of a Final. More than once this kept the team I raced with from getting psyched into leaning on the needle or pouring more pop in the fuel, going instead for the good, consistent run.

So. Check that tank for leaks; plug all the vent lines with tubing, put pressure to the feed line using a bulb or syringe and putting the whole mess under water. No matter how small the leak, it has to be fixed. In the case of a plastic tank or bladder, throw it away. If the tank still doesn't work properly, the internal lines can be replaced. The brass and copper tubing we use in hard tanks has a seam along the side and this can be split open. This can't always be seen, by the way, so replacement of all internal lines is the safe way to go. With the plastic tanks, I just automatically replace all the fuel lines, internal and external, if something doesn't seem right. The lines can easily develop pin holes that are almost impossible to locate.

If you have trouble with hard tanks, and everybody does at one time or another in their career, maybe knowing that the last Rat I built had three complete tanks, all identical, that went with it will help. Maybe they weren't really identical, as two of them never did work right, causing a definite lean condition at the end of the tank. But, one did work and is still in the model . . . If only I knew what invisible differences there were in those other two tanks, I'd be an expert with that particular style of tank.

Another operation that you will see messed up a lot of time is the simple act of setting the needle. After you compete for awhile you finally learn how to get that good, fast run; with more experience most even get to the point where they can just set the motor in the pits, don't even have to put up a test flight. The real problem comes when called to fly, the model is started and it doesn't sound quite right. Magic Fingers to the rescue and the needle is (usually) nudged in a click or two leaner. There seems to be a couple of reasons for doing this, neither good enough to justify continuing the practice. First, in the pits everything is relatively calm and thought processes are fairly logical. At the line for a flight, the adrenalin is pumping, the competitive insticts tell logic to take a hike and wending its way through now befuddled thought processes is the old adage that leaner equals faster. Our hero twists the needle in, the engine says, "Hey, Turkey! Don't do that!", the model is launched anyway . . . and "bad luck" once again strikes.

Secondly, there is something that is different at the line, a condition that didn't exist when the model was needled in the pits. Usually the motor isn't up to operating temperature yet, where it was thoroughly warmed earlier. Or maybe the tank is just fuller, in the case of Combat the bladder may be over-filled, giving a bit of extra pressure for the first few seconds, and of course it will sound a little richer until this excess fuel is burned off.

The real trick here is to stick by the needle setting that you got earlier in test flights or ground running. Unless you are really in trouble, there isn't anything at all that should have changed from the time the initial setting was locked in until the official flight. You're running the same fuel, engine, plug, prop . . . Hell, same

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A Davis Homebuilt Peanut being prepped for flight. Photo by Robert Yoha.

Indoor Waterman "Gosling" spans 16 inches. Uses Hungerford spoke wheels and sheet wood prop. Colored condenser paper.

INDOOR

By KEN JOHNSON

● This issue we will discuss two relatively new events to indoor modeling, AIR XX and Grapenut scale.

The initials AIR mean Antique Indoor Rubber. The XX refers to 20 (roman numerals) inch maximum span. The antique denotes outdoor rubber or gas models flown before World War II, like the models now being called oldtimer outdoor.

Examples could be: The Sparky, Gollywolk, Miss Worlds Fair, Zipper, and High Climber.

An article on AIR XX appeared in Model Builder sometime ago. Did you see and remember this article? *(Goes back to when Bob Stalick was our F/F columnist. wcn)*

Grapenut scale models are those that are smaller than Peanut. I asked around and couldn't find anyone who could come up with a definite set of rules for Grapenut. It seems that any scale model with a wingspan of 8 inches or less will qualify. Although I can't see any reason why the model could not be an 8-inch replica of a Korda Victory, for instance. This could be a scale model of a model.

There are positives and negatives to Grapenut.

The positives are:

- You can fly a smaller model in a smaller area.
- Less critical scale judging.
- Less materials needed to build a Grapenut.
- It is easier to carry more models in a given size box.
- It is a definite challenge to build a tiny scale model, and more of a challenge to make it fly really well.

The negatives are:

- Finding rubber small enough to fly this size model, without making it a zoomer. My 8-inch Piper Vagabond flies on one loop of .017 rubber.
- The use of tweezers is mandatory in the construction of an airplane of this size.
- Wheels and propeller for a model of Grapenut size will need to be handmade.

Building a Grapenut scale model is very rewarding. It's really fun to reach into your model box and pull out an 8-inch Waterman or DH6 and see the looks you get when it climbs out of your hand. If you haven't tried one this small, you're in for a treat.

The selection of the plane you model is important. The wings should be of sufficient area to give ample lift. The fuselage should be long enough to house a fair size motor, and the subject simple enough so that scale detailing wouldn't be a burden.

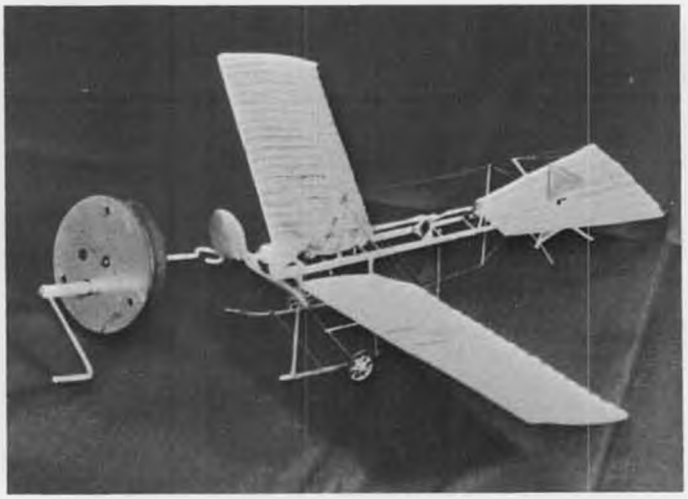
Doubtless you will need to strip light indoor balsa for the construction. Strip the wood with a metal straight edge or the Jim Jones balsa stripper discussed in my last column. Remember to use the cement sparingly.

Covering with anything heavier than condenser paper is not recommended. An ideal covering material is metalized Microlite (Micro-X Products, P.O. Box 1063, Lorain, OH 44055). It is scale looking and extremely light.

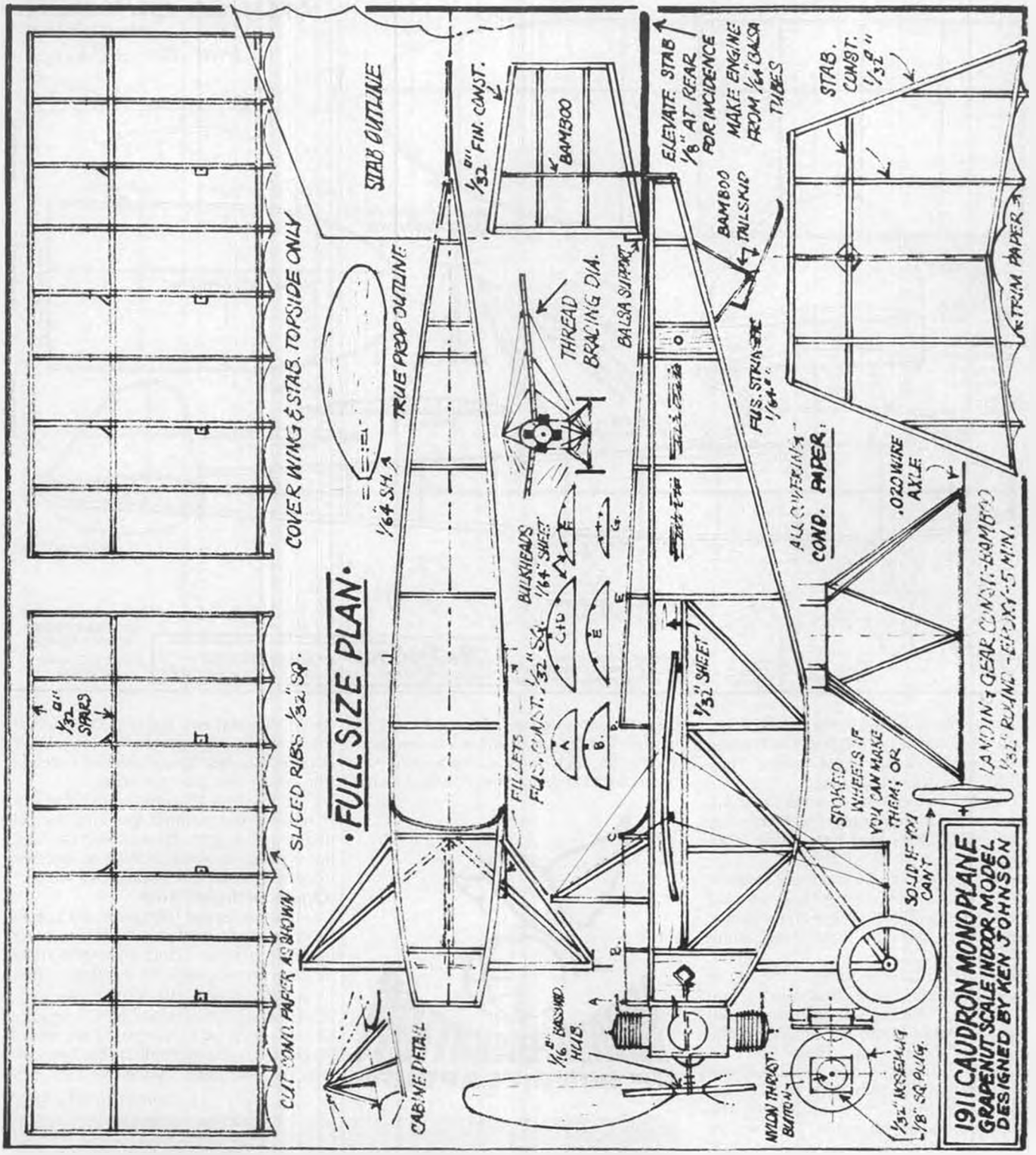
Airplanes with rounded fuselages should be avoided. Can you imagine how small the stringers would be on a Grapenut Gee Bee racer?

Propeller blades of 1/64 sheet balsa are about right. A .015 wire prop shaft and indoor teflon bearings complete the front end assembly (with the balsa nose lock, of course).

AIR XX "Sparky" weighs 3.5 grams. Grapenut Piper Vagabond flies on one loop of .017 rubber. Author's models and photo.



Peanut "Spin", first Fokker airplane, by Chris Johnson. Exposed wood dyed. Spoked wheels by Chris. Slow flying model.



Very few plans are available at this time for Grapenut models. Here is one source: David Aronstein, 50 Pasture Lane, Poughkeepsie, NY 12602.

Many quick print/xerox stores can make xerox reductions of your favorite scale or peanut scale plans. Select the reduction that comes to 8 inches or just under. Then simplify the reduction. Reduce the number of wing ribs, stringers and spars. Using sliced wing ribs is recommended. Perhaps the number of fuselage uprights can be reduced.

Covering adhesive should be either thinned Elmer's glue or thinned Aerogloss dope. Beadboard foam wheels (painted with india ink) are lightweight and simple to make.

Some model shops now stock small sizes of rubber strip from Micro-X and Indoor Model Supply. IMS strips rubber down to .020, and Micro-X strips down to .015. Indoor Model Supply address is Box C, Garberville, CA 95540.

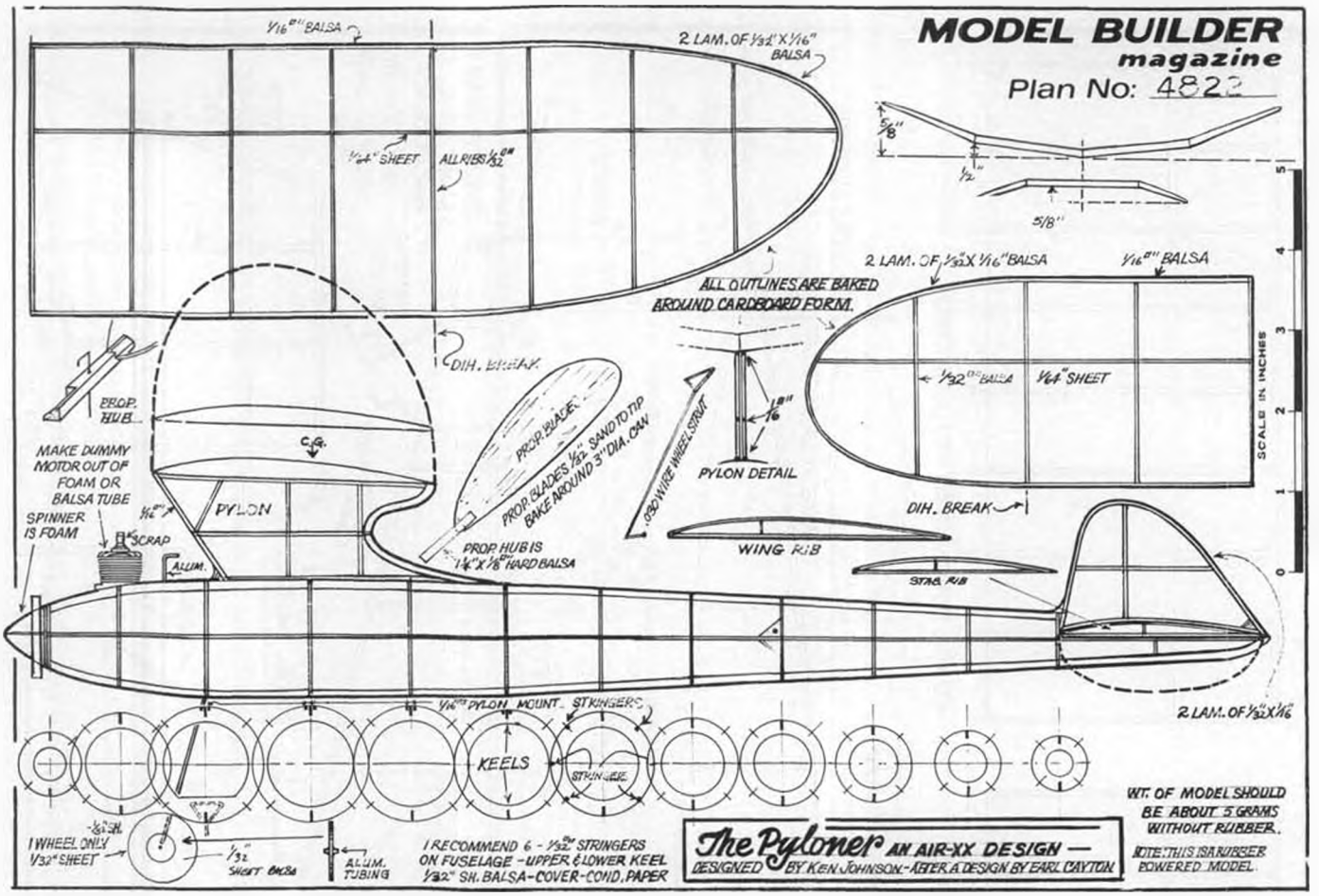
How about using a one-strand motor? Make a loop at each end and cement with Hot Stuff. A one-strand motor of .040 should equal a one-loop motor of .020.

Back to AIR XX. Featured this month is a plan of an oldtimer gas model converted to 20-inch indoor type. I have not yet built this model, but feel it is a good subject for AIR XX. By the time you read this issue, I will have completed and flown this aircraft. I expect it to fly for 2 to 3 minutes under a 20 foot ceiling. I would like to compare my times with yours on this model. Are you game to try? Send me your results.

If you old time indoor flyers are interested, I have plans for the following AIR XX models: The Sparky, Gollywock, Korda Victory, Miss World's Fair, and American Ace.

Japanese Indoor Kits Now Available.

A new series of indoor model kits from



FULL SIZE PLANS AVAILABLE—SEE PAGE 100

Japan is now available in the U.S. The kits come in four series of models. The B-plane series consists of four sheet models. They sell for about $3.70 per kit.

The Mini-indoor series contains two A-6 size models, an ornithopter (the Hummingbird) and a Delta Dart type model. The price is about $4.50 each.

Moving up to the Tournament series at $10.00 each, we see an A class, an Easy B, and a Penny Plane. These feature sheet wood props and light plastic transparent covering.

The top of the line series is the Micro Plane models. These four planes are microfilm covered, but still use a solid motor stick/tail boom set up. Again the props are sheet wood. These new kits feature die-cut sliced ribs and cardboard jigs for prop pitch, dihedral, etc. The full color packaging is very attractive. The measurements are all metric. The price for the Micro Plane series is about $13.00 each.

These models are definitely for the beginner and intermediate builder. These prices may seem a little high, but remember, the models are imported. The kits are made by Sun-Star Stationery, Ltd. The importer is Two Worlds International, 500 Laurelwood Rd., Ste. 9, Santa Clara, CA 95050. My kit was purchased at T&A Hobby, 3512 West Victory Blvd., Burbank, CA 91505.

The Van Gorder Modified A.M.A. Cub Kit

Walt Van Gorder, of Cincinnati, Ohio (fellow club member of your indoor column editor, when in Cincy) has come up with a new version of the A.M.A. Cub model. The biggest drawback to the stock kit was the lack of clearance for the rubber motor to unwind. The prop bearing has been trimmed and the rear hook lengthened to allow for good clearance. Walt's kit uses Japanese tissue covering instead of the onion-skin plan covering.

The result: a 15 gram model that does 1 min. 40 sec. without touching the ceiling in a 20 ft. gym. To purchase the $2.25 kit (incl. post.) write to Walt at 5669 Victoryview Lane, Cincinnati, OH 45238.

Ornithoptologists Arise

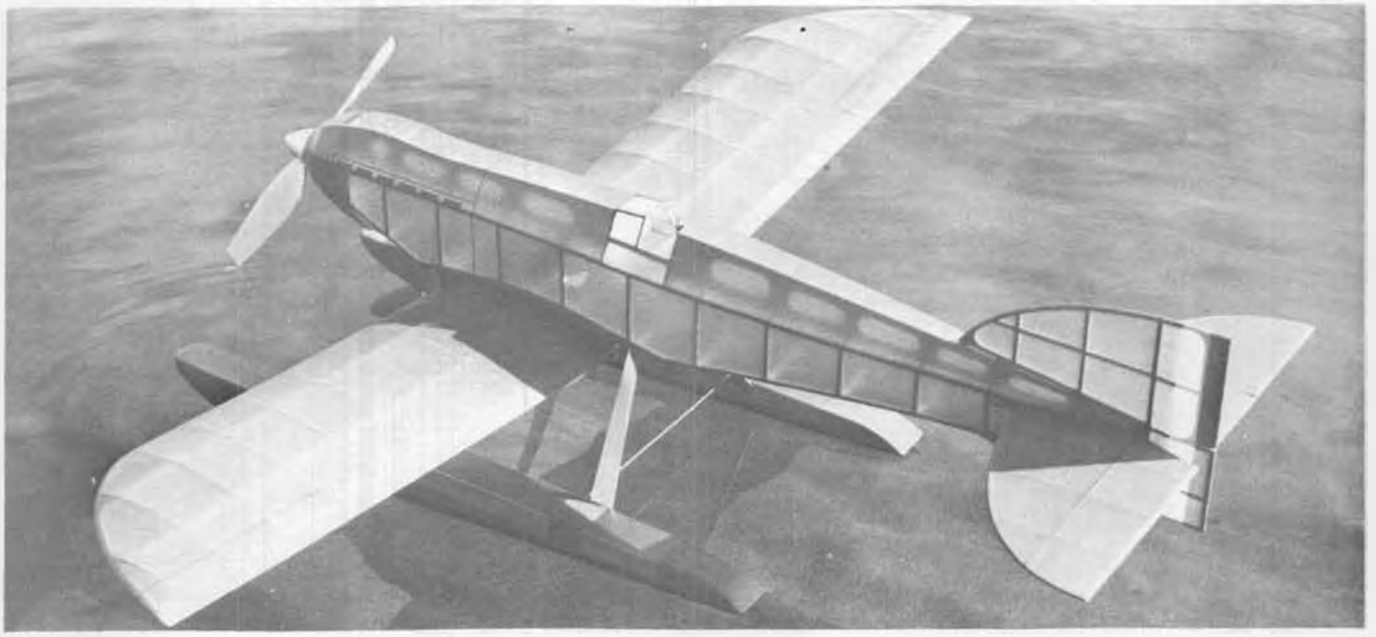
Announcing the formation of a specialized group of modelers for the research, development and documentation of aircraft powered solely by flapping wings.

While visiting the public library in Columbus, Ohio, years ago, I inquired about a book on flapping wing aircraft concepts. I was told that nothing has been written on this subject. Since that time it has

Continued on page 73

WORLD FEDERATION OF WING FLAPPERS

Peanut TBF Avenger modeled from Monogram 1/48 plastic, which is Peanut size, by Scott Rubke. Plug-in gear, decals, and scale prop come from kit. Flies over 30 seconds. Rubke photo.



"SCHNIEDAIR"

By WALT WINBERG . . . The designer has combined the best features of various Schneider Cup racers to create this attractive lightweight. Designed for CO_2, the model also adapts well to rubber power.

PHOTOS BY AUTHOR

• Searching for a design that would suit the MODELA CO2, I decided to utilize a recent small compressed air model that I had designed along the lines of the beautiful Schnieder racers.

With the exception of a slimming of the width of fuselage (the original was of course designed around a beer can tank) all the outlines were retained. The hump on the forward fuselage, for example, was a fairing for the pump valve, serving now as a dummy air intake.

Keel stringers replace numerous formers and stringers, and with careful selection of balsa, are actually lighter. The laminated curves on the wing tips and tail surfaces are all achieved on one simple form.

With removable wings and floats, Schniedair will fit into a compact box to take along on vacation by the sea or lake. Having tried many forms of modelling over the years, I still find the sight of a free flight on floats, whirring quietly off a glassy lake, a stirring sight.

FUSELAGE

Except where noted on the plan a light, firm grade of balsa was used throughout.

The fuselage is built around a basic 3/32 square box.

Start with the 3/32 sheet wing saddles first. Cut and sand to exact shape, then build up both fuselage sides; use your favorite glue but don't use white glues on a seaplane!

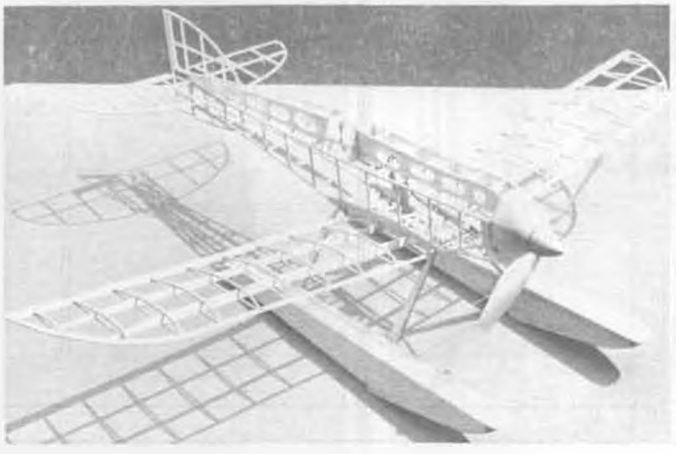
'Thick' cyanocrylates are ideal for this. After placing a drop on a joint, let it set a few seconds to soak in then blot up any excess with a bit of kleenex rolled to a point. After removing from plan, glue opposite side in a similar fashion. This method makes for easier sanding and excellent glue joints.

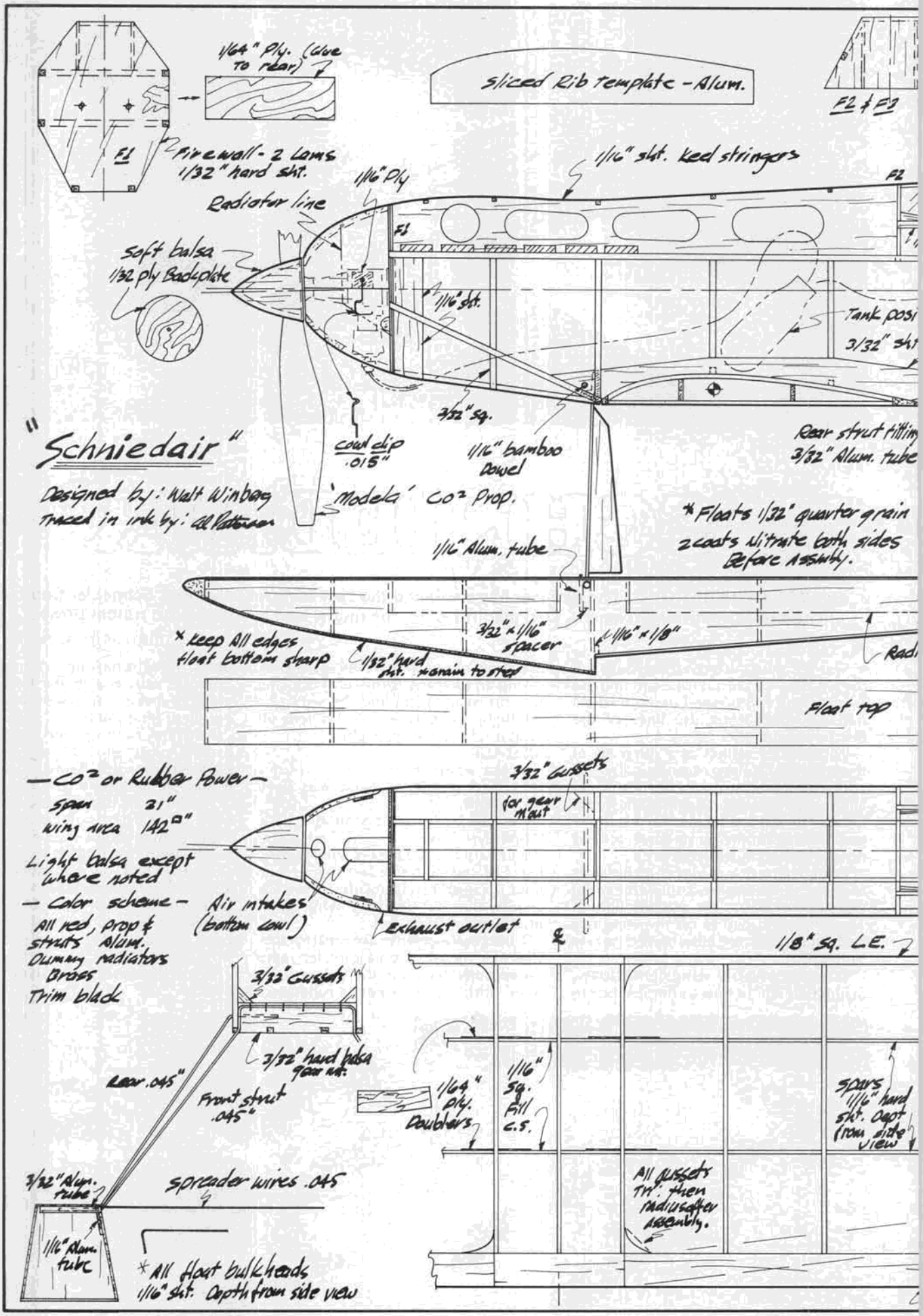
Note the built-up slot for the stabilizer, a piece of 3/32 sq. temporarily placed in the slot during construction will assure a close fit later.

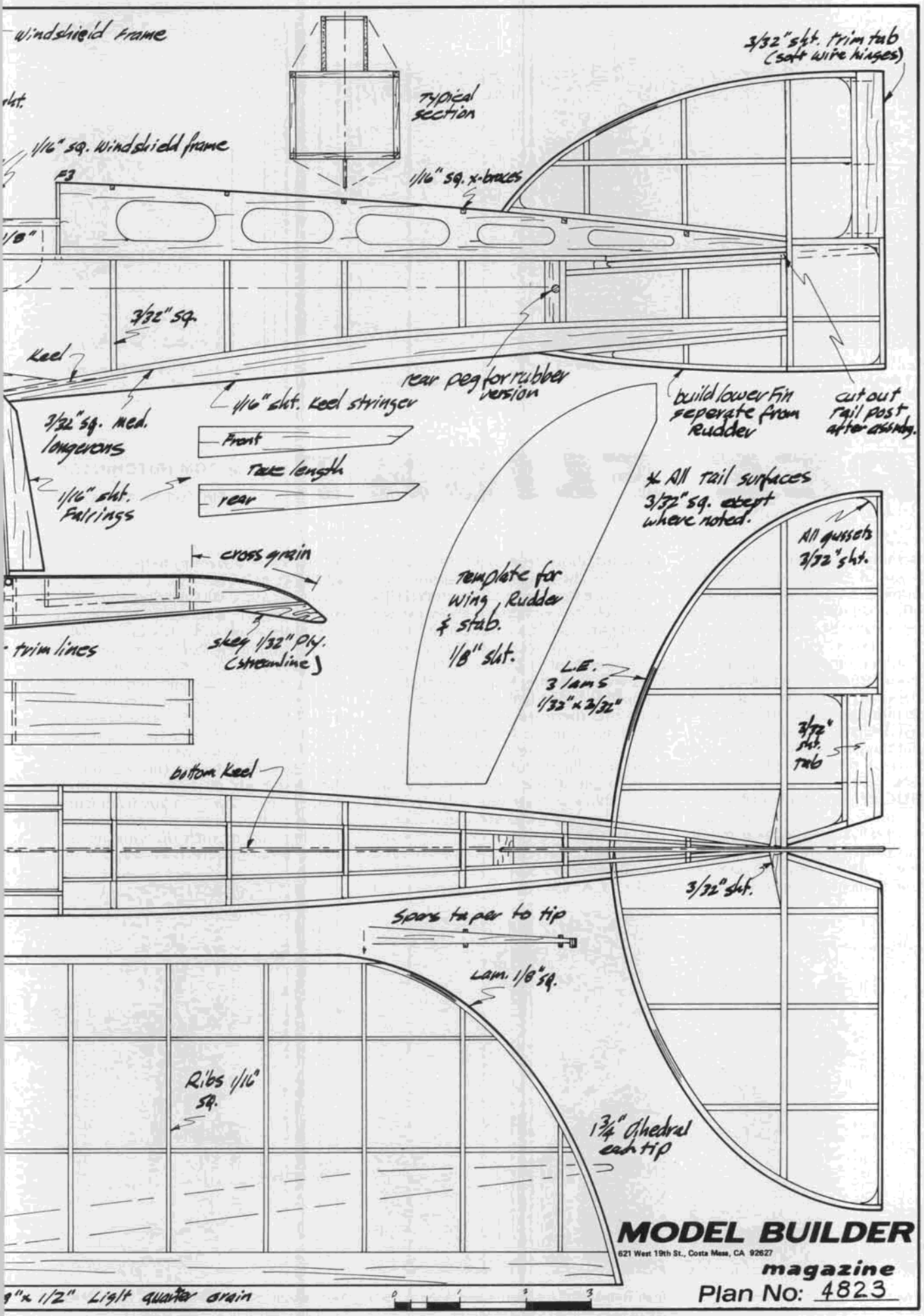
The 'firewall' is laminated cross grain, from 1/32 hard balsa. Glue it up first as a sheet slightly larger than firewall, then cut to shape and notch for longerons. Glue the 1/64 ply backplate in place and mark off and drill the two mounting holes for the MODELA. Glue the two fuselage sides into the firewall notches; note that a couple degrees of downthrust is built in.

With the fuselage upright on the

Continued on page 74




1/64" Ply. (Glue to rear)
Sliced Rib template - Alum.
F2 & F3
F1
Firewall - 2 Lams 1/32" hard sht.
1/16" Ply
1/16" sht. keel stringers
F2
Radiator line
F1
Soft balsa 1/32 ply Backplate
1/16" sht.
Tank posi
3/32" sht
3/32" sq.
Rear strut fitting 3/32" Alum. tube
"Schniedair"
Designed by: Walt Winberg
Traced in ink by: Al Patterson
Cowl dip .015"
1/16" bamboo dowel
'Modela' CO² Prop.
* Floats 1/32" quarter grain 2 coats Nitrate both sides Before Assmbly.
1/16" Alum. tube
3/32" x 1/16" spacer
1/16" x 1/8"
* Keep All edges Float bottom sharp
1/32" hard sht. grain to stbd
Float top
— CO² or Rubber Power —
span 21"
wing area 142 sq"
Light balsa except where noted
— Color scheme —
All red, prop & struts Alum.
Dummy radiators Brass
Trim black
3/32" Gussets for gear mount
Air intakes (bottom cowl)
Exhaust outlet
1/8" sq. L.E.
3/32" Gussets
3/32" hard balsa gear mt.
Rear .045"
Front strut .045"
1/64" ply. Doublers
1/16" sq. Fill c.s.
Spars 1/16" hard sht. Capt from side view
3/32" Alum. tube
spreader wires .045
All gussets Thk. then radio after assembly.
1/16" Alum. tube
* All float bulkheads 1/16" sht. Depth from side view



MODEL BUILDER
621 West 19th St., Costa Mesa, CA 92627
magazine
Plan No: 4823

Tom Cashman and Gary Medley wait for good air at Harts Lake Prairie FA-1 Semi-Finals.

Bob Hunter building new Satellite (what else?) 1300 for Rossi .65 ABC speed. Hmm . . . what kinda glue is he using?

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

• It's difficult to write something which will come out in early spring, when the ground outside is covered with all that white stuff. It doesn't snow too much here in the Northwest, but when it does, it sort of paralyzes everything. One beneficial effect is that the snow and icy driving conditions this week caused cancellation of a couple of days of school, permitting me to get this month's epistle off before the deadline. (It helped that the garage is now too frigid for any sort of serious building to be accomplished, either.)

NFFS PUBLIC RELATIONS EFFORT

I got a letter this month from Jack Woodard, who has taken over as public relations director for the National Free Flight Society. Jack hopes to use his professional skills in this area to spread the word about free flight beyond the bounds of the modeling fraternity. (My experience has been that, even WITHIN the fraternity, not much is known about free flight.) Jack has a budget of exactly zero dollars to accomplish this effort, but hopes to start out by making contacts with currently active free flighters on both an individual and club basis. He notes that there are 30 states (including such large ones as Michigan and New York) for which the AMA lists no chartered free flight clubs. For his PR program to get off the ground, Jack would like to have at least one volunteer PR person familiar with each major metropolitan area of every state that has any free flight activity. Write to Jack Woodard, 7985 Sunridge Court, Fair Oaks, CA 95628, or phone (916) 961-1829 if you want to help out.

MYSTERY MODEL

This month's MM may be a bit difficult to identify, as it has little in the way of identification aids. It's just a plain-vanilla Unlimited Rubber model from out of the past. You might notice that it had a sheet balsa fuselage, and the wings used multi-spar construction, but the straight-forward lines and Oakland Cloud Duster rudder shape might be a clue to the designer, who was one of the top U.S. rubber flyers. This was one of the first-high performance rubber models I ever saw . . . a guy from Baton Rouge used to have a pair of them and put them up to such dizzying heights that a three-minute max was a mere

Mark Valerius tunes up Class B at Seguin Nats. Where to this year?

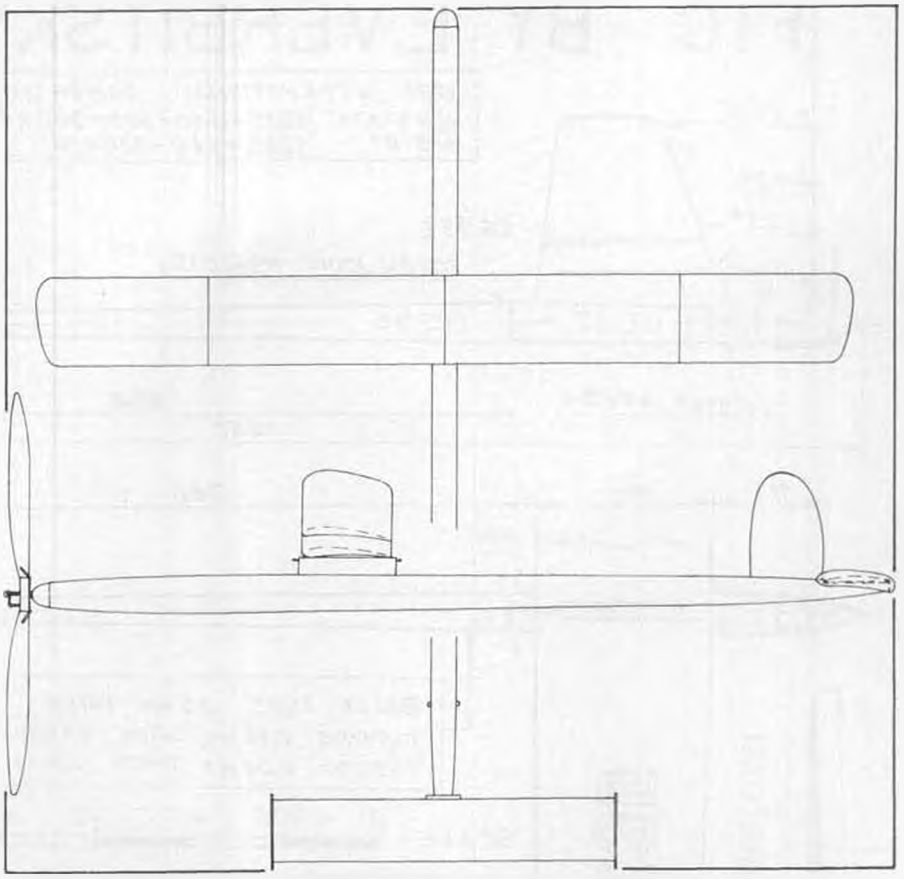
Rich Rohrke and his short-nosed Wake at 1981 Sierra Cup. Will Nakashima photo.

Youngest member of Brown F/F Team, David, Launches Mulvihill at 1981 Nats.

formality (the challenge was in retrieving it for the next max!). When I met Lee Polansky, he had one of these, too. It would probably be a competitive Mulvihill ship even today.

If you think you can identify this ship, send in your entry to the *Model Builder* office (621 W. 19th, Costa Mesa, CA 92627). First correct identification (based on postmark and location handicap) wins a free subscription.

The basic idea came from Eric Lister's *Drag Reduction and Structures Handbook*, which is written for R/C gliders, but has a lot of application to free flight, as does his earlier *Sailplane Designer's Handbook*. Both are excellent "nuts and bolts" books about model aerodynamics and design (available from the author for about $6 apiece . . . address is 410 Regina Drive, Clarksburg, MD 20734). Eric looked at a bunch of Eppler airfoils, trying to find a common design factor. Reasoning that Eppler be trying to reduce drag by reducing trailing edge separation, Lister looked at how the rear portions of the Eppler sections changed. He found that the maximu drop-off in upper surface ordinates was five percent between the 40 and 60 percent chord stations. (This corresponds to a top surface angle at the rear of about seven percent degrees.) Lister used this observation to design a whole series of airfoils based on the Eppler mean camber lines and thickness distribution, being careful that the resulting airfoil section had less than a five percent drop-off at the rear. He also mentioned that many of the "old stand-by" airfoils used by modelers also met this requirement.



APRIL MYSTERY MODEL

The basic idea came from Eric Lister's *Drag Reduction and Structures Handbook*, which is written for R/C gliders, but has a lot of application to free flight, as does his earlier *Sailplane Designer's Handbook*. Both are excellent "nuts and bolts" books about model aerodynamics and design (available from the author for about $6 apiece . . . address is 410 Regina Drive, Clarksburg, MD 20734). Eric looked at a bunch of Eppler airfoils, trying to find a common design factor. Reasoning that Eppler might be trying to reduce drag by reducing trailing edge separation, Lister looked at how the rear portions of the Eppler sections changed. He found that the maximum drop-off in upper surface ordinates was five percent between the 40 and 60 percent chord stations. (This corresponds to a top surface angle at the rear of about seven degrees.) Lister used this observation to design a whole series of airfoils based on the Eppler mean camber lines and thickness distribution, being careful that the resulting airfoil section had less than a five percent drop-off at the rear. He also mentioned that many of the "old stand-by" airfoils used by modelers also met this requirement.

So, I started to check out each month's DGA to see what the upper-surface drop-off was. For lack of a better term, I dubbed this comparison the "Eppler test" and have been referring to it in this manner for the last year or so. The fact that a particular section passes this test doesn't necessarily mean that it's a world beater, but about 90 percent of the published DGA's that I've checked do pass the test. In any case, it's easy to apply and gives you something to back up your "eyeball selection criteria," if you want to argue with someone else.

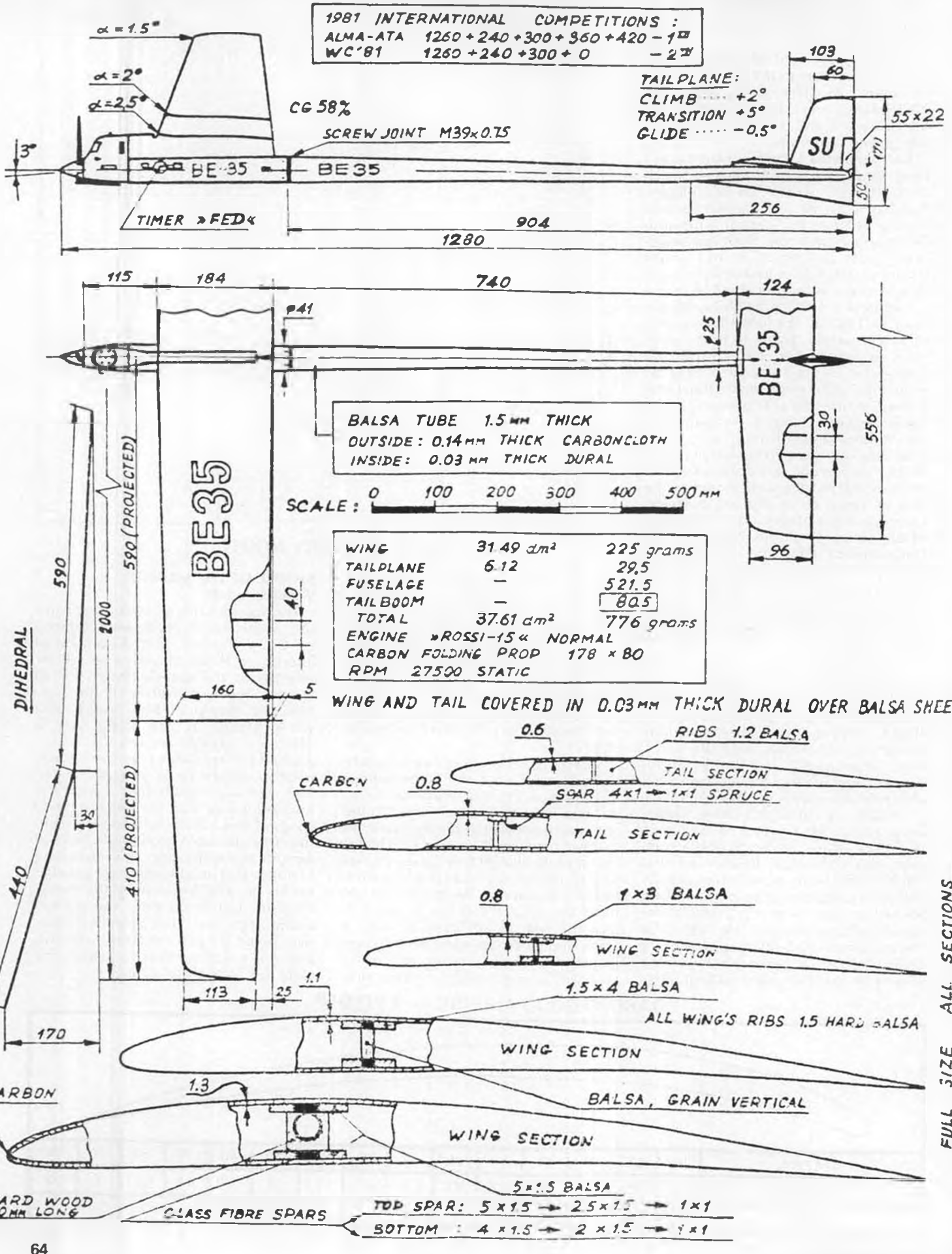
MODEL OF THE MONTH: Verbitsky's F1C

This month's three-view comes courtesy of the *Bat Sheet* (drawing supplied by Craig Cusick), and should be of interest to those of you who are interested in the state-of-the-art in FAI Power. Eugen Verbitsky is the uncrowned champ of F1C, based on a World Champs record dating back to 1967. His models are usually distinguished by very clean, *consistent* power patterns, which result in great height. They are also usually full of technical innovations, as with the metal-skinned wings of this model. And his workmanship is impeccable (notice the table of weights in the drawing). It's interesting to notice that he still uses a rear position for his fin, and has avoided the trendy three-fin layout (as does the current champ, Meczner). His airfoil is distinctive, being six percent thick, with two percent undercamber to regain the glide lost by the thin airfoil.

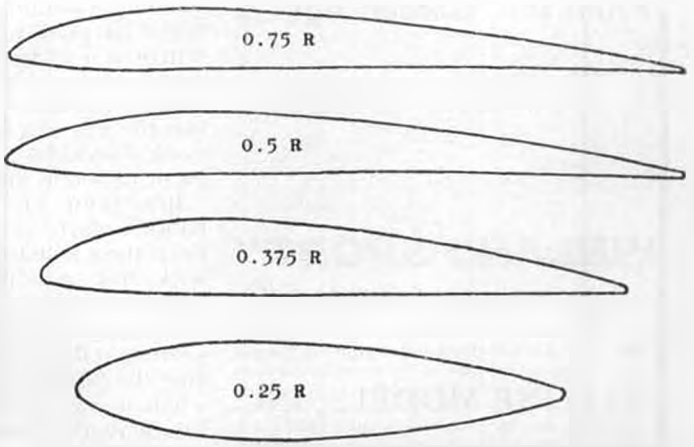
DARNED GOOD AIRFOIL — КУПØЕР

STATION	0	2.5	5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	1	3.5	5	7	8.3	9.2	9.7	10.2	11	11	10.2	8.5	6.4	4	0.3
LOWER	1	0.3	1.2	3	4.2	5	5.6	6	6.8	7	6.5	5.5	4	2.2	0

FIC BY E.VERBITSKY USSR



Craig Cusick trying to un-flood Super Tigre on Saturn FAI Power design. Visalia, 1965.



Typical propeller section (carbon fiber/epoxy). Increase thickness by 5% for glass/epoxy; by 10% for glass/polyester.

ON PROHIBITION OF FAI PROXY FLYING
by Paul Lagan

The following comes from the Australian FF newsletter, *Flypaper*, via the Stratobats *"Batsheet"*:

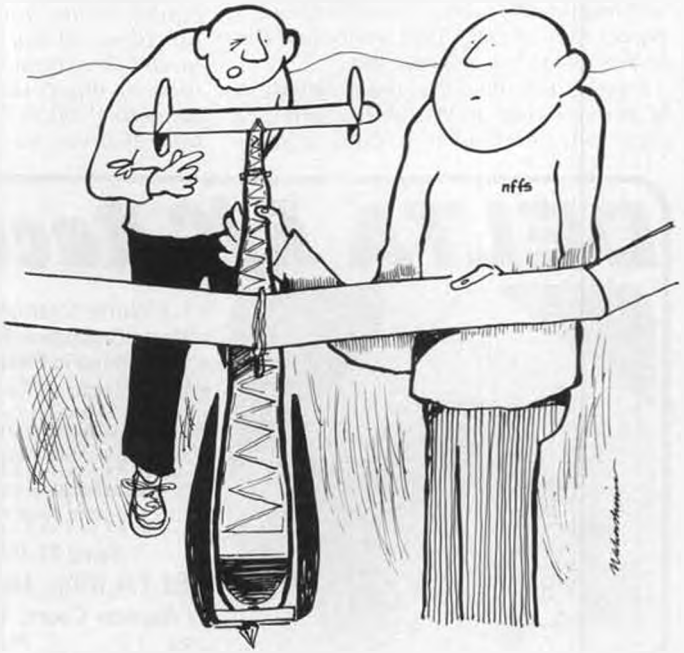
"The decision of the FAI Models Commission to prohibit proxy flying at the World Champs from 1982 onwards is something of a turning point in Free Flight. As the World's most proxied World Champs entrant, I feel qualified to write about some of the advantages of the practice that may have been overlooked in Paris when the decision was taken. In a remote country, such as New Zealand (and Australia), there is really little opportunity for the majority of modellers to attend a World Free Flight Champs. Some who have reached a very high level of flying skill make the effort and the financial commitment to compete with in-form, in-season flyers who are virtually flying on home ground. Usually the antipodean (living on opposite side of the world) modeller doesn't perform up to his home standard. Exceptions occur only when the traveller has stayed in the area of the World Champs for some considerable time prior to the event. I'm about to depart for Spain and I look out the window, and here it is about 10° C (50°F), blowing 20 knots, and there hasn't been a flyable day, let alone any sort of day that will bear any resemblance to Spanish mid-summer, for weeks. (At least the wind conditions turned out to be similar! . . . TH) I arrive in Spain two days before the start of the World Champs and really can only rely on past experience rather than current form to give me any chance of flying well.

"With so much going against the antipodean at the World Champs, it is little wonder that many who have attended return a little disillusioned and often give the FF game away in frustration. This frustration and the experience rub off onto local FF'ers who see little point in attempting to travel to a World Champs, and hence their sights are set lower than the ultimate (World Champs) standard and they are content to aim at local, state, and national honors in their chosen classes.

"Entering by proxy and having an European fly one's models in Europe is still a very valid way to participate at a World Champs. It allows the FF'er who may aspire to one day travel to the WC to develop models with the necessary potential; it produces a concentrated effort following team selection to build, fly and generally prepare a set of models; it establishes contact with the proxy who may well be a very experienced person and who can pass on suggestions; it gives the proxy opportunity to try models other than his own and learn from them and it gives him practice in flying in top level. What does it really matter if the proxy attains top or bottom place? The exercise is not undertaken with the motive of winning the World Champs, as all who have proxied or have been proxied know that any victory is a hollow one . . . the entrant (builder) gains no real credit as that is given by the unthinking masses to the flyers . . . and, of course, the flyer gains no real credit either, as he is just the proxy and it is the entrant's name that goes on the trophy.

"New Zealand participated in World Championships from the very outset of International Free Flight. The Moffett and Wakefield events pre-war, often

Eugen Verbitsky confers with USSR teammates Sharin, Ehtenkov at 1973 WC, Weiner Neustadt, site of 1983 World Champs.



"Do the wavy sides contribute to performance?"

had only four or five countries represented . . . one of these was New Zealand. Naturally, participation was almost always by proxy. Since the war, NZ has been represented in all but one World Champs . . . many times (most times prior to 1967) the entire NZ team was proxy flown. This participation has done wonders for incentive in NZ and for the standard. Now that proxying is no longer allowed. New Zealand may well regress and opt out of International Free Flight.

"I believe the motive for dropping the proxy rule was to attempt to have aeromodelling recognized as a 'sport' rather than a hobby. Apparently, some have argued that if a proxy can fly another's model, then the flying aspect of the activity is not important and therefore cannot be regarded as requiring any physical skills or ability. If that was the motive, then surely satisfaction would be gained by some modification to the wording of the proxy rules to allow a team entry when the builder of the model cannot attend the event. The flyer, appointed by the builder, could be a member of the two-man team and would in this fashion gain equal credit for any success (or failure) at the contest.

"Despite the above sounding-off, I expect that January 1982 will herald the end of proxying. A great pity."

I agree with Paul that the prohibition of proxy flying at World Champs is a great pity, ending as it does a long-standing tradition in international free flight participation. The most likely outcome is to see a shrinking away of participation by more remote or less affluent nations. It does seem a shame that the size of a free-flighter's pocketbook should be a qualifying factor for participation in the World Champs.

But, then, perhaps the European nations which control the FAI prefer to keep their teaparty in their own bailiwick, not be bothered by interlopers from the nether reaches of the planet. Some proof of this attitude was certainly evident in the overseas modelling press after the 1979 World Champs in the USA, when it was pointedly suggested that future World Champs should not ever be held so "far away" again. Certainly this attitude was evident in the selection of Weiner Neustadt as the site for the 1983 World Champs, even though legitimate proposals from Argentina and Australia had been presented over a year ago, as well as a new proposal from Israel. While the delegates may claim that they favored a return to a known site and proven organizations, I suspect a healthy dose of European parochialism to be the real reason. (Be that as it may, I'm going to start saving my pennies for a return trip to Austria, even as a spectator. Using Munich, Zurich, or Vienna as a base for European travelling before or after the contest does give you access to some of the most spectacular scenery in the Continent.)

POWER MODEL PROPELLOR TESTS
by Pete Buskell

(Reprinted from *Free Flight News*)

There are probably not very many modellers who insist on carving their own gas model props, so the results of Pete's experimentation make interesting reading, now that many FAI Power flyers are molding their own props:

"When I started flying FAI Power models, the only propellers available commercially were club-like plastic propellers and a restricted range of equally crude wooden ones. It seemed ridiculous to put time and effort into model development and motor tuning, then to equip the front end with the proverbial blunt instrument. The solution, as usual, was 'do-it-yourself'.

"The procurement of a sheet of 'carp' grade Tufnol (phenolic) at bargain price from a surplus store solved the material problem, being easy to carve while giving reasonably stiff propellers with some flexibility to absorb landing shocks. Carving time was about two hours each, and expenditure averaged about 1½ per contest, including trimming flights. Batches of six were carved fairly regularly, affording the opportunity to experiment with various design features and to develop a propeller design based on practical tests. Assessment was based on airplane duration. The aspects examined were:

1) PITCH: This is dependent on model weight/drag plus power output/operating rpm of the motor and the contest engine run. Pitch was varied in 1/4-inch steps around a nominal figure, keeping rpm constant by varying blade area.

Higher pitch gives more pick-up in the air with acceleration continuing throughout the run, but at the expense of less initial acceleration. Lower pitch gives fast acceleration initially with the model soon reaching constant speed. Optimum duration came with a pitch which allowed the model to continue accelerating for about 80 percent of the motor run. A pitch of 3-1/4 inches seems about right for current Rossi models.

2) With constant pitch, blade area and diameter were progressively varied for optimum duration. Diameter was found to be the important factor. The more the diameter could be increased by cutting blade area, the better . . . the limiting factor being blade strength.

Increasing the section thickness was tried as a means of maintaining blade strength, but this reduced engine rpm and lowered performance. Producing high aspect ratio thin section propellers, as with wings, is a problem of material. Carbon fiber/epoxy resin propellers can offer substantial improvement in this respect.

3) BLADE SHAPE: There was found to be a small but definite advantage in elliptical blade shape as against square with parallel or straight taper blades. One reason is that, due to the smaller tip chord, elliptical blades can give a slightly larger diameter for the same blade area. Also, spillage around the tips is reduced and a better thrust velocity gradient is obtained.

4) PITCH VARIATION: After reading various propeller design articles, some variations in pitch distribution were tried. The first was to increase pitch very slightly from 0.5 radius outward. This slowed motor rpm, however, making it necessary to crop diameter slightly to restore the loss and this led to lower performance. As the result was positive, it seemed worth trying the opposite, i.e., slightly less tip pitch. This looked good, as the airplane accelerated more quickly, but duration was down.

5) SECTION: Thus far, the propellers had been carved with a 'Clark Y-ish' section with maximum camber at around 40 percent. Very slight undercamber was found to be beneficial.

One day, while carving a couple of propellers for a competition on the following day, hacking away furiously, I took too much material off the top back of the blank, resulting in a section with maximum camber at around 30 percent. Motor rpm were up 1000 with this prop and duration similarly improved.

The prop was cut up and the section examined, and a further series of tests followed in which the section was progressively varied, leading to some further slight improvements in performance and ending up with the section shown in Fig. 1 (0.5 and 0.75 R), which, it will be noticed, is not unlike the sections currently used in F1C wings.

"The test indicated that the exact shape didn't matter a lot, provided that the folowing salient features were incorporated:

a) maximum camber in the 30% chord region;

b) entry tending towards symmetrical;

c) very slightly undercamber.

"The changes carried out progressively in 1-5 led to quite considerable improvement over earlier efforts, but the largest improvement came about accidentally when the original sheet of Tufnol ran out. This was 3/8 inch thick material, which allowed helical pitch to be maintained to the root.

"All I could get quickly was 1/4 inch thick, and, as I needed props, I had to use it. The solution adopted was to carve from a block with the usual front view, but where the pitch started to depart from helical (at about .35 R), to make a progressive change to a symmetrical section (at the hub). The idea was to 'feather' this portion at zero incidence. Inferior performance was expected, but in use, rpm went up about 1500; and performance was much improved.

"After adjustment of diameter to get the revs down to the correct figure, duration was found to be about 10 percent up. Why? My guess is that producing thrust near the propeller hub only produces high fuselage drag. The ideal would seem to be the rubber model folding propeller with elliptical blades and a wire hub. A tube of thrust is produced outboard of the fuselage, resulting in lower drag. Diameter came out important for the same reason in that large diameter and smaller blade area near the root means that less thrust is produced near the fuselage and a larger volume of air is moved at a lower velocity.

"Later developments: A change to fiberglass props was made in the ST G15 era, giving improved efficiency from the thinner, stiffer blades . . . Serious development ceased when the change to fiberglass was made, due to the vast amount of extra work involved." •

Electric .....*Continued from page 45*

minutes, and 3.8 amperes after three minutes, and so on. At three minutes you have put in a total of 11.8 Am, if you are using 1/2AA cells, you should be thinking about stopping, if you are using sub-C cells, there is a way to go yet.

Well, enough of the technical side of things, this was really sort of an introduction to a couple of other items. One is the new charger by Astro Flight, which retails for about $60. This charger operates from either a charge battery or from house current. I really like the house current feature; it allows you to charge

packs before going to the field without using up your field charge batteries, and it will run motors on house currents for break in. The current is fully adjustable, so you can charge any size of pack in any voltage up to and including eight cells. The charging instructions are printed right on the front of the charger, where they should be. In addition to all this, there is an overnight (slow charge) circuit to charge packs up to even out all the cells, as mentioned just a little earlier. There is a pilot light that stays lit when the slow charge circuit is on, so you know it is working. There are voltmeter jacks so you can monitor voltage if you are charging to a voltage peak (described in previous columns). The connectors that come with the charger are the standard Astro power plug, a Molex plug for packs that use them, and alligator clips for connection to a field charger battery, plus, of course, the house current cord. It looks like a good charger to have, and used with a voltmeter, it is as versatile as you can get short of having automatic electronic control circuits.

I have mentioned the Jomac instructions for its chargers in a previous column, and commented on how good they are. Recently, I was talking to Don McKay at Jomac, and he mentioned an offer you can't refuse! For just the price of a stamped self-addressed envelope, Jomac will send you its sheet on batteries and its sheet on the constant current digital charging methods. The sheet on digital charging alone is worth the stamp. It includes a voltage table for finding the 100% voltage of your pack on charge, a must if you want to use a voltmeter for charging. The sheet on batteries covers the characteristics of G.E. and Sanyo batteries, all the methods for fast charging, and tips for getting the maximum performance from your batteries. Send your SASE to Jomac Products Inc., 12702 NE 124th St., Kirkland, Washington 98033. Definitely a good deal, mention you saw it in this column!

Charlie Parker, of Parker R/C Planes (P.O. Box 8195, Van Nuys, California 91409), sent in a bunch of good photos of his kits and experimental planes. They all look good, and all the reports about the planes have been good, so let's take a look. The Corvette is a two-meter sailplane for the Astro 05 (or gas), with 630 sq. in. of area, and a flying weight around 38 to 42 ounces. Charlie says it has a climb with the Astro 05 XL that is hard to believe. Some of the fliers who have built the Corvette are raw beginners, and have had good success right away. The kits feature precut ribs and formers, a clear canopy, complete hardware, and rolled plans, for $33.95. The Lil Joule is a low wing aileron ship designed for maximum performance, in fact, Charlie says it can perform vertical rolls and inverted flight with ease. He especially recommends the Astro 05XL or the Leisure 05 for it. The wing area is 273 sq. in., and the flying weight is about 28 ounces. The kit has precut ribs, formers, complete hardware, and clear canopy, for $34.95. The most exotic plane in the Parker line is the Sorcerer, designed for the Astro 075. This looks like something out of the future, and has a span of 92 inches, and area of 815 sq. in. The kit includes pre-cut ribs and formers, complete hardware, wing jig, and clear canopy, for $69.95.

Charlie also offers combos at very good prices, the Corvette, with an Astro 05 flight pack is $65, and with a charger, $80. With a Leisure flight pack it is $75, and with the digital charger as well, it is $145. This is a very good deal, about two-thirds of what the separate items would add up to . . . over 30% savings. The Lil Joule comes in the same combos, for $75, $97.50, $85, and $149. Parker R/C has a catalog; it would be a good idea to send for it with an SASE, since prices can (and usually do) change.

Charlie sent some photos of his more experimental planes and those in development. The 928 is a second generation two-meter electric sailplane, with a span of 74 inches, wing area 660 sq. in., with a flying weight of 33 ounces (that is light!). It has a very slim fuselage. Charlie is putting a lot of effort into achieving minimum drag. The 928 will be a kit in the future, possibly this spring, for about $40. The last plane is really far out. Charlie calls it the R-1 (as in resistor), and the framework weight is 4-1/2 ounces! That's like indoor R/C! The span is 60 inches, with an area of 600 sq. in.. Flying weight, with a mini Cannon radio (three channels, four ounces), is 25 ounces with the Astro 05XL. Charlie used a .550 Ah (33 Am!) pack for the motor to save weight. I'll misquote Charlie as saying it goes like a homesick angel; his own description had more flavor, but the editor might object!

The next project for Charlie is an attempt on the electric world speed record with a plane he's designed. Bob Boucher from Astro Flight is making some samarium cobalt 05 motors (same material as used on the space shuttle control motors) with a very high power-to-weight ratio, and Charlie is going to aim for 150 mph. Who knows, he may succeed! The fastest electric I know of is the Electra 225, a twin Astro 25 plane from Astro Flight. I think it did between

80 and 90 mph.

Till next time, fly faster with electrics!●

R/C Boats ....*Continued from page 31*

sembly is definitely a big improvement over the clamp-together method used on the 3.5 until it's latest update. By the way, it is possible to purchase a new lower unit for the 3.5 that employs the screw-in prop shaft and a longer skeg. We have tried the new 3.5 lower unit on a couple of our small tunnels and it has greatly improved the cornering characteristics. Enough about the engine, 3.5 and 7.5 versions. Let's look at some boats.

THE JVS TUNNEL

JVS Products, P.O. Box 452, Anza, CA 92306, is offering a 34 inch fiberglass tunnel design that is very scale appearing. The price of the JVS 7.5 Outboard Tunnel is $110. The boat comes completely joined, in white gel coat. The quality of materials and layup is excellent. The rear cowling is removable for access to the radio and fuel systems. A removable waterproof radio box is recommended and we used a G & M Models 3 × 5 radio box. This is a very fine radio box, selling for $22.50, and includes the seals and push rod ends. It is available from G & M Models, P.O. Box 342, Broadview, IL 60153.

The transom on our boat was reinforced by adding triangular transom braces made from 1/4-inch plywood. To help fasten a turn fin, a piece of 1/4-inch plywood was glassed to the inside of the right tunnel wall. The piece was about 1 x 4, and was positioned so the turn fin could be mounted 8 inches from the transom to the back edge of the fin. A 12-ounce Sullivan rectangular fuel tank was located just in front of the engine.

An interesting feature of this hull is the full length ride strakes built into the sponsons. This, of course, is very common with deep vee hulls, but it is the first time I've seen it employed on a tunnel. The tunnel floor has a slight amount of vee in it to improve stability. The vee in the tunnel floor is comparable to dihedral in the wing of an airplane. I used the idea in my 7.5 tunnel design, and it seems like a reasonable theory.

There is one thing we found out the hard way on our JVS 7.5 Tunnel. The fiberglass back cowl doesn't float unless you glue something like a chunk of white foam to it. Seems like the system we used for attaching the cowl to the hull was not able to withstand a high-speed spin and flip. The cowl popped off and promptly sank to the bottom of the pond. So, stick some type of flotation in the cowl. While you're at it, stick some down in the sponson cavities, too.

During our running of the JVS 7.5 Tunnel, we found the boat to perform very well. It flew nicely down the straightaways, and the cornering was very good. The boat looked scale-like when running. The JVS is a fine performing fiberglass boat. It is easy to rig and can be made into a most realistic appearing model. I would like to thank Vern Schmidt of JVS Products for allowing us to test this boat.

THE OCTURA WILDCAT TUNNEL

During a phone conversation with Tom Perzentka last summer, I suggested that his Wildcat Tunnel, designed for .45 to .60 inboards, might be adaptable to outboard usage. The Octura Wildcat Tunnel is a 36 inch wooden kit selling for $67.50, and available from Octura Models, 7351 North Hamlin, Skokie, IL 60076. Originally designed in 1975 for inboard racing in the hydroplane class, the boat has achieved some success in oval racing with a .60 size engine and has been timed at 55 mph with a .60 inboard. The boat is rather narrow when compared to the tunnel designs of more recent origin. However, as will be mentioned later when we discuss the running of the boat, this did not present any problems.

All the plywood, with the exception of the tunnel floor, is aircraft grade. The frames are of 1/8 inch, the sponson bottoms are 1/16, and the sponson sides and decking are 1/32 plywood. The parts are all cut on a band saw and the pieces fit together very well. There are no written instructions with this boat. Instead, a pictorial guideline is supplied showing step-by-step the construction of the boat. There is also an excellent full scale set of plans to assist in the building process. Using Hot Stuff Super T and five-minute epoxy, I put the boat to-

gether, brushed on a coat of clear epoxy, and had it in the water in five days. The G & M radio box was again used to hold the radio system.

Because I was interested in seeing how the boat would work with the 7.5 Outboard, I didn't bother to design an outboard tunnel type of cowling. As can be seen in the picture of the boat, I ran it without any cowling. With a little bit of imagination and some plywood, it would be possible to create a cowling for this boat. If I ever stop building new boats to try with the engine, I'll get around to building a cowl for the Wildcat Tunnel.

Any concerns I had about the boat being too narrow were quickly dispatched when the boat was tested with the 7.5 Outboard. On our first outing, we tried the boat without a turn fin. The cornering was not very good, so a turn fin was added prior to the next trip to the pond. On this second occasion, the Wildcat Tunnel cornered well and displayed good speed in the straightaways. For a very simplistic designed tunnel, it performed admirably. I was pleasantly surprised. Appearancewise, the Wildcat Tunnel doesn't have the scale look of boats designed for the 7.5 Outboard. However, it wouldn't take all that much effort to build a cowl on this hull. The Octura Wildcat Tunnel is certainly capable of handling the 7.5 Outboard.

PRATHER 35 INCH TUNNEL

Although I have not yet had the opportunity to try out the Prather 35 inch Tunnel, I wanted to let people know it was available. If the 7.5 version of the Prather Tunnel does as well as its 3.5 tunnel, this will be an excellent boat for the 7.5 outboard tunnel class. Like all the Prather Products boats, this one is also made of epoxy-fiberglass. It comes completely joined, with the plywood transom plate factory-installed. The boat sells for $175.95. An epoxy-fiberglass radio box kit is also available for this boat and costs $24.95. The Prather 35 Tunnel has undergone extensive testing, and I'm confident that the boat will show the same kind of excellent performance as other Prather Products boats. I've always been more than satisfied with any of the boats I've received from them.

Two other items of interest from Prather Products for the outboard are its new adjustable motor mount for the K&B 7.5 Outboard and the outboard cable set for steering and throttle. The cost of the 7.5 motor mount is $24.95, while the outboard cable set sells for $14.95. Contact Prather Products at: 1660 Ravenna Ave., Wilmington, CA 90744. The phone number is 213-835-4764.

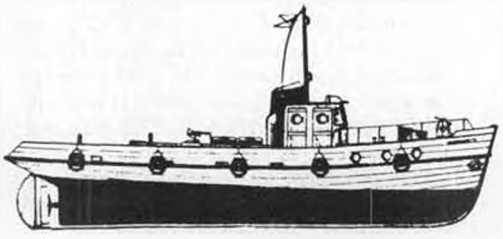
THE DUMAS HOTSHOT 45

This is the kit version of the 7.5 tunnel I designed and tested last summer. It is a wooden kit selling for $79, and if it's not in your local hobby shop it can be obtained from Dumas Boats, 909 East 17th Street, Tucson, AZ 85719. Since my January column was pretty much devoted to this boat, I won't spend a great amount of time discussing it. I have, however, received and built a kit version of my boat. Here are a few thoughts about the kit.

I would definitely recommend using a flat building board when assembling the framework. The building board helps assure that the framework is true prior to the application of the sheeting. Although the die-cutting of the parts is pretty good, I suggest that all the frames be block sanded to achieve a flat gluing surface. Since this is the first time any of my designs have ever been offered as a kit, it was fun sticking it together. The kit version looks just like the original, and there's no reason it shouldn't run just as well as the original. Speaking of the original, it is now in the hands of my racing buddy, Jack Garcia. Since Jack has won the 3.5 outboard tunnel class at the last three NAMBA Nationals, I know he will do a good job of racing this boat. After testing the boat with the prototype 7.5 outboard last summer, I boxed them both up and sent them down to Jack, who just happens to work for K&B. When Jack had an opportunity to run the boat, he liked it so much that he called me up and talked me out of it. Go get 'em Jack!

My next activity for the 7.5 Outboard will be to try out the engine on some vee hulls. A project I hope to begin shortly is a 38 inch shallow vee racing runabout of my own design. If it works out, I'll try to get an article and set of plans ready for this column.

Any of you who would like to share what you're doing in the way of boats, kits or originals, are encouraged to send along some photos for use in this column. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. 206-584-7131. •



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

playing time. So, football is toward the upper right. (In contrast, the team manager operates to the left, being mostly concerned with reasoning and less with his personal execution.) Baseball seems somewhat less complex, requiring less strategy and perhaps less time and effort for the exercise of skill. Tennis requires less conscious awareness and cognitive ability (strategy). There are fewer players in the game and fewer options to consider. Bowling falls near the lower right corner. Watching sports on T.V. also falls somewhere in this domain!

Card games can also be viewed in this manner. Contract Bridge requires more thought and less skill than Poker. Gin Rummy requires still less strategy and tactics. Casino falls somewhere near Tic-tac-toe. Using the same logic, you can portray Roulette, Twenty-one, Craps, and even the slot machines. You can even contrast the different musicians of the symphony orchestra in this manner: the oboeist is primarily involved in tactics, while the conductor is most concerned with strategy. And jazz musicians fall in separate places in the strategy/tactics domain.

What has all this got to do with R/C soaring? Well, there are different kinds of events. For example, thermal flight requires considerable skill, but clearly, real success depends on your thinking ability. You must use your knowledge of the local environment, observe birds in flight and other sailplanes, and other signs to understand what's happening. If you're flying in a contest, you must also monitor the remaining time . . . more thinking. The triathelon rules simply further increase the required amount of strategy.

Flying for fun on slope lift requires little skill and practically no strategy. In contrast, the serius aerobatic pilot focuses on tactical matters. F3B competition events involve the pilot in speed, distance and duration . . . an even deeper mix of skill and logic. It's interesting to place yourself in this domain. What have you been doing? Are other areas worthy of exploration?

Perhaps this domain can help us invent new aspects of soaring . . . new ways to expand our horizon and diversify our activity. Perhaps other dimensions should be added to the figure, such as time required, the availability of geographic locale, funds required, and so forth. Here's a way to show the novice, and have the public appreciate more fully what we do and how it relates to other leisure activities.

And there's another way to improve our public image and overcome the "crash and burn syndrome." Flight simulators have saved many lives. Say . . . why not use flight simulation for R/C soaring? Video games are no longer a novelty. Why not show the terrain in color with your plane appearing in proper range and perspective? You make it fly around the "sky" by moving the controls. The actual movement is a realistic representation of the dynamics of the particular model you're flying. You search for lift and take advantage of it when it appears. You land on a scale runway at your foot, or even in your hand. After each flight your score indicates how well you did . . . overall and by individual aspects of your intent (provided you told the simulator the kind of flight you desired).

You could choose to explore how it feels to fly various kinds and size aircraft (simulating different dynamics), the effect of wind conditions, of terrain, and so forth. You could practice aerobatics, precision flying or even competition, with the other planes being simulated to fly at whatever skill level you wish to challenge.

Here's entertainment, education and R/C soaring all rolled into one. Sure, it's not as good as the real thing, but it seems a good way to spend rainy days and long hours. As the technology advances, you might simulate shifting more of your tactical responsibility to the sailplane, allowing you to spend more of your time and effort on strategic matters . . . or you might simply let the bird do most of the thinking for you.

See you next month. •

Control Line ..*Continued from page 55*

everything. So how could the needle setting have possibly changed? Fire that camel up, don't worry about how the engine sounds, fly that thing . . . 99 times out of 100 the model will, assuming it didn't sound quite right on the ground, go a couple laps and settle right into a fast, right-on run.

Well, maybe that "99 times out of 100" statement is an exaggerated one, 'cause there indeed are times when something has caused the engine to go rich or lean. What you *must* remember, and most don't, is that there is a very good reason for the engine being off and that it is only very rarely the engine can be brought back on song with a twist or two of the needle valve. Assuming the ambient temperature hasn't changed too much, the primary causes of a funny-sounding run at the start are the ones already mentioned, engine not up to temp, tank too full, etc. These things will go away in a few seconds, no problem. However, the plug could be bad, a piece of junk might have found its way to the spray bar, a fast-fill plug might be leaking slightly, possibly a vent on a suction tank is blocked. There are other possibilities; just notice that none of them can be cured by twisting on the needle. You have to find the real problem first, leave the damn needle valve alone. Do you hear me, I say!? *Leave the damn needle alone!!*

I suppose that the best example of what we have just gone over is the all-important start in Fast Combat. And I am not trying to look down my nose at you, expecting you to look back up in awe, but what I have always done when flying in the N.W., where we commonly require the pilot to make the initial start, is to fire the engine with the blind faith that prior to the match I have taken the time to get everything just perf. If, on the way to the handle, the motor hasn't started to sound just right, I'll come back to nurse it along, rather than trust a ratchet-fingered pitman, as all he is going to do is twist on the needle. No matter what, I pinch off the feed line and stop the motor. If it was lean, maybe the new plug wasn't tightened enough or just simply has a bad washer that leaks. Or the line could be pinched someplace; maybe there is trash in the line or spray bar. Whatever, it has to be fixed and if the needle is changed, it most definitely will need resetting when the real problem is fixed.

If the motor is too rich, quite likely it is because it isn't warmed yet, as I *always* start Combat motors cold, no pre-match warm-up. This will go away, but if it hasn't by the time the decision is made to stop the engine, the best approach is to disconnect the fuel line and squirt some excess fuel on your pit man's leg. Hook it back up, if you don't particularly care for the pit man, act like you're actually zipping your pants back up and let him think about it. With the pressure back to normal in the bladder (either one, or both), fire the motor back up and it should sing. Rush back to the handle, hoping Mr. Pit doesn't decide to point the model directly at you as he releases it . . .

Incidentally, one of the most effective ways to avoid false pressure with bladder systems is to first determine exactly how much fuel the bladder will accept before giving false pressure. Then, when filling, put that much in, plus an extra ounce, letting this extra shot of fuel back out almost immediately, and it will be very rare for you to ever have a problem with runs that are rich for a few laps, dead-lean for the rest of the flight.

Hello, Wynn!!

Had an interesting phone call the other day. Wynn Paul, editor of PAMPA's Stunt News newsletter and author of a Stunt column in another magazine, the name of which I don't seem to recall at the moment, was wanting to know how to get into RC. Yes! You read that correctly! All the usual questions, what radio do I get, what frequency is best, how do I charge the batteries and so on to the point of absolute boredom.

I am very tempted to just let it go at that, but what Wynn actually wanted was info on RC, as in Remoteo Controlleo race cars. Seems that a couple of his buddies race electric in a gym and Wynn is planning to blow away their Radio Shack Foof-Mobiles with a full-on 1/12 scale car. ●

Pattern .....*Continued from page 27*

button fan like some fliers are . . . well . . . here's some more buttons.

Just in case you think gadget flying is not "realistic," take a look at the F-16. That thing is so wild it could not be flown by conventional means. The control is through computers which modify the pilots' input by pre-determined amounts, then decides if the airframe will stand the load. If everything checks out, the plane executes the maneuver . . . how's that for a gadget?

I hope you will visit your friendly radio person and really look at the new trick stuff and the SUPER servos that are available. You may be surprised at how the old pattern bird "locks in" using the new stuff. ●

Peanut .....*Continued from page 51*

great and surely gets accomplished in a hurry.

The wings and tail surfaces are constructed directly over the plans. Use 1/16 sheet for the root ribs and 1/32 for all the other ribs. The spars are 1/16 square, both on the wing and on the tail surfaces. The top of the leading edge of the wing, and between the root and first rib, is covered with 1/64 sheet. If you find this hard to obtain ready-made, carefully sand some 1/32 sheet to about half thickness.

The fuselage is constructed as a conventional stick framed box, topped with sheet formers and sheet balsa turtle deck and engine cowl areas. It has a single stringer on each side and on the bottom. The stringers are about 1/8th wide at the front and taper to almost nothing at the aft end, as shown in the top and the side view of the fuselage. Solid balsa butt ribs are also added to the fuselage structure. A small area of the side cowling panel must be removed to accept the forward end of the butt ribs.

The landing gear wire is strictly conventional. The landing gear leg fairing is simulated by a 1/16th sheet triangle. It is rounded on its leading and trailing edge, not streamlined. A small piece of plastic tubing is slit for half of its length and slipped over the bottom of the wire to simulate the stub axle and thin wire simulates the diagonal landing gear brace, the lower end slipping into the end of the stub axle.

The windshield and canopy is made from thin clear plastic. It has compound curvature, so a form needs to be carved so it can be heat formed. The old Mattel Vacuform toy made the one on the model in the photos. If this will give you trouble, it is obvious that the Lark could be flown without the canopy, and the windshield alone has only simple curvature.

Cover your model with your favorite material. The one in the photos was covered all over with yellow Japanese tissue. After water shrinking and two coats of thin dope, the red Japanese tissue color trim and registration numbers were added. The first comment of my favorite model photographer, Fudo Takagi, on seeing the model was, "Ah, the rising sun!"

Have a lark with your Keleher Lark.●

Indoor .....*Continued from page 57*

been my dream to write such a volume. I hope, through my efforts and those of others, such a book will be available for researchers in the future.

I set about doing this by collecting every scrap of material findable on this subject. Photos were needed for the book. To get these, I tried to interest various publications to do articles on my flappers. Each time an article was done, they took more photos, which I planned for the book. Included in these efforts were two newspaper Sunday magazine articles, Model Airplane News, and Aeromodeler Cover articles, and a four-page article in Esquire magazine. Ohio State University Press had agreed to publish the book, but I moved to California and lost that opportunity.

This seems the right time to unite the ornithopter enthusiasts around the world to pool our experiments and findings and bind them together in one volume. I guess you could say our founder was the great visionary, Leonardo daVinci. His was the first concept of man flying in a machine. That first machine, as we all know, was an ornithopter.

Send me anything you have on this subject. What concepts have you tried that failed? What have you tried that worked? Or just send me your name and address if you are an enthusiast.

Building Tip

When building indoor duration wings and stabs, you may have noticed that some of the ribs stick up higher than others.

Using sliced ribs of 1/32 sq. or smaller is a tricky thing. The ribs are very flexible and can be mismeasured for length. When the front and back of the ribs are cemented in place, all of them may not line up across the top.

Try placing a long length of 1/32 sq. strip along the wing so that it rests on the highest point of the ribs arc. This strip would be parallel to the leading edge of the wing.

It will now be easy to see which ribs stick up too high or not high enough. A new rib can be then substituted which matches up to the others. The more constant the airfoil, the more efficient the wing.

Opaque Art Markers

In my continuing search for new and better products to assist the avid scale modeler; note the following. The art supply store in my area is now stocking opaque silver, gold, and white markers. These could be used in coloring areas on completed models. On many airplanes, the cowl area at the front of the fuselage is aluminum color. The markers are too wide to letter small NC numbers on your model's wing, but I'm sure they would have many uses. Ask for UniPaint Markers.

The price is about $2.40 each.

Campus Peanut Scale Engine

Have you seen the new Brown CO_2 yet? This remarkable powerplant is only one inch high and weighs only 7-1/2 grams. It looks too small to run.

But run it does. I held the little powerplant in my hands and ran it time after time. Each time I flipped the prop I thought of all the Peanut scale models it could fly. It is just perfect for all those great World War I biplanes. I found myself wishing I could have about 50 of these engines to put in all my favorite airplanes.

About two years ago, I installed a larger British CO_2 engine in an indoor Fokker Spin model. The wingspan was about 22 inches. I flew the Spin several times one evening at the Burbank High School gym. The one discouraging thing I remember about that evening was that each time the model made contact with the wall or the ceiling, the engine stopped. The result was that the Spin dove straight down to the floor.

Tractor models with CO_2 powerplants are great outdoors, or in a room with very high ceilings. Low ceilings and tractors are bad news. The ideal setup is pusher planes, like the Lockspeiser. This type model can strike an object and just bounce off and keep running.

The Campus CO_2 engine sells for about $40, and the charger for $10. Order from Peck-Polymers, P.O. Box 2498-MB, La Mesa, CA 92041.

New From Indoor Model Supply

A Penny Plane Bearing pack containing one dural bearing, one length of shaft wire (with loop bent in one end) and two washers is now available. A new dual bearing for F.A.I. is made from .020 stock and a single hole bearing made from .015 stock. Order your new goodies catalog from I.M.S., Box C, Garberville, CA 95440. Catalog cost is $1.00.

Send your comments and questions to Ken Johnson, 16052 Tulsa Street, Granada Hills, CA 91344.

P.S. The profile on Addie Mae Naccarato is postponed temporarily to obtain more information on this unique and very talented indoor model builder. ●

Schniedair .....*Continued from page 61*

bench, install the crosspieces from the cockpit forward, which are all the same length. Use a slower drying glue here, such as Ambroid. This gives you a chance to get everything square and true. Once the glue is dry, the tailpost can be pulled together, glued, and remaining crosspieces installed.

Select light quarter grain balsa for the keel stringers, cut and sand the upper stringers in pairs, lightly tack glued together. Mark off the crosspiece positions and sand in the notches with a 1/16 sq. sanding tool made by contact cementing sandpaper to a piece of 1/16 sq.

The rear stringers are best installed by gluing F 3 in place first. Fit the two stringers against the bulkhead and glue at the tail. The 1/16 sq. crosspieces can now be installed.

Glue windshield frame and lower stringer in place. The front gear strut can now be bent to shape. Sew it to the 3/32 gear mount with nylon thread, rub in a couple of coats of glue and glue in place. The two lower nose stringers can now be installed; these should be fairly firm balsa. Crosspieces of 3/32 sq. form a bulkhead between gear and firewall, but leave the lower crosspiece off for now for later installation of the CO2 tank.

The cowl is made up of two soft blocks of balsa. Tack glue at separation line, tack glue 1/32 ply spinner backplated to block centerline. Tack this to fuselage and carve to shape, blending the angular lines to spinner backplate. Split apart and hollow out both blocks to about 1/8 wall thickness.

Glue the two cowl clips to the lower cowl, leaving the upright free to flex. Slide the cowls together and press the V-shaped ends of clips into upper cowl to mark their position, then glue the two small 1/16 ply plates to upper cowl, aligning the holes with indents. When glue is dry, give it a trial fit; any minor adjustments can be made by bending the wire clips.

Give firewall and cowl interior several coats of dope. Install the MODELA at this time, bend tube to profile shown on plan and juggle tank through the lower nose stringers. The bend towards the

filler may have to be straightened initially to accomplish this. I used the nut plate provided the MODELA, but found that the mounting bolts were not threaded far enough to tighten up, so 2-56 by 1/2-inch bolts were substituted. As downthrust is built in, the downthrust shim provided is not required. A good idea at this point is to wrap a bit of Saran Wrap around the engine before any further sanding or finishing, to protect it from paint and grit. The upper cowl can now be glued in place.

The tank should be anchored to prevent it from drifting around. Glue a strip of 1/2-inch wide 1/16 sheet balsa between fuselage sides. Wrap this to tank with nylon thread, gluing to tank with Ambroid, which can always be removed with dope thinner.

WING

The wing is a straightforward sliced rib structure. Note that the wing tips are laminated 1/8 x 1/8, and must be built flat on the plan. Cut all sliced ribs to length from the trailing edge.

Cut the spars to depth from side view and assemble the center section first. Bevel outer panel spars to dihedral angle and bevel ends to meet the tip.

Sand leading edges to near triangular section, note that the leading edges are kept low and with a very small radius. The wing tips should be shaped in a similar fashion.

TAIL SURFACES

Juggle the laminated leading edges to position on the plan and cut to length. The rest of the tail is built up from 3/32 sq. balsa. The curve on the lower fin can be bent to shape by steaming over a tea kettle. The 3/32 sheet trim tabs can be tack glued with Ambroid to stab and rudder and faired to shape when sanding tail surfaces.

FLOATS

Select light quarter grain balsa for the sides and top of floats. Two costs of nitrate dope thinned 50% should be applied to both sides of all sheet balsa used on the floats, lightly sanded between coats. This of course helps waterproof the floats, but most important, it prevents 'dipping' between the formers than can result from the later tissue covered and doped surface.

The float formers can be quickly cut to shape with the use of a 1/32 ply template. Mark off former depths on the template from side view of floats. Lay the template on sheet balsa edge, sliding the template up until depth of each former is reached, then cut to shape. This method is faster and more accurate than attempts to trace out each former separately.

Mark off former positions on the float top, and, pinned down to insure alignment, glue formers in position. The sides can now be added, and when glue is dry, install the rear top from crossgrain balsa. Sand and fair float formers to bottom outline.

The aluminum tube gear and spreader bar mounts should now be glued in place. Use hard crossgrain balsa from bow to step, medium quarter grain is adequate aft of the step with grain running lengthwise. Top of floats can be radiused slightly, but keep all bottom edges sharp.

Bend rear struts and spreader bars to shape. Make a trial fit of floats. The spreader wires should snap in place, just snug enough so they can't pop off in flight; tiny kinks bent into ends will ensure this.

COVERING AND FINISHING

Carefully sand and fair all surfaces. Apply three thinned coats to entire airframe wherever tissue touches the surface, lightly sand between coats.

The original Schniedair was covered completely with red tissue, except for the rudder and strut fairings, which were covered with white tissue. Lightly water spray all surfaces with an airbrush. Pin down all wing and tail surfaces with scraps of 1/8 x 1/4 balsa until dry. We finished our Schniedair with about four coats of thinned nitrate drop lightly plasticised with castor oil. Pin down between each coat.

There is no rush to pin doped surfaces down; wait until they are almost dry to touch then clamp down to a Saran Wrap surface. This will eliminate shiny spots that occur where wet dope touches the Saran. Since Schniedair has obvious Italian influence, we applied a strip of red and green tissue to rudder. Control surfaces, cowling outlines, exhaust ports, etc., were done with strips of black tissue. Spinner and float struts were finished with nitrate aluminum.

PROPELLER

Athough plans and photos show the MODELA plastic propeller installed, numerous test flights proved this to be quite inadequate for R.O.W. work.

A Top Flite 8 x 6 wooden prop was finally fitted with excellent results. The prop was modified as follows: First remove the lacquer finish; acetone works well. Wipe down to bare wood, cut 1/4 inch off each tip, fill prop shaft hole with a snug-fitting hardwood dowel, Hot Stuff in place. Drill 5/64 for prop screw. Reduce hub diameter to 1/2

inch and carve as much wood as possible away from hub area. Thoroughly sand underside of blades. Try for a slight undercamber here, then sand top of blade until thickness is reduced to about 1/16 at mid-point of blade to about 1/32 at tip. Keep trailing edges quite sharp. Balance prop and finish with four or five coats of nitrate. The resulting propeller is actually lighter than original plastic prop.

The dummy radiators can now be masked off and painted. We used HUMBROL brass enamel. Pour oil off from the top of tin, then dump contents into a small jar, add an ounce or so of nitrate thinners and shake well. Allow to stand until pigment settles, then pour thinners off from the top. This eliminates most of the oil base. The resulting pure pigment can be added to thinned nitrate and has great coverage.

Since we fly off salt water, all radiator areas were sprayed with a thin coat of nitrate to prevent oxidizing of finish.

Cut out tailpost and slice tissue out of stab opening. With tail surfaces glued in place, your Schniedair is just about complete.

The spinner is simply tack glued to backplate with AMBROID. We have not encountered any problems with the MODELA kicking the prop loose. One way to insure against this is to coat the center of the spinner backplate, about 1/2 inch diameter, on both sides with contact cement and allow to dry thoroughly. This rubber-like coating will provide an excellent grip on drive washer and prop.

FLYING

Before installing the MODELA, some bench runs were made to get aquainted with this neat little engine. Testing was done with an ANSUL extinguisher fitted with a BROWN CO_2 adaptor, which will not fit the MODELA filler. We replaced ours with a BROWN filler which will just fit inside the MODELA fuel line. Don't forget to dismantle filler to remove gasket and check valve before soldering. Adjustments should be made in very small increments. At first it seemed difficult to obtain more than 30 seconds duration on the engine. But after a dozen or so runs, well lubricated between, we were able to obtain runs of 45 secs. Later tests with the wooden prop increased this to one minute; obviously duration improves with the break in time. Shim in about three degrees right thrust. Check that balance point is on location shown on plan. The original model required a few grams of ballast in the nose to achieve this, and weighed 3.15 oz. all up. Steam in slight washout in both wing tips.

Make first test glides over that proverbial tall grass. Trim with rudder for a slight right turn in glide. Test flights are best made R.O.W. in calm conditions. Schniedair seemed happiest flying left under power and right in the glide. With the MODELA adjusted for about a 45 sec. run, the original would get off in about 25 ft., making delightful power on landings just before the engine stopped. Increasing the power resulted in take offs as short as 5 ft. This is safer in a slight wind as float planes often exhibit a tendency to turn out of wind. If one float gets off before take off speed is reached, it will almost certainly cartwheel and attempt to make like a submarine!

If you elect to try the rubber-powered version, us an 8-1/4 plastic prop with a standard square plug fitting in the nose. Due to long moment arms, the rear peg should not be any farther aft than shown.

Happy landings. •

R/C Auto .....*Continued from page 47*

umn. He didn't have to show me how it is done, much less agree, when asked, to me publishing the technique. As already mentioned, Don and I only rarely totally agree on most anything, but my experience with Don has always been that he will tell any racer anything he wants to know when it comes to trying to win races. The advice often comes rapid-fire and the technique needs polishing, sometimes coming off a little too blunt for tender egos, but still credit needs to be given for desire to help all racers, not just members of the JoMac Racing Team.

This will come off looking like a you-scratch-my-back, I'll-scratch-yours deal,

but it isn't. Still, I want to mention that all of the latest setup tricks for Lightning 2000 race cars are included with all car kits and ready to run's, and that this sheet is updated as new techniques are proven on the track. You don't have to buy a new car to get this information, just send a stamped, self-addressed envelope to: JoMac Products, Inc., 12702 N.E. 124th St., Kirkland, WA. 98033.

Time To Speak Up . . .

The competition for big wins has escalated, not slowly at all, but apace of the increased racing activity in 1/12 scale, until now all of the manufacturers have quite large teams of sponsored racers. On each team and with each racer, the deal varies considerably; some just get 50% off on their car parts, some get all the parts they can eat (and, quite often, can sell to their fellow racers) for free, while the top guys who can, and have, win any big race given a spot of luck, get everything for free, including flying to the races, lodging, meals and possibly some cash money, although I don't have first-hand knowledge of any race-for-pay situations.

Personally, I see these teams as a liability to the sport of car racing, although I will admit that in the rush to get the wins, they do develop cars, accessories and techniques that you and I, average racers out for a day of crashing, can enjoy. But this shouldn't be over-stated, as many of the developments actually originate with the designers employed full-time by the manufacturers; only a few developments come from sponsored racers.

If the decision were left up to me (and it obviously isn't) I would, as just one of a number of moves to make the ROAR Nationals more attractive to average racers of equally average abilities and an appreciation for a week-long party, take steps to not so much ban sponsored racers altogether but to give them a separate category to race in; separate from independent racers, and also give them plenty to do in the way of providing space, booths and time to conduct seminars on proper setup of their particular brand of car, show films, whatever, all in the interest of passing the latest info direct from the designers to the active and involved racers.

That got me started on one of those famous super-long sentences I do once in awhile, but if the sponsored racers tend to put a damper on the ROAR Nationals, at least as far as grass-roots racers are concerned, what is happening at the local level? Are you getting a little fed up with having to compete with a sponsored racer? Or do you feel that they contribute enough to the racing, the club and the overall level of expertise in your local racing to be a positive asset?

However you feel on this question, there is no better time than right now to write to any and/or all of the manufacturers, telling them exactly how you feel about their sponsorship program and how it affects your racing.

The reason that this is time to speak up is that right now there is some very serious discussion going on between the manufacturers themselves, concerning their teams and whether or not their individual programs are beneficial to the sport of RC car racing or not. The people doing the talking really are concerned about what the racing scene will be like years down the road; they'll be listening to you . . . All you have to do is to write. ●

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

your birdie is a super-scale Stearman or just a plain ugly Big Stick . . . or powered by a gas engine or a methanol burner . . . or whether or not it even has an engine. *ALL* BIG Birds are equally welcome here. . .

Now I'm not a scale nut . . . I never have been and probably will never be, because I'd rather spend the time flying than researching or putting untold thousands of rivets on an airplane. However, I can, and do, marvel at the fantastic craftsmanship I see at shows and flying fields, and appreciate the kind of patience and dedication it takes. Right now my only concession to scale is the stand-way-off type . . . like a thirty, forty, or even fifth footer. And though I'm not seriously into scale, I resent the name "Quarter Scale" being misused, abused, and in general bandied around by so many people who should know better. I think you'll find that most of the birds being referred to are usually not

scale, and that an equal number are anything but quarter-size.

As for powerplants, don't believe the story that you gotta have a gas engine in order to enjoy flying BIG birds. It ain't so! If you already own a Quadra or such, fine . . . use it. But if you don't, there are a bunch of BIG Bird kits and plans available that will yield a 12 to 15 pound aircraft; and that 60 or 90 engine you already have will swing a 15 or 16-inch prop and haul that plane very nicely. Of course I'm talking about puddle-jumper types, like the Cub and Champ, that are, at best, mildly aerobatic. If, however, you're power hungry and dream of a Cap 20 or a Zlin doing 80 knots or better, then a 3.15 Kawasaki or a dual-ninety drive unit would be your only salvation. I presently have an equal of gasoline powered "hot doggers" and methanol powered putt-putts, and enjoy flying each of them.

And don't forget that not every BIG Bird is powered. There are many BIG special-purpose, one-of-a-kind flying machines out there that don't have, or don't need an engine (I promise not to step on your toes, Larry).

SHARING

That's the name of the game. In a sense you could say that I'm going to act as a clearing house, shunting the correct information to whoever needs it. In many cases that info will come from me, but often I'll rely on input from more informed sources. But what's important is that we're going to share and help each other over the hurdles so that everybody can start getting some of that great BIG Bird stick time. So if you've got any questions, or anything to say or comment on, let me know. And any good B&W pictures of building and flying activity will also be most welcome. I'm going to be winging it for the first three months or so until I start getting feedback and find out what you guys want or need.

And by the way, since Mr. Northrop doesn't let Texans have an open expense account, I'd appreciate it very much if you'd include a self-addressed stamped envelope (SASE) with your letter; otherwise I'll have to assume that you don't care how long it takes for a reply.

FLY-IN

Like the vast majority of BIG Bird pilots, I prefer the relaxed, uncontest atmosphere of an International Miniature Aircraft Association (IMAA) type Fly-In instead of the so-called "Fun-Fly" that continually perpetuates unsafe and sloppy flying. Because fun-fly events are usually timed against the clock and/or other contestants, caution is ignored and even good pilots all too frequently break basic safety rules. The fact that serious accidents don't happen too often is pure dumb luck . . . and is in spite of the people involved and not because of them.

SMALL TRAILER FOR A BIG BIRD

J.W. Jones, who's a darn good tenor man, a confirmed Mode I flyer (he doesn't know any better), and a member of our local IMAA Chapter 21, got plumb tired of having to cram and stuff airplane parts and support equipment into the nooks and crannies of his car. So he made up his mind to build the smallest trailer possible to hold his Fleet bipe and the necessary goodies. It builds fast and easy and does the job, as proven by the 6000 hard miles it's been driven. The parts layout is quite simple to understand, but I'm including some notes that J.W. felt should supplement the drawings.

This is based on a Montgomery Ward light-duty luggage trailer chassis (Ward's Lightweight Trailer, Cat. #61C51013R, $259.00, 120 pounds, on page 714 of the Fall/Winter '81 Catalog).

With economy in mind, J.W. was able to make all the wooden parts from only three 4 x 8 foot, 3/4-inch ply sheets, and had the lumber yard cut everything to size (for a very nominal charge). For construction, J.W. recommends any good waterproof wood glue, along with No. 10 x 1-1/2 inch wood screws, and to start by gluing and screwing 38-1/2-inch lengths of one-inch ply strips to the front and rear ends of the bottom, allowing three quarters of an inch space in from the outside of the bottom edges for the 3/4-inch thick end pieces. Note that the ends and lower sides are glued and screwed to the *top* side of the bottom piece, flush with the edges. Also note that the end pieces are *not* cut four inches

from the top until *after* the box is completely assembled and the piano hinge is installed.

Next the front and rear ends are G&S to the bottom, using the one-inch ply cleats at each end as support until the ends can be screwed to the bottom.

Then G&S right and left *lower* sides to ends and bottom. G&S *top* sides to *ends only*.

G&S the *top* to the ends and *top* sides, spacing screws about six inches apart all the way around.

Now screw the continuous piano-type hinge to either side and equally space the hinge over the 1/16 inch slit with about one inch left on each end. These will be trimmed later with one inch aluminum angle. Heavy brass piano hinges in six inch lengths can be purchased at any good building materials supply house.

The ends can now be cut, connecting the four inch wide slits on the sides; the lid should now swing open.

G&S 1-1/2 x 1/4 inch strips of pine molding on the *inside* of the top, allowing the molding to extend 1/2-inch *below* the edge of the top. This helps to form a waterproof seal when the rubber weatherstrip is applied after painting.

Okay, now you can place the box on the trailer, locating the right and left centerline about three inches ahead of the axle so you'll have some tongue pressure when trailering. Mark the location of the trailer chassis cross members on the bottom of the box and G&S the 6 x 37 inch bottom doublers on so they cover the marked trailer cross members.

The box is held to the chassis with 6 x 1/4 inch bolts, using large washers under the bolt heads, and one-inch wide aluminum angle strips are fitted to all outside seams to cover the raw wood edges.

The two closing devices are large, heavy-duty draw bolts as used on large trunks. A well stocked luggage retail or repair shop may have these . . . or they can be ordered from a special luggage supply company. A hasp with lock can be installed for security.

Any good epoxy enamel should be used; preferably white or some very light color to keep the trailer from soaking up too much heat. And don't forget to install a vent (with filter) in the rear of the trailer to carry off gas fumes.

Here's another plus for this size trailer: it can be easily stored in a two-car garage. By tipping the empty trailer up on its back end, and flush against the wall, J.W. has enough room to park his '68 Camaro right behind it and still be able to close the garage door.

And the trailer does provide easy access to any part of the airplane at a comfortable, chest-high elevation. . .

Now all you gotta do is build the box and have a hitch installed on your buggy and you're set for the season.

Oops, almost forgot about the Tip Of The Month. Always remember to wear dark-colored pants when you go flying, especially if you're just getting into BIG Birds . . . cause those sudden and frequent peaks of pleasure are too much for light-colored trousers to handle. Al Alman, 2609 Burningtree Ct., Arlington, TX 76014. •

Hannan .....*Continued from page 50*

spoked wheels coerced them into building an antique aircraft. Others start with a particular model engine, such as one of the opposed cylinder twins, and try to find an appropriate scale subject to fit it.

Biplane enthsiasts (such as Bill Northrop) have a built-in bias in that direction, while conversely, those who dislike building wings avoid multi-wingers like the plague.

Exceptionally artistic modelers, such as Bill Noonan, often make their choice of subject because of its elaborate color scheme and/or markings detail. Others are inclined in the opposite direction, and strive to find simple, easy-to-execute arrangements. Which may help to account for so many "plain Jane" models.

Flightmaster Bob Linn always took the "square is beautiful" viewpoint, especially in terms of construction ease, and doubtless he had a valid argument.

In my own case, complex windshields have long been a stumbling block, accounting for a strong leaning toward open cockpit designs!

Probably most of us have affection for certain subject types which we don't even try to rationalize . . . we just find them fascinating, and are willing to undergo whatever difficulties may be involved in producing them. Of course this can lead to real tests of one's patience. Take Claude McCullough's obsession with the Bellanca 28-92 trimotor racer, for instance: This unusual craft has been on Claude's "must build" list for something like 20 years. He has the documentation, ambition and skill required to execute a fully-detailed R/C scale model of it. With one exception. No instrument panel information! Since the Bellanca finished second in the 1938 Bendix race, it received quite an amount of publicity, and it would seem likely that there *must* be cockpit photos somewhere. Claude has tried all the usual sources including factory employees, racing book authors and even members of the Bellanca family. Nothing. Does anyone in our audience have any better ideas?

SPANISH RE-INVENT AUTOGIRO

According to the December '81 *Aeroplane Monthly*, a new Autogiro has been announced in Spain, birthplace of the original Cierva Autogiro of 1924. The new machine is a pusher pod-and-boom design with tricycle landing gear and seats four. Fittingly, it made its appearance at Quatra Vientos (four winds), a site which figured in some of the early experiments of Juan de la Cierva.

FAC NATS, MARK III

Lin Reichel has announced that the third Flying Aces Club Nationals model contest will take place during July 17-18,

1982, at the Johnsville Naval Air Station, Philadelphia, Pennsylvania. And, if anywhere near as successful as the previous meets, this should be a real winner. Last time, it was reported as the largest gathering of flying scale models in the world, with more varieties of events than had ever before been offered. Full details of the forthcoming competition will appear in the Flying Aces Club News, and subscriptions are still available at a modest $9 per year, from Lin Reichel, G.H.Q., 3301 Cindy Lane, Erie, PA 16506.

Joe Wagner, formerly of California, now lives in New Wilmington, Pennsylvania, and reports on a new branch of the Flying Aces Club there, called "The Bald Eagle Squadron". Which reminds us of Vince Costanzo, surveying the aging Flightmaster club members, and proposing a "Grey Eagle Division"! And Dave Gibson confirms that even in Ohio, "the older one gets, the faster time passes". The universal message seems to be build now, before it's too late!

The Washington, D.C. Maxecuters club also sponsors Flying Aces events, including FAC Scale, Jumbo Scale, and various mass-launch categories, and is also introducing new ones such as the "Trans-Comsat Speed and Navigation Race." This involves the flying of rubber-powered scale models, mass-launched across a course defined by two parallel lines 300 to 400 feet apart. The winner of the speed event will be the individual's model to first land on the other side of the finish line. The winner of the navigation event will be the model landing closest to a designated area beyond the line.

Their Comsat Altitude Race is a mass-launched affair for *any* sort of rubber-driven model: "Some unsuspecting sole will be selected from the crowd to serve as judge and his decision will be final as to which plane achieved the highest altitude". Sounds like fun!

AND IN CALIFORNIA

Ralph Scott, of Sacramento, tells of indoor flying activity at the Sierra College Gymnasium. He and Dominic Bressi invite any interested modelers to attend, and from their "recruiting poster", it sounds like a very relaxed operation: "No club . . . no dues . . . just fun flying . . . impromptu contests can be arranged (for glory only). Hand-launched gliders, stick jobs, Peanuts, scale planes, whatever! Guaranteed no dry weeds to stab your tissue, no stickers in your sox . . . and positively no sheep droppings! Spectators welcome. Bring kids and get them hooked on rubber lube". For more details, contact Ralph at 857 38th St., Sacramento, CA 95816.

CRAFTSMANSHIP

"Craftsmanship in the blood is as persistent and domineering as a bad habit, and every bit as much fun . . . it's sort of a cult in itself. Craftsmanship is to an important degree its own reward, but it's a lot more entertaining than virtue, if hearsay is to be relied upon." So said Fred Cooper in the December, 1940 *American Artist* magazine.

NEW ADDITIONS TO OLD AIRCRAFT DISPLAY

Three excellent additions to the constantly growing collection of the *San Diego Aero-Space Museum* arrived in December. One is a Thomas-Morse S4-C Scout, circa 1918, which is powered by an 80 hp Le Rhone rotary engine. The second is a SPAD VII, of 1916 vintage, featuring a 150 hp Hispano-Suiza V-8, and sporting markings of the 103rd Pursuit Squadron. This aircraft has had a remarkably complex life, having been in the U.S. Air Service in France, post-war service at McCook field in the United States, use in some 16 Hollywood movies, exhibition in the *Movieland of the Air Museum*, the Smithsonian *Air and Space Museum*, and the Florida *Wings and Wheels* display.

The third addition, and certainly the piece de resistance, is a pre-WW I Deperdussin monoplane, Type C, which incorporates a 50 hp Gnome rotary. Any model builder interested in pioneer designs would find this jewel fascinating to study, since it fairly bristles with intriguing mechanisms and fittings.

The Aero-Space technical library also continues to grow, so anyone passing through the San Diego area should try to put aside a few extra hours for visiting this facility. You will be well rewarded!

FEEDBACK

Butch Hadland's proposed FAI international Peanut Scale rules have received many comments and actual testing. Alan Callaghan, of England says, in part: "I begin to realize that not everyone looks at the rules as critically as some of us do, even though Peanut is the most heavily supported scale class there has ever been in the United Kingdom. OK. Most people see it as a bit of fun mainly, and good luck to them, but at the same time, I think the rules should be well-enough thought out so that others who wish to take the building and flying of these little wonders more seriously, can have the scope to do so. All too often I have seen the most superb models lose out because of poor rules and inept judging. For peace-of-mind, perhaps the answer is to not enter contests!"

And from Butch Hadland, himself: "The British have accepted the rules in toto . . . the U.S. West Coast prefers the Mooney type rules . . . the U.S. East Coast (south) prefers the Martin/Miama Club rules . . . the Flying Aces will stick to their own ideas . . . so it looks as though most diehards prefer their own local rules. There seems a great resistance to change (usually a British disease) and it surprises me that so many really active model flyers are content to sit on their you-know-whats and just fly and complain, fly and complain.

"We had a Peanut meet here with 34 entries . . . only one maxed out to his static score (a Santos-Dumont 14 bis). He was beaten by a Fike with a Lacey following up 3rd!

"Personally, I prefer the Miama set-up with the possible inclusion of the 5-foot viewing distance. R.O.G. also, like indoor, solely for the purpose of excluding oversize propellers.

"What everyone seemed to miss in their comments was that we *need* one set of rules for Peanuts. What I did was to compile and knock into shape the various comments that I've heard from Peanut competitors worldwide!

"What is common *in all cases*, is that modelers will comment, some criticize, but most constructively; but *no one* will sit down and propose their own rules ideals (sheep always follow the shepherd)."

Evidently Hadland has taken the bull by its horns and will solicit FAI sanction for international Peanut competition rules. Stay tuned for future developments.

SIGN OFF

Especially appropriate for our hobby is this anonymous declaration, via Richard Miller: "Results are what you expect; consequences are what you get." •

Electronics ...*Continued from page 29*

the resistance difference after the leads are reversed.

Now, if you are unable to identify the transistor as either a PNP or NPN, you can still make a valid test in a kind of hunt-and-peck method. Note that for either type, with one lead on the base, there are similar resistances to the other two leads, both of which switch in value as the leads are reversed. With only three transistor leads and two coming from the meter, there are not that many combinations . . . you will be able to come up with the indicated resistances if the transistor is good. If the resistances are not there, the chances are that neither is the transistor.

There is, however, always the chance that there is another component in the circuit that will upset these high-low resistance readings, so any time that you do not get the expected resistances with the transistor in the circuit, the next step is to remove it and test it in the same manner outside of the circuit. If it still exhibits resistance ratios other than those shown, you can be sure that a new one is indicated.

Diodes, being a kind of cousin of the transistor, can be checked in the same manner, including the small signal diodes and Zeners found throughout our equipment, as well as the larger power rectifiers used in our chargers. Again, it is a matter of high to low resistance ratios, as seen on our diagram. And again, a valid test can be made while the diode is connected in the circuit, but there are exceptions when they must be tested with at least one lead free, and a final test of any suspected diode should always be made with it out of a circuit. And if it is a charger that you are checking, be sure that it is inplugged from the wall socket.

There is another exception . . . Field Effect Transistors, better known as FET's, have recently appeared in our equipment. One place that you will run into them is in the output of some of the Kraft transmitters. They can be identified in the schematic by their distinctive diagrams, quite unlike either of the two shown, and by their funny designations: D4025/CR866, in this case. Anyway, do not check FET's in this manner, they require special tests, this one will usually ruin them.

TAKE IT OFF!

Removing components from a printed circuit board, such as the transistors mentioned earlier, must be done with care. The application of too much heat can cause separation of the metal foil from the laminate, in some cases completely ruining the object. This chore is made considerably easier, and safer, with the use of a desoldering braid, made specially for that purpose. It is a copper braid, made up of many fine wire strands, and impregnated with a flux of some type. It is held against the solder connection, and heat is applied simultaneously to both the braid and the connection. As the solder melts, it is attracted to the braid and is sucked up into it, leaving a clean component lead and pad. When all the component leads are thus clean of solder, the component can be easily pulled off.

As with all work on printed circuit boards, an iron of no more than 30 watts should be used, with a point small enough not to cover any adjacent lands. Keep the tip clean for best results.

This material is available from electronic suppliers under various names, such as Soder-Wick, Chem-Wik, etc. Radio Shack calls it simply Desoldering Braid, part number 64-2090; a roll of five feet is $1.49.

UNCLE BEN'S SUPER SEMI-CYCLING SYSTEM

Had a note from Mr. Ben Brackett, Cincinnati, who tells us about a circuit he uses to discharge and cycle his Ni-Cds. He applies either a 10 or 20 ohm load, and reads the voltage on a meter

which is simultaneously switched to read either 5 or 10 volts. The disadvantage which he mentions and is looking for relief from is the fact that you have to eyeball it periodically to be sure that you haven't run the batteries down below their critical level. He asks, "Could you recommend a circuit such as RCM's Low Voltage Alarm, May '76 to trigger an audible alarm to let one know it is time."

Well Ben, first let me say that I enjoy your rice! Then I'll say that your idea is good, and there are more interesting things to keep an eye on than a voltmeter. However, the circuit you mentioned apparently has problems, as reported later in September '76 RCM, Page 159. The problems are caused by the inconsistency of the Zener voltage which is adversely affected by the current through it, as it is used in this particular circuit.

Here is a circuit for you to play with, which should not have the above mentioned problem, as the Zener has only to furnish 5 micro-amps of current as required to trigger the 555 IC. As shown, it will provide you with an audible indication, though there is enough output available from the 555 to trigger a low voltage relay, connected to pin 3, with the other end grounded. If used, the relay should be paralleled with a silicon diode, cathode to pin 3.

Possibly someone out there in reader-land has similar circuits that we may pass on. The main drawback to these types of devices is that they require an accurate variable voltage supply and digital voltmeter to calibrate, but there is usually some friendly ham in the neighborhood who is willing to help.

BOOKSHELF

The post-person brought a question, and a couple of days later, was nice enough to bring the answer. The question, or questions, actually, came from Greg Clemmons, Florence, Alabama. Greg is a licensed 2-Way FM Technician, but readily admits that R/C techniques are new to him, and what he asked about would have let me fill up an issue of **MB** all by myself. Which I would happily do . . . but the second piece of mail arrived just as I was gathering data for Greg.

It came in the form of Fred Mark's excellent book, entitled *"GETTING THE MOST FROM RADIO CONTROL SYSTEMS"*, a 8 x 11, 88-page volume chock full of basic and advanced R/C theory, with over 120 illustrations, including schematic diagrams as they were developed by the industry, from the early days to the recent so-called super systems.

The book begins with a review of the basics of the hobby, including legal requirements, frequency use, and what type of system might best suit your needs. It goes on to explain in great detail just how each part of the transmitter, receiver, and servos actually work, and compares the different techniques in use now, and earlier. It breaks

down the why, and how of programmable functions, mixers, metering, servo reversal, etc.

And it goes on to include useful information about the care and maintenance of your R/C system, piece-by-piece; even includes a list of items to check prior to its use. Even trouble-shooting and repair information is included. The section on trouble-free and efficient system installation is worth the price of the book all by itself!

"GETTING THE MOST FROM RADIO CONTROL SYSTEMS" is a book that no R/C'er who is at all interested in what happens when he switches "ON" should be without. It is the *only* up-to-date book of its kind now available; factual and accurate, and I recommend it without reservation.

"GETTING THE MOST, etc.", is priced at $8.95, plus 75¢ postage, and worth every penny of it, from Kalmbach Press, Dept MB, 1027 N. 7th St., Milwaukee, WI 53233. •

Thornburg ....*Continued from page 40*

After final sanding I apply a single coat of clear dope, *but not to the entire structure.* I dope only the leading edge, trailing edge, and a half-inch-wide strip around the root and tip. I used to spend hours doping every bit of balsa that the covering touched, but that isn't necessary when you cover dry. Just don't forget to dope the polyhedral joint rib, top and bottom; this is where the covering will be cut and lapped.

Let this "picture frame" of dope dry, then hit it lightly with #400 sandpaper, on a sanding block. Now we're ready to stretch the canvas.

At this point let's take a quick look at our supplies. On the workbench sits two small jelly jars. One jar has four ounces of clear dope on it, the other four ounces of thinner. I use Sig, Aero Gloss . . . whatever the hobby shop sells. Beside the jars is a good quality camel-hair brush, about 1/2-inch wide. Mine's a Grumbacher #7701. It cost me three bucks a year ago, and it's been worth it. All I do to maintain it, is dip it in thinner and squeeze the bristles through a Kleenex before putting it away. It never sheds. A good brush takes half the heartache out of doping.

Another specialty item on the bench is an atomizer. Mine cost $1.50 at an art supply store. It's nothing more than two pieces of aluminum tubing hinged together at one end. Open the hinge to 90°, place one tube in a glass of water, blow through the other. Simple. Don't try to get by with your wife's clothes sprayer, or a Windex bottle. They'll get your silk (and consequently your framework) too wet. All you need is a fine mist.

So much for special equipment. Everything else is just what you'd use for Monokoting. Namely, a card table or equivalent covered with a dozen layers of old newspaper, to serve as a cutting board. And a fresh razor blade or modeling knife . . . emphasis on the *fresh.*

All that's missing now is the silk. For this job I've chosen yellow Esaki silk, marketed by Sig. Royal Products, in Denver, also imports good Japanese silk, as well as a blend of silk and rayon they call "Silron." It's a little stiffer than pure silk, doesn't run as easily, and thus is easier to apply.

What you need to know about silk (or Silron, or paper) is just this: it has a "grain," or direction of major weave. This grain direction is important . . . it must run spanwise on your wing. If you make a mistake and put it chordwise instead, the covering will sag excessively between the ribs, doing weird things to your airfoil. You can spot this major weave by looking closely at the silk. If in doubt, check the selvage (hemmed edge) of the piece: the selvage always runs parallel to the "grain."

Step Two is to cut out four panels of silk, grain longwise. You can be macho and cover the bottom with a single piece if you want; I find it easier to join two pieces at the polyhedral rib, just as on the top. (Note: The Bird wing is 10 feet in span. To cut all eight silk panels with the grain in the proper direction requires starting with a two-yard piece of silk. Two one-yard pieces won't work.)

Step Three is known as Sticking It Down. I've decided to begin with the hardest panel, the top of the outer (tip)

panel. I quickly spread a second coat of clear dope around my "picture frame," ending with the cap strip on the polyhedral rib, since that's where my covering job will begin. Then I lay the silk in place, pulling a little chordwise tension at the poly rib to remove sags and wrinkles and smoothing it down onto the bead of fresh dope there. With this end tacked down securely, I can work my way down the wing in a leisurely fashion, pulling the covering tight and tacking it in place with brushloads of . . . not dope but *thinner*.

Thinner is the secret here. It soaks through the silk instantly, activating the dope underneath to tack the silk in place in a jiffy. If you should happen to slop a bit of it onto an open bay, it won't spoil your unshrunken silk as dope would: it evaporates to nothing. Take your time: pull out all the wrinkles; go up and down the panel to your heart's content. Just remember to keep the weave of the silk as straight as possible down the wing, both for appearance sake and for warp-free shrinking.

The edges of the silk have to be trimmed and lapped in much the same way as you'd do Monokote, except that you use either dope or thinner to seal them down. Once you're satisfied, turn the panel over and cover the bottom in the same fashion.

Don't worry about getting the silk on skin-tight . . . it still has to be water-shrunk later. And water-shrinking can remove a multitude of sins, including even the fold-creases of the silk, although I prefer to remove these creases with an iron and ironing board before the covering begins. It makes life easier.

And speaking of water-shrinking; don't be tempted to do it prematurely; before the entire wing panel is covered. I once covered just the top of a wing, then shrunk it to see how it would look. It looked great . . . but it pulled the trailing edge up into a permanent reflex. Another time I water-shrunk a tip panel like this before I had covered the inner panel. It pulled a bow into the polyhedral rib that I never could get out. So be patient, and cover the rest of the panel.

One of the commonest covering mistakes I know . . . and this applies to Monokote as well as silk and paper . . . is to fail to trim the lapped edge at the polyhedral joint *before* putting the covering down permanently. If you wait to trim this joint until the covering is already in place, you have little choice but to use your wing sheeting as a cutting board. A bad practice. I've seen more than one wing fail right at a Monokote joint, because the builder scored the balsa sheet with his knife when trimming the covering. Much of the strength of your wing lies in this sheeting . . . don't take chances with it.

If you get yourself into a position where you must trim a piece of covering that's over tender sheeting, try this trick. Using a very fresh blade, place the cutting edge on the trim line and *pull up* on the strip of covering you want removed. This isn't as slick and quick as normal cutting, but it sure saves the sheeting or covering material underneath.

Step Four is the water shrinking. I love this part. Using my buck-and-a-half atomizer, I spray a fine mist of water (lots of folk prefer rubbing alcohol) into the air above my wing, allowing it to fall onto the silk and dampen it lightly and evenly. Do this to the bottom of the panel first, then the top. This avoids any

chance of the top (which has most of the leverage on your trailing edge) drying too quickly and pulling the trailing edge up into a reflex. Now I just like to sit and watch it dry, a process that takes less than 10 minutes in low-humidity New Mexico.

This is a good time to bend in (or out) any special warps. Most wings need a little washout at the tip, for stability. My pylon free flights get their washin in the right inner panel at this point. The Bird of Time wing I try to keep perfectly straight and warp-free during this drying, since its washout is already sanded into the tip.

You can speed the drying process a bit by blowing over the wing, but don't get the bright idea to turn a Monokote gun onto the wet silk. Its heat will cause overshrinking, and when the silk cools it will sag. Forever.

Step Five is the critical one; sealing the pores of the silk. At this point you have a beautiful, transparent skin of silk over your framework . . . smooth and wrinkle-free, I trust, and actually lighter than Monokote. But . . . it won't hold air. Sealing the silk with a minimum of weight built-up is perhaps the greatest trick in silking.

Some folks say that mixing talcum powder with your clear dope will help get a quick seal.

Some folk say that using a wide, soft brush, and making one and only one stroke across each area is the trick.

Some folk say that you have to do a rib bay then flip the panel over quickly and do another on the bottom, while the dope on top runs back through the silk and dries on the surface.

Some folk say you have to apply paper over the silk to get a light, quick seal.

The problem that everyone is wrestling with is this; when you brush dope onto the open weave of silk, it seeps through quickly to the underside, forming unsightly blobs that not only destroy the silk's lovely translucency, but build up weight surprisingly fast. Obviously, this is only a problem in the open rib bays; doping sheeted areas is easy. But glider wings are mostly open structure.

I've used all the methods described above for getting those critical first two or three coats of dope on. And they all help. But lately I've been using a real lazy-man approach; I buy a couple of cans of spray dope and spray on those first coats. Takes about six coats to seal, but it ultimately results in a nice translucent base for final doping. If you try it, don't be put off by the gator-hide appearance after two or three coats; it will ultimately smooth out. Just keep the spray can at least a foot from the silk . . . too close and you force the dope through the weave just as you would with a brush.

Once you get the silk completely sealed, you can become a bit more ham-handed in your technique. Five or six brushed-on coats of dope will give you a satisfactory finish for a glider, unless you're planning to use a

power pod. Fuel and castor oil eat away at dope finishes, so a couple more coats are in order for powered models.

I hope this encourages you to try a silk finish, if only just once. Especially if you're planning to build any of the Nostalgia or Old Timer designs. Modern, high-speed designs look good in Monokote; but it's a bad joke to cover a Bombshell or a Quaker in plastic. The shallow flashiness of plastic film is simply out of place on depression-era models. •

F/F Scale. . . . *Continued from page 49*

All of the decals were then applied using a product called Solvaset used by model railroaders. This causes the decal to snuggle down and conform perfectly to whatever the irregularities might be.

All that remains is a bit of detail work. The canopy frames should be painted. I simply tape so that the frames running from one side to the other are painted first. All else is masked off. When these have dried, I paint the frames that run fore and aft, masking off the rest of the canopy. I feel that this is easier than taping all glass areas and exposing only the frames.

Ailerons, flaps, elevators, and rudder areas can be ruled in, but I prefer to spray them in, using an airbrush, making several light passes with black paint to give the impression of three dimensions. Other panel markings on the wing and fuselage can be done for a bit more realism.

I hope this has helped those of you who are starting out in F/F Scale. •

Fuel Lines .... *Continued from page 27*

unburned mixture reaching the temperature of spontaneous ignition or explosion (detonation).

The squish band forces the mixture into a compact combustion chamber. This decreases the possibility of detonation, for a given pressure, compared to an elongated chamber. Simple, but effective.

While we're discussing cylinder heads, take a look at the second cross section drawing. You'll notice that the plug portion of the head is a rather loose fit into the cylinder. All other things being equal, this setup will not produce as much power as the first illustration, where the head fits much closer to the cylinder wall. If there's extra space, fuel/air mixture will be forced into it during the compression stroke of the piston. These gases will not burn together with the charge in the combustion chamber. They are wasted as far as power production is concerned. How much is lost? Well, one way to express it in easy terms is to give an example of RPM loss. Remember RPM is a part of the BHP equation that was presented the last two months. On a racing .15 engine, there will be about a 1000 RPM loss when the head plug is .003 inches undersize compared to one that's .0005 inches smaller than the cylinder bore. That's a significant amount.

Guys, you can see by now that just any old head won't do on a high performance engine. Keep it in mind when you're looking at the entire engine power picture.

Next month, unless Southern California slides into the Pacific Ocean because of too much rain, it'll be that promised test. Take care. . . •

Choppers ..... *Continued from page 23*

servos half-way up the main shaft. From this point, stick the pitch gauge to the tips of the blades, and set both blade's pitch so the top of the pitch gauge is level with the flybar. Eyeball the black mixers (on the pitch arms) level and connect the pushrods from the swashplate to the pitch arm mixers. Check to see that the top of each blade's pitch gauge is still level with the flybar. Now connect the pushrods from the mixers up to the flybar plastic block. Remove the 1/32 piece of ply and you're all set.

At half-stick, the throttle barrel should be 5/8 to 3/4 open, depending on the power of your engine. When looking at the throttle/collective servo from the front, the servo arm or wheel will appear as it is in the photo. At idle, the throttle barrel should be nearly closed, just below clutch engagement. I elaborated on collective and throttle setup in the March '81 issue of *Model Builder*, refer back to it for more details.

The tail rotor set up is explained in the instructions, so I won't go into that here. It is rather straightforward and typical of other helicopters.

FLYING

I've said this before, and there's no doubt that I'll say it again: If you are a novice, get some help to trim out your helicopter. If you can't fly to start with, it is very difficult to tell whether it's you or the helicopter that needs adjusting. It is almost impossible to write about trimming procedures vs. watching them being done. (This is a whole series of articles later on.) Even if you have to drive five hours to get near someone experienced, *DO IT!* The reason I'm so emphatic about this is that most helicopter pilots are hard-heads to varying degrees. If I stress this last point with a sledge hammer maybe some will take the advice!

Once an experienced flyer has trimmed your helicopter out for you, you have a much better chance of learning how to fly it with a minimum of damage: And to see your helicopter hovering will give you that added bit of incentive to keep going in those early learning stages. Anyway, back to the 300.

Typical of helicopters using the Bell/Hiller system, flying is smooth and predictable on the ground as well as in the

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air. Vary the cyclic and tail rotor throws to give you the desired control action. Due to the high center of gravity, you should definitely use training gear to avoid lateral tip-overs if you are not accomplished at landings or take-offs. The best way to do this is use the aluminum yardsticks that I described last month, or the dowel rod and wiffle ball system.

In forward flight, the Hughes 300 has excellent disc rigidity due to strong blades and excellent rotor r.p.m. The rotor head is not quite as "hard" as a Heli-Boy, so response in forward flight will be somewhat softer, more like a Jet Ranger with a standard (soft) rubber damper.

Although the 300 is not an aerobatic helicopter, it can be looped if you care to do so. Stall turns are pleasing to look at and easy to do. With the modified tail rotor control system, consecutive pirouettes (tail rotor turns) are done with ease and precision. The wide and long tail rotor blades can give powerful control when you want it.

Due to the large canopy up front there is some "shielding" of the tail rotor at times. This will most likely occur coming down from stall turns, and hovering into a slight headwind. The tail will pulse left or right for an instant because it is forced to temporarily work in pre-turbulated air. It is one peculiarity of the ship that is not serious, but you will probably notice it at some time during flight. Overall handling is smooth and solid throughout all flight regimes.

ASSORTED HINTS AND SUGGESTED MODS

ENGINE: If you disassemble the side frames, drill holes in them just behind the engine mounting area (see photo showing the collective spring to see this). This will allow you to easily stick an Allen wrench through and hold the heads as you tighten down the engine. Without these holes you have to fiddle around a bit to hold the heads.

Make some thin brass shims to stick under the engine mounting flanges to precisely set the belt tension. Two rather thick shims are provided with the kit. I used one thick shim and several of my thin shims.

When you screw the clutch to the engine, tighten it very firmly. My clutch popped loose as I was starting the engine for the sixth flight. To retighten it, you must pull the engine, not a major job, but to save you from the trouble . . .

ROTOR HEAD: With both servos mounted on the brass sleeve, there is about five ounces of weight on one side of the collective yoke. I felt the need to static balance the yoke with a common spring. This is easily accomplished by running a 6-32 bolt through one of the side frames, and extending the spring up to the yoke arm (see photos). Now, at any collective position, the whole servo assembly is perfectly balanced.

Since I have collective trim on my Variant, and I need independent throttle and collective servos to use it, I elected to use a separate collective servo mounted next to the main rotor shaft on the side frame. The standard throttle hookup remains, but without the linkage up to the yoke arm. An extra advantage of this setup is the ability to use differential collective, or to set up the exact travel you want on throttle or collective without trying to do it all on one servo wheel.

The standard collective setup with one servo does work very well, and I would suggest that novices stay with the stock arrangement, since it is more "goof proof."

The black plastic mixers, which are mounted on the pitch arms, come "squared off," where the balls screw into the ends. With certain combinations of cyclic and collective, the ball links will rub on these corners. To rectify this simply take your model knife and bevel the plastic as it leads to the brass ball.

TAIL ROTOR DRIVE SHAFT SUPPORT: The tail rotor drive shaft is supported by a foam insert placed half way back along the tail tube's length. This insert is subject to rapid wear from the friction of the drive shaft. Essentially the hole enlarges, and the drive shaft starts to whip around inside the tail tube. It ends up as a high frequency vibration which can't be worked out of the ship.

The simplist way I found to eliminate this tendency was to buy a bag of various sized bottle corks. Take one that is slightly oversized and drill a small hole through it, roughly centered by eyeball, and from end to end. Now take a 1-1/2 inch long piece of 3/16 I.D. brass tubing, and force it through your pre-drilled hole. Center the

cork on the tubing and Hot Stuff it in place. Lightly chuck one end of the brass tubing in your electric drill. Using a 120 grit sanding block, grind off the "excess" cork, leaving you with a perfectly constant diameter cork. As you get close to the I.D. of the tail boom, make some test fits. It should be fairly snug. Pushing it half way down the tail tube completes the task. No glue is required to hold this insert in place, and it will run perfectly smooth for the life of the helicopter.

TAIL ROTOR PITCH CHANGE BELLCRANK: I mentioned last month how I thought the stock pitch change system was too "soft." For those of you who try the stock set-up and agree with me, you can purchase a few pieces of K & S brass, and fashion what is shown in the photos. Any bellcrank will do; I used a Kavan bellcrank because they are the best I've found for these types of installations (Kavan Jet Ranger part #3123). I made a little brass extension to it, otherwise the tail rotor will be too positive . . . With the setup shown, I have very nice response with the tail rotor pushrod in the middle hole of a standard servo arm.

In addition to this last step, you must make a longer pushrod that runs through the tail rotor shaft out to the pitch change links. This is standard metric two mm pushrod material, and is readily available through Kavan or Schluter if you don't happen to have any extra on hand. A piece five and three-quarter inches long will suit just fine.

The two collars on the end of this pushrod do not come with washers to bush the plastic pitch change plate. Add two small washers between each collar and the plastic plate. Lubricate with oil before each flight to prevent binding or premature wear.

The tail rotor blades are very nice looking, but I would suggest a FasCal covering to make them more durable. I used red with white tip stripes.

MISC. SUGGESTIONS: It is a good idea to use medium sized grommets in the canopy at the attachment points. This prevents direct contact to the helicopter, and the canopy will be much less subject to cracks near these stress areas.

If you find your starter slips on the starting cone, Hot Stuff a piece of 240-400 grit wet or dry sandpaper to the starter cone. This provides a little extra traction for the starter to grip, and you won't have to constantly wipe the exhaust oil from the cone.

Since the tank placement is low, it is tricky to prime the engine for the first flight of the day. To do this best, remove the glow plug from the engine and apply your starter to the engine. Turn it over for a few seconds to draw some fuel and lubricate the engine. After this is done, put the glo plug back in the engine, but leave it loose. This lessens the compression and enables you to start the engine more easily. After the engine is running, reach in and tighten the glo plug the rest of the way. Be careful when you do this, as there is no shroud around the cooling fan!

CONCLUSIONS: Advertised as a trainer or sport machine, the K-K Hughes 300 effectively fulfills the requirements for this type of helicopter. Plus it looks like a real helicopter too. I feel it is best suited for those who have mastered a fixed pitch "trainer," and are ready to step up to collective pitch. It will serve well as a primary trainer (1st helicopter) for those who have some help available. Generally, collective pitch helicopters and rank beginners don't get along too well.

As I look over the entire helicopter, after having built and flown it, the following bad and good points surface:

1. Marginal engine cooling in the stock configuration.
2. Below average quality of the ball links.
3. Low tank placement could be a problem for some engines.

There is some work being done on the engine cooling "problem," I hope to try out a cooling shroud in the next several weeks. Hopefully this will show a definite improvement over the stock system. I'll let you know about availability as soon as I find out myself.

On the other hand, the most apparent strengths are:

1. Good mechanical layout, gears, drive system, etc.
2. Excellent main and tail rotor r.p.m., and good disc rigidity for any type of forward flight.
3. This helicopter is very easy to service and replace parts. And the parts are reasonably priced. Every single, little part is *on hand and available* direct from Orange Coast Hobbies.
4. A simple collective pitch system makes setup and adjustment easy for those who are new to collective pitch system. You don't have to be an expert to set this one up correctly.
5. It is a semi-scale model of a real live helicopter! In short, it looks good while still maintaining "practibility."

I have enjoyed my Hughes 300, I'm sure that if you are looking for this type of

machine it will give you good service and pleasurable flying.

Next month I want to overview the contests for model helicopters; what has been and what is needed to get the contestant draw we had several years ago. And to give you a start on the next upcoming subject, go out and purchase High Point Product's "multi use precision balancer." [3013 Mary Kay Lane, Glenview, Illinois, 60025, (312) 272-8684.] If you don't already have one of these balancers, it is as necessary as your tail rotor . . . See you next month. ●

Scale ..... *Continued from page 16*

Into this gloomy picture has stepped a group willing to devote some time, energy, and prestige in presenting FAI competition. While their efforts do not change the form of competition to bridge the gulf in rules, they have provided a means of promoting interest in FAI that can lead to meaningful, logical proposals to the FAI on the behalf of the U.S. points of view. The Southern Indiana Modelers, who sponsor what has been among the largest if not *the* largest scale event in the form of the Mint Julep meet, have elected this year to offer two "pure" FAI events. At their meet in April, both F4C Precision and the Provisional (for one more year!) Stand Off scale will be offered *in addition* to their regular events. This is a very generous and ambitious program.

Such an event can serve a number of very useful purposes. First, it will provide an opportunity for those who *are* interested in international competition to compete. So often, the only opportunity to hone competitive skills for the FAI occurs *at* the World Championships. That is hardly conducive to developing the very best possible team. Secondly, the event will provide a chance to train people in the rules and regulations. When we are called upon to provide personnel for judging on an international level, we are hard pressed to come up with names of persons skilled or experienced enough to do the job. Thirdly, it will provide a showcase and a testing ground. The large numbers of modelers and spectators at the Mint Julep will be able to see firsthand the fact that, in actuality, the separation they may believe exists between the FAI and the U.S. points of view are not as pronounced as first seems the case.

In an effort to develop this program and to help in the future U.S.-FAI scale participation, the National Association of Scale Aeromodelers (NASA) will be working with the Mint Julep contest and their CD, John Guenther, to make this a successful event. NASA will work at providing judges, guidance, and possibly some other type of contestant recognition. In addition, it is hoped that the U.S. 1982 F4C and Stand Off teams will be present to use the event as a training event for the Reno competition in June. AMA has designated that a practice session can be set up for teams. The Canadian team members have also been invited, in order to help provide some healthy, friendly competition.

A last thought on what the Mint Julep offer could create in the future should be the fact that conversations were generated last summer relative to future FAI team selections. At the Scale Masters Tournament in Louisville last August, tentative inquiry was made about the possibility of including in that event in the future, a team selection program. There were some concerns expressed by a number of those present at a general meeting as to whether they wanted the Scale Masters to have such a program included. Subsequent action by those responsible for developing the Scale Masters concerning opening up weight and engine size restrictions and sort of lumping Sport Scale and Giant Scale in one event might tend to make an FAI team selection program more difficult to sell at that event. In actuality, there is no significant reason that such a program as the Scale Masters, with its qualifying meets, could *not* be used. The Mint Julep offer could help to indicate such a possibility. Indeed, if it is a successful operation, it itself could offer future possibilities.

NASA welcomes the Mint Julep offer since it can serve scale in so many ways. We need a set of viable alternatives for the future. The Nats has served as a team selection vehicle in past years. While no real problems are inherent in the system, there are some disadvantages. The greatest of these is the problem of inflexible time scheduling possibilities. Should the necessity develop to provide more flying time, it becomes almost an impossibility. A lesser, but more important factor, is that to develop a healthy team selection program, more concentrated focus must be placed on it. At present, the team selection gets buried in the morass of people and events of the Nats. Using a specific program and final event could help alleviate this quite nicely. Having the selection at a special scale event using FAI rules and regulations could do much to speak to all the concerns we have about the FAI program.

As a modeler interested in International scale competition, I salute the Southern Indiana Modelers, the Mint Julep, and specifically John Guenther, for a bold attempt at upgrading and promoting FAI scale competition. I sincerely hope that scale modelers will support your interest.

FINISHING TECHNIQUES

Over the years there has been no large group of modelers beating down my door asking for my "secrets" on putting a finish on models. I personally feel that this is due, at least in part, to the fact that they have seen my models! Certainly I have progressed beyond that stage that made my early efforts look like I put on the paint using sand finish latex applied with a roller, behind my back, after having imbibed copious quantities of alcoholic beverages. My big problem is that I enjoy this aspect of building the very *least*.

In spite of lack of early success, recent efforts have not been *too* bad. I have recognized that there are several ways to produce a satisfying end product as far as the *finish* is concerned. If, however, you wish to create a satisfying project that will *fly* it's something else. Some of those super finish jobs you've seen at trade shows turn out to be lead sleds with more paint weight than structure weight. (To friend Paul Clements, who has won a number of finish awards recently, may I say 'taint' you I speak of.)

In an effort to produce a satisfactory, *lightweight* finish, may I offer the following possibilities. The time-worn suggestion that you can't cover up lousy structure is still a valid and important point. Trying to cover up lumps, projections, open grain, and assorted gremlins will not work well. Therefore, all seams and joints require very concentratd effort. Finish off your sanding with 240 or 320 paper and clean off the entire structure carefully. A nylon bristle paint brush will help get all that dust off the sheeting and out of the corners. When you have reached the point where you feel that it is absolutely perfect, then you know that it will require only one *more* trip over the entire structure.

For fully sheeted subjects, I utilize the following procedures: Starting on the bottom of the aircraft, I apply 3/4-ounce cloth to the sheeted structure. Lay the slightly oversize cloth on the surface and gently smooth it out with your hands. Be careful to allow enough overhang, as when you work in the resin into it, sometimes it scoots somewhat. Generally it will lay quite flat against the sheeting and will work nicely around compound curves.

Mix up a small amount of resin in a bathroom-type paper cup. I use the bathroom type because they are not treated (waxed) as some of the others are. In most cases, I try to mix about 1 to 1-1/2 ounces maximum. I feel it's better to mix too little than to try and quickly brush on resin that is setting up.

Using one of the small disposable stiff bristle brushes, begin at one edge of the structure and brush the resin into and through the color. You'll be able to see it contact the wood underneath. Work your way across the sheeting and try desperately to avoid the little ripples that are want to appear. When you have covered that section, run a bead of resin on the cloth just off the edge of the structure to facilitate cleaning up the edge later.

Allow the resin to set thoroughly and then hit it with some 240 grit paper. Don't get carried away.

At the next point you'll find a divided opinion. I have, as is generally done, applied a heavy coat of resin over this. I no longer do this since I've found that I wound up picking up a lot of weight because almost without a doubt, I'll tire of sanding before I've gone as deep as is possible toward the cloth. Sanding dust is like spilled blood; a little of it looks like a heck of a lot more than it really is. In recent efforts, I've gone with the one coat of resin during the glass cloth application. After a light sanding, I then spray on a generous coat of K&B Primer. This serves two purposes: first it will fill any cloth fibers not filled by resin, and secondly, it allows you to see the problem areas very clearly.

After the one or two coats of primer have set up, I attack the little necks, depressions, etc. with Sears Spackling compound. This water soluble material can be brushed on, spread on with a spatula made of 1/64 plywood, or spread on with your finger. All of this is then allowed to dry completely. A few hours generally is enough if the spackling is not too thick.

The 240 sandpaper is then brought out and you start working, making white dust fly forever. I usually go virtually back down to the cloth. In that way you fill any remaining weave of the cloth. You may have to make a couple of passes at the cloth to really get a super smooth surface. When you are satisfied with the surface, spray on a couple of thinned primer coats to achieve a smooth, uniformly colored surface. This becomes a very important step, because if you allow the mottled wood/resin/primer finish to show, you'll have to put on extra paint to completely cover it. You

also run the risk of having something show through later as your rub out the surface.

When you have achieved a smooth, evenly colored surface, spray on the paint. I have used a great variety of paint types over the K&B Primer, and have had no adverse reactions with any. I find automotive acrylic enamel very easy to work with. It covers well, sets up quickly, rubs out well, and is relatively inexpensive. There is, of course, a vast range of colors as well. Between coats, as it sets up, I attack it with an old piece of 600 wet or dry paper, using it wet. You'll quickly pick up high and low spots by the dull/shiny contrast. I use fairly thin coats as opposed to a couple of massively thick globby coats. It takes longer but it's easier to control what's happening.

Once again, the practice of "one more time" should be used when rubbing out, sanding, etc. It's amazing how often we come back a day later and realize that what we thought was a perfect finish product the day before is really not. All that it takes then is a little more elbow grease and the job is really improved.

On fabric-covered open bay surfaces, I generally use either Fabricote or Coverite. In a recent article, I told of my first experiences with Top Flite's new Fabricote, both regular and light varieties. I suggested that there were two pluses over other material. It has no grain to worry about as far as shrinkage is concerned, and it seems to take less material to fill the weave, therefore affording a lighter end product. Bottom surfaces are done first to put the overlap joint on the underside. All joints are given a shot of instant glue to firm them up.

Once again, after application, I spray on a couple of coats (light) of K&B Primer. These are lightly sanded, with particular attention to any fuzzy, frayed edges. In regard to the seam from the overlap, I have used both a heavier application of primer sprayed into it or a lightly thinned, brushed on coat of spackling compound to smooth out the joint. *Very careful* sanding is required.

The final finish you achieve will have to be determined from experience, if you wish an open weave effect as is found on some aircraft, less paint and primer will be required. On the other hand, some fabric aircraft have a really beautiful, rubbed, super smooth finish. Don't let the degree of shine fool you. You can achieve a shiny finish without having everything completely filled and super smooth.

Over both the finish sheeted and fabric surfaces, apply a coat of clear. I have used K&B as well as polyurethane. I have had less yellowing or color change with K&B. The clear, aside from making certain that the paint is fuel-proofed, serves to make it easier to rub out for a smooth surface without the colors smearing or bleeding. For rubbing out, I generally use the DuPont *white* Polishing compound. They also have a brownish colored *Rubbing* compound, but it is much coarser. If done properly, the rubbing out will give the glossy finish a beautiful sheen, as opposed to the shiny, toy-like plastic surface of raw, untouched paint. You *do* have to take some time, however, because it 'taint' easy to get everything even.

On military aircraft with dull, more flat colored surfaces, all of the techniques up to the final painting and clear coats are the same. I have tended to use R&S Military flats for this, however. The biggest hangup there will be to achieve the colors you desire. While they have some basic drab greens, light blues (and grays for undersides, etc.), they don't always match my presentations. This is especially true when I model Russian aircraft. Therefore, mixing is necessary. The biggest problem with this is that you are not working with basic colors, therefore blending can be frustrating, time consuming, and expensive. For instance, to achieve the "greener" Russian olive drab, I had to use R&S Dark Slate Drab, Light Spring Green, and black, to reach the desired color. Good luck!

The final clear coat must again be carefully controlled. Using K&B Satin Finish Clear, I dust on several very light coats, allowing them to dry completely and rubbing them with a paper towel in between. I believe you'll notice, if you look at photos of military aircraft, that the finish is rarely dead flat. There is a degree of sheen that develops from much the same things our models encounter; that is rubbing, fuel, etc.

Certainly, this has not been a comprehensive treatise on finishing. Again, I realize that my degree of expertise in this area falls far short of the best, however, I have been improving and gaining experience. If you have any favorite "tricks" you'd like to pass on, let me know and I'll share them with the world.

One to One, Bob. •

R/C World .....*Continued from page 15*

hose or tubing clamps, suitable for fuel lines, smoker hook-ups, etc. John Patterson of Strike Force had T-shirts with nostalgic WW-II Bomber-fighter nose art, or squadron emblems. A wet T-shirt contest would have been nice Royal Electronics and Royal Products, Sid Gates and Dave Anderson respectively, doing the honors with 'Royals' R/C systems and kits, tachs, and other goodies and 'Royals' very complete line of R/C scale model kits. This line continues to expand with a Super Cub, 1/4-scale, coming soon!

Larry and Joe were "Zinging" it with their Skywalkers, but the big news from J&Z Products is the 'complete' line of long awaited pusher props! John Tatone, of Tatone timer fame, has been expanding his engine mount, and muffler

line to include the larger engines, popular with the builders of biggies. Good looking, practical items. Check 'em out. Larry Van Osten and crew, of RCH Hobby Marketing, a leading producer of parts and accessories for R/C off-road racing cars and buggies and producer/director of the Western R/C Off-road Championships in Costa Mesa, California this past fall, were busy passing out 'hot tips' on how to set up that car/buggy for better handling and how to win in one easy lesson. Sure! Next door, Bob Novak, of Novak Electronics, was proudly showing off his new servo with a speed of about Warp 7! 'Fast' doesn't describe it, instant action would be better, with zero over-shoot, I think. Another winner by Bob for the R/C car crowd, but the plane guys will like it too. Bob McDaniel, chin whiskers and all, can really get your engine started with his nifty Ni-Starter. An excellent item, carry it in your pocket, it won't short your change.

For the R/C boaters, the 32nd Parallel (shades of the old radio program, Latitude Zero!) had an impressive line up, from a 38.5 inch long VS-8 German hydrofoil, a Schnellboate, or PT boat, to an 83-inch long type V11 U-boat, plus accessories to fit them out for war, er, duty. Impressive.

Circus Hobbies had a large display with the JR systems in the spotlight. New is the Apollo five and six-channel systems, for fixed wing and helicopter operation, new helicopters, the high quality Graupner sailplane and kit line, accessories, neat two and three-channel ARF's such as the 1/2A Mirage 111c. Well done, Marty Barry, Don Weitz, and Ron Gilman. John Converse, of Vortex, was displaying the very well known Santa Barbara one design sail boat and the 'Sixty' a super realistic 60-inch sail boat for light weather sailing. A scale twelve meter rig with two sheeting units, very complete, a fabulous kit.

The Gorham Model Products, Helicenter West display drew large crowds all weekend. Along with the well known 'Cricket,' they were displaying and featuring the new Hughes 300 C for .25 through .40 sized engines and the 'Competitor,' as its name implies, a 50/60 powered machine, ball bearing tail control, autorotation, and multi-servo operation for electronic mixing as standard concepts! And not too many years ago, the record for R/C helicopter flight was *five* seconds. Consolidated Models had the Diablo, a shoulder-wing sport trainer for .40 to .60 engines and the Hustler, a two-channel glider designed for sport-slope fun. Eldon J. Lind and Co. displayed its wing covering tool (it replaces three pairs of hands!) and a sanding tool that should be on your list of modeling tools to buy if you don't have one! Can be adjusted, with guides or templates provided, to accurately sand leading edges uniformly, tip to tip (a chore for some of us), fuselage edges, tail feathers, you name it, even fillets. Works great.

John Pond O.T. Plans has just that, 'Olde Tyme Plans.' If you are addicted to any kind of model plans from Kordas to Ace Whitman kits, even Joe Ott's designs from WW II days, John probably has plans for 'em. Peck-Polymers' Bob and Sandy Peck had their award winning Pony Blimp on display and buzzing the area during demo time, much to the delight of the spectators. Their very complete line of Peanut kits (sorry, Jimmy), supplies, plans, stirred up much comment. RJL Industries K-62 and T-61 engines drew quite a bit of interest. They are one of a very small number of American engine manufacturers still on the scene. Look for new things from Randy's house of engines.

Tower Hobbies had lots of catalogs, show specials, and was showing its new two-channel system. Some modelers were heard to say they wished that manufacturers would produce an economical, two-channel, *one* stick system, as they find it difficult to find instructors capable of teaching with Mode One equipment. Manufacturers and importers, take note. This problem has been around for quite a while. Wally MacAllister and 'hot air ballonist' George Steiner had an impressive line of mufflers for fixed and rotary wing aircraft, including side and rear exhaust header pipes, tuned pipes, muffled tuned pipes, marine tuned pipes, and mounting hardware, all giving evidence of careful design and quality workmanship. DaCa, or Dave and Caren Litt, escaped from Omaha again to display their ever expanding line of flight line (and shoreline) support equipment, or, bench and field model cradles! Adaptable for all sizes of models, eases assembly problems at the field and eliminates hanger rash!

If big is better, then Bill and Charlie Cannon's super small Mini-systems have to be something else. A mere 3.8 ounces for a 4-channel airborne unit is, something else! Their G-Mark series of engines, including two twins and a five-cylinder radial turned a few heads and caused a few modelers to 'think small.' Jerry Nelson & Co. was demonstrating light weight Ceconite covering materials and had a large, Piper Super Cub, with flaps, in his booth. 'Jer' sez plans for the Super Cub, and other good things will be available soon.

C&D Enterprises, the Pro-Driver, Start-Pac people, Chip and Howard, were showing their new Twinn-Drivers. Perfect for twin-engined aircraft, or; twin or multi-cylinder engines. A neat idea, well done, always something new under the sun.

Dave and Sandra Robertson, of Orange Coast Hobbies, were displaying a new Huges 300 'copter kit, or semi-kit if you will since it comes with most major assembly/installations done for you! Nice. See the review on this item beginning in the March issue, and concluded in this one. A sharp ARF Cessna Cardinal and P-51 Mustang, both designed for .10 power, along with a small squadron of molded foam, rubber powered war-birds graced their booth. These 18-inch wing span models fly very well. Bob Holman Plans, has plans and epoxy-glass fuselages, cowls, foam wings, scale drawings, and scale reference materials. Lots of it. R.S. 'Bob' Hirsch has scale drawings too, however, this goldmine concerns itself primarily with the raceplanes of yesteryear through the present, plus a few other interesting types. Well worth looking into, you Schneider Cup types.

Robart's Bart Fury and his father had the full line of retracts large and small, hinges, fuel pump systems, incidence gauges, great looking wheels (and promises of some new sizes soon!), and a new item, a differential bellcrank. Great for changing servo linkage direction, fine tuning aileron differential, natch, and here's a thought for you; setting up differential in your throttle linkage to provide a more linear throttle response.

It was unfortunate that the Loctite Adhesives group was unable to exhibit at the IMS due to some last-minute legal difficulties, but we understand things have been cleared up.

Kraft Systems continues to enhance its product line with subtle but important improvements in everything from new materials in the motor mounts of its accessory line to adding servo reversing to the top of the line transmitters. Dedication to improving the breed. Kraft has also introduced a new "Carpack" two-channel air- er, 'carborne' system for R/C car usage. Highlight of this package is the super fast servos developed by Bob Novak; 0.27 sec/90 degrees.

RAM's Ralph Warner had his "Red Line" lighting systems, control devices, and battery backer devices ready for inspection. Seems a few more R/C types are actually getting brave (braver?) and going night flying. RAM also has a nice line of scale pilots (complete people) that will enhance most .40 to .60-size ships.

Many Organizations/club groups, such as S.C.C.A., SAM, Q.S.S.A., and several clubs, had booths, with lots of help to talk 'modeling' to anybody with a question about our hobby sport, controline, free flight, or R/C. The swap shop (first time for the IMS) was a huge success in that a lot of interesting items were transferred from one modelers workshop, or garage to another's. Par for the course.

Final note; the industry may be a bit off its feed or pace, but the modeler is still there, kicking back a bit, as it is said, but still there. ●

Counter ..... *Continued from page 9*

Weyerts Engineering has introduced its new electronic speed controller for R/C boats with features which it says are not found on other units. The LUXURY LINER Speed Controller offers fully proportional forward-stop, and reverse. With a voltage range from 6 to 24 volts, plus a regulated 4.8 volts for receiver supply if desired, the unit will handle a maximum motor current of 10 amps. Connecting directly with the receiver (no servo needed), positive or negative pulse, it is protected from reversed polarity. The LUXURY LINER is guaranteed for one year and sells for $79.95. Contact Weyerts Engineering Co., 11814 N.E. 68th Pl., Kirkland, WA 98033; or call (206) 827-8384 for more information.

★ ★ ★

Prolific Nick Ziroli has added the Baron's famous 'Dridecker' or Dr 1 Triplane to his ever growing list of giant scale plans. Scaled at 2.7 inches to the foot, this project was designed and built for the Columbia Pictures movie "Neighbors." Nick also did the flying in this movie featuring John Belushi and Dan Aykroyd. The two models built for the movie flew so well that it was decided to offer plans. The 'Tripe' and a

similar sized Sopwith Triplane were flown to first place in 'Combat' at the 1981 Rhinebeck WW-1 Scramble. Sized and recommended for the Quadra, with 1560 sq. in. of wing area and a flying weight of 15 lbs., wing loading is a reasonable 22 oz. per sq. ft.

Three sheets of plans totaling about 45 sq. ft., plus 10 pieces of hardwood for the wing and landing gear mounts cost you $25, sent postpaid in the USA. Order from Nick Ziroli Plans, 29 Edgar Dr., Smithtown, NY 11787.

★ ★ ★

Robart has announced a product upgrade on its 'Model Incidence Meter' and 'Helio Blade Pitch Meter.' An Anti-Paralax Meter Scale has been incorporated that provides a visual cue for super accurate readings. By simply positioning your viewing angle so that you see only the needle and not its reflection on the mirrored background, you will be dead square to the meter face, thus accuracy and repeatability of a reading is assured. The mirrored anti-paralax meter scale is now a standard feature on the 'Model Incidence Meter', $21.95, and the 'Helio Blade Pitch Meter,' $21.95. Robart, 310 N. 5th St., St. Charles, IL 60174.

★ ★ ★

For those who wish to 'do it themselves,' or perhaps understand two-cycle engines a bit better, Shamrock Competition Imports offers the 'Two Stroke Tuners Handbook' by Gorden Jennings. It is full of illustrations, facts, and formulas on all aspects of the two-stroke, from fundamentals, port timing, crankcase pumping, to carburetion and ignition. Send check or money order for $5.95 plus $1.50 postage and handling to: Shamrock Competition Imports, P.O. Box 26247, New Orleans, LA 70186.

★ ★ ★

D.G.A. Designs is proud to announce that its plans for the 1/4-scale Davis D-1K are ready for shipment. Scaled after Cole Palen's own Davis D-1W, the plans detail either the D-1K or the D-1W. Spanning 90.5 inches, with a wing area of 1267 sq. in., a Quadra powers it perfectly. Reputed to be a beautiful flyer. Plans are shipped rolled and are postpaid in the USA for $25, New York residents add 7% tax. Also available are 12 color prints of Cole Palen's Davis D-1W for only $7.25, perfect for documentation. Coming soon will be a Kinner Sportster and a Stits SA3A. Send an SASE for further information on plans and/or plan copy service. D.G.A. Designs, 135 E. Main St., Phelps, NY 14532.

★ ★ ★

Fults Tooling now has available its Dual Strut Steerable Nosegear and Snap Lock Steering Arm. Dual struts provide extra stability during takeoffs and landings, while the extra-heavy 3/16 pivot shaft gives the dual strut several options for mounting *and* plenty of strength. Excellent workmanship, silver-soldered joints, nickel plating, and the axle locked in place with set screws yields a quality nose gear. Two lengths are available, both are complete with all mounting hardware and steering arm, either priced at only $8.95.

The Snap Lock Steering Arm can be mounted with the arm below the fuselage, or inside, with a left or right-handed linkage drive. Two sizes are available; 5/32 or 3/16 dia. wire, and either retails for 98¢ at your dealers now. Distributor inquires are invited. write or call Fults Tooling, P.O. Box 145, Seymour, Il 61875; (217) 687-5150.

★ ★ ★

Roush Manufacturing is proud to announce the addition of the 1.3 cu. in. 'Kioritz Jr.' to its line of fine engines. This engine has long been awaited by those modelers with .90 powered or 1/5-scale airplanes who want the performance and economy of a gas engine.

The Kioritz Jr., weighing in at only four pounds, produces 1.5 hp and is built with the same features as all Kioritz engines. Use of a three-bolt hub allows tracking of the prop. Props of 15 and 16 inch diameter are recommended, and "Jr." will turn a 15-10 Zinger at 7200 rpm. It fits easily into a Bridi Rearwin Speed-

ster, the Ohio Superstar Zlin Z50L, and the new Sig Clipped Wing Cub. The Kioritz Jr. 1.3 is available for $159.95 from: Roush Manufacturing, P.O. Box 251, Sandyville, OH 44671; or call (216) 866-9462 for more information.

★ ★ ★

Drapers R/C Service has announced that it is the sole U.S. agent for the REDSHIFT 60 series of high performance R/C engines. Produced by Fisher Products of England, a full range of aero engines suitable for large, heavy aerobatic models, large scale models, and helicopters are available, along with a water cooled, marine version. Opposite rotation versions of all engines are available, too.

Virtually a hand-made engine, all engines are dyno tested before shipment and carry a six-month warranty under racing conditions with the use of castor oil based fuels. Each engine is 'serial number registered' to the customer and any updates will be mailed to customers! Drapers R/C Service mentions that a full line of spare parts are available for all engines. For more information, send an SASE to: Drapers R/C Service, 10 Castle Hill Dr., Bethel, CT; or call Phil Draper at (203) 748-7320.

★ ★ ★

Prather Products has announced release of the Prather 35 Tunnel, designed expressly for the new K&B 7.5cc outboard engine. Designed for quick building, the epoxy-fiberglass hull comes completely joined, with the plywood transom plate factory installed. A scale appearing epoxy-fiberglass cowl is also included.

The 35 gets on the step easily and corners smoothly, even at full speed. A radio box kit, designed specifically for the 35 tunnel, is available, made of epoxy-fiberglass with plywood bulkheads, wood mounting rails, and lexan cover. Price of the 35 tunnel kit is $179.95, and the radio box kit lists for $24.95. See your dealers, or send 50¢ for catalog. Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744; or call (213) 835-4764. •

★ ★ ★

Plug Sparks ...*Continued from page 36*

for five or six years, Cadwell got hooked up with Bill Chenault and his red hot Texas Pearl designs, ranging from "Mini" to "Mother of Pearl". The gang would come out to California for the U.S. Free Flight Championships just to terrorize the natives. We're gonna miss that old grouch!

BALSA AND SILK

George Murphy, newsletter editor of *Thundervolts*, the official organ of the Thundervolts R/C club of Schnectady, New York, has some interesting tips on the use of silk, covering and doping.

George sez, "There are several methods of covering with silk (either wet or dry) and to each his own. This method works well regardless of which method you use. It will save you weight and time.

"Before you apply the first coat of dope to the silk, spray on one or two applications of spray sizing. This is the junk that cloth manufacturers put on new material to fill the weave. After the sizing has dried, proceed as usual with the doping of the silk.

"You will find that it only takes about half to one third the time to apply enough coats to fill the weave in the silk. The time, dope, and weight saved will amaze you. As an added bonus, your wife will love you as you are using less dope."

The writer is reminded of the system used by Bob Hunter, where dietetic gelatin dissolved into water and painted on gave the same effect.

TAFT TREMORS

If there wasn't an earthquake at Taft over the November 21-22 weekend, there should have been with all the activity going on that day. Everyone knows how big the Taft area is but can you imagine four contests in the same place!

To help draw contestants and to please members of their own Chapter, SAM 49 has started to schedule its R/C O/T meets on the same day as the SCAMPS F/F Annual. This apparently seems to work out well, as one only has to walk several hundred feet and he is in an entirely different world of flight. In that line of thought, Photo No. 8 shows a dual performance model by Tom Rice, who flies his Lanzo R/C Stick both ways! Does he have a ball! Jim Adams, who was the Contest Director of an R/C meet for the first time, reports the weather was excellent. Matter of fact, when models get so high and start looking alike, invariably two fellows will try to fly the same model. Ron Doig and Ray VanDe-Walker were the culprits this time. Even the timer lost Ron's ship. Guess what? The model was found right in the middle of the free flight area, having made a perfect landing without any assistance. This is what is so great about the R/C Controlled old timers! More than once this has happened and always with a happy ending thanks to the stability built into the O/T design.

Transmitter control broke down a bit when one 1/2A Texaco was launched with the switch off. Believe it or not, Ross Thomas got a nine minute flight out of it! Not so lucky was Al Hellman, as one of the impounded transmitters was not turned off. Al is now rebuilding a kitted model.

Weather was so nice this time of the year that several 30-minute Texaco flights were registered in the last two hours. Let's take a look at the results:

CLASS AB

1. Doc Patterson (Playboy)	18:01
2. Ross Thomas (Playboy)	16:44
3. Jack Albrecht (Playboy)	16:12

CLASS C
1. Ross Thomas (Lanzo Bomber) 30:12
2. Doc Patterson (Playboy) 30:02
3. Jack Albrecht (Sailplane) 29:00

ANTIQUE
1. Nick Nicholau (Dallaire) 28:01
2. Ross Thomas (Lanzo Bomber) 26:57
3. Jack Albrecht (Anderson Pylon) 21:42

TEXACO
1. Chuck Thompson (Record Breaker) 36:16
2. Ross Thomas (Lanzo Bomber) 36:01
3. Tom Kulp (M-G) 35:53

1/2A TEXACO
1. Ray VanDeWalker (Buccaneer) 27:48
2. Ernie Payne (Lanzo) 22:39
3. Chuck Thompson (Mike) 22:37

ELECTRIC
1. Roland Boucher (Playboy) 16:31
2. Ross Thomas (Playboy) 13:50

Before closing off, we didn't get the results of the Scamps F/F meet, but we did have some photos (courtesy of Jim Adams) we would like to feature.

One of the better flying models one doesn't normally see in the rubber O/T competition is the Roy Nelder Moffet Winner. Photo No. 9 shows Bill Crovella with his meticulously reproduced jewel that has been giving the boys fits. And just think, it hasn't been fully sorted out yet!

Incidentally, SAM 49 is running a series of special rules this year particularly in the Antique Event. This has met with considerable objection from the Northern California Clubs. The latest idea now is to eliminate the Antique Event if SAM rules cannot be conformed to.

For the limited Engine Run Events, SAM 49 has jumped the gun by using the rules voted in for 1982. Class A, B, and C Events will set up like this:

15 second motor run for Schneurle ported engine powered models.

20 second motor run for cross scavenged engines.

35 second motor run for converted ignition glow engines.

55 second motor run for original ignition engine in production prior to 1950.

The bone of contention of course is in the Antique Event, for no official changes have been voted into the SAM Rule Book. SAM 49 has been promoting these rules:

4 seconds per pound for Schneurle ported engines. Schneurle engines converted to ignition get the same run (sic!).

5 seconds per pound for cross scavenged glow engines.

7 seconds for ignition converted glow engines.

10 seconds for original ignition engines in production prior to 1950.

Here we go again! Don't you wish you had been an engine collector? If you think prices are high now on engines like Orwicks, Super Cykes, etc., wait until we get halfway through 1982!!

VAMPS FALL ANNUAL

This is one meet the columnist simply

has never found time to attend. Strangely enough, when the weather is much more threatening in the mountains over which one travels to get into Nevada, this February Annual is the best attended! You figure it out!

Photo No. 10 shows Don Weitz, one of the leading hot shots of the Vegas Antique Model Plane Society (VAMPS), with his Comet Clipper. Normally, Don always provides a spectacular background when he is trimming out his models. Don gets his motors running so hot you would think they are glow powered. Naturally it takes a lot of patience in trimming out this hot powered ship.

Seems like fortune smiled on Weitz this time, as he won Class C pylon with his Playboy, Class A-B Cabin with a Brooklyn Dodger, and Class C Cabin with the Clipper seen in the photo. Good thing he didn't enter the other two events!!

Photo No. 11 is a shot taken of Rudy Calvo with his Playboy Senior. Of course it has a Super Cyclone for power! No doubt about it, for power-to-weight ratio, the Super Cyke is the best combination to use with the Playboy. Note the bikes in the background for retrieving. Those are a must!

Talking about Taft activity, we did mention that the SCIF (Southern California Ignition Fliers) holds two annuals a year also. Ken Sykora, the SCIFS newsletter editor, reports that some of the SCIF members (Faykun, Levine, Wade, and Chandler) upheld the club honor at the SCAMPS Annual. However, Clark, Sykora, and Freeman set personal records for plane bent, busted rubber motors and engines that would make good door stops! As Ken says, some fellows have to march behind so that the lead flag carriers look good! True!

Photo No. 12 shows Ken again with another model, this one an O&R 19 powered Foote Westerner. Not many people read the fine print on the Class A Westerner plans but if one does, he will discover Foote recommends extending the wing several inches on each side for better soaring ability. Dave Bruner, ex-Pres of SAM 21, discovered this little item and turned out a beautiful soaring model for the 1/2A Texaco Event. You might consider this if your Westerner is too hot!

Sykora also reports that Andy Faykum came up with a new type emery board. This one is put out by the cosmetic manufacturers. The board is really a cross between a paper emery board and a metal nail file. This new board is metal but has grooves on it like a file formed by gluing on many fine metal particles.

Faykun says it's great for those delicate filing and honing jobs where a small file is too rough while a regular emery board or sandpaper won't stand up. One thought that immediately occurs to this writer is the possibility of using this board for dressing engine points. These new boards, as put out by Revlon, are called "Emerfile", and come in several lengths to suit the particular purpose you have in mind.

Before closing off about the SCIFS, we simply had to show Photo No. 13 which depicts the official banner of the SCIFS Czech Club. Names can be clearly seen, indicating a very select club. Carl Hatrak, the originator, says they can use new members but warns that screening is very tough. Look at the case of Andy Faykun!

This columnist simply had to run a photo of Herb Wahl, as seen in Photo No. 14 at the 1981 SAM Champs at Taft. The model he is holding is called the O.O.S. and was developed in Chicago. Actually, this scribe regards the model as the "Poor Man's Ranger". It really is simplified!

Herb Wahl, who produces engines like Brown Jr. and Hurleman engines, is now busily engaged in tooling up for production of the Ohlsson Gold Seal (step-fin model) that was so successful on the West Coast. If you haven't ordered yours by the time you read this, forget it, as Herb closed off all orders on Dec. 31.

Most people figure Herb will weaken, but this is not true. When Wahl said he was going to produce 400 Brown Jr. Commemorative engines, that's exactly what he did . . . 400 engines! Best part about them is that they are better work than the originals!

Anyway, the point is that Herb is a real dedicated O/T modeler and as such, is always promoting the sport. Herb has most generously donated Brown Jr. engines to various SAM Chapters for free! Now how about that!!

FLORIDA FLASHES

Terry Rimert, of 367 Orange Ave., Baldwin, FL 32234, reports that all year long (1981) old timer activity has been on the upswing. Along comes the big Annual at Pensacola in the fall and attendance falls off! A lot of the regulars simply did not show up.

With great weather, fellows like Tom McLaughlin flew until it got dark on both days. That's a lot of flying! It does help when you have a great field too! Worst part in the free flight picture is that quite a few modelers in Georgia and Louisiana don't have a field to fly!

The Jim Kloth Memorial Trophy was won by Clifton Betz followed by Joubert and McLaughlin. This trophy is awarded to the winner of the .020 Replica Event, this being the most popular event of all.

Rimert reports some new faces, especially one Harold Evans recently moved from Chicago. Turns out that Harold flew with the famous names in that area and actually held the Senior Glider Record. We did notice a special Aerbo Event was staged, evidently for the Findra design only. We'll get more dope on this one!

TEXAS TEA PARTY

SAM 29: James "Bo" Buice has been sending in good pictures of the activity of SAM Chapter #29 (called the Planesman) in Fort Worth. Photo No. 15 shows Richard Greer with his brand new red silked Trenton terror scaled up slightly to accommodate a K&B 35. Latest reports are that the T/T flies like a bomb!

SOUTH AFRICAN ECLECTICS

We still have a few photos left over from Jack Abbott during his visit to the USA for the FAI Glider Championships at Sacramento. Photo No. 16 depicts Dave Shakeshaft with his Skyrocket B needing some paint trim before flying.

A great deal of credit should go to Abbott for his efforts in pioneering old timers in South Africa. As he mentioned in a conversation, "It all takes time, but we are making progress."

SAM CHAMPS 1982 REPORT

The latest SAM 7 newsletter indicates things are progressing great. All contest directors, people who will work the Champs, are all lined up. Each event will have an Event Director directly in charge. Each director will be responsible for his recorders, timers, and people necessary to run a meet. This reporter can't help but be amazed at the way SAM 7 has taken hold of this upcoming Champs. Predictions that this will be the biggest Champs yet are no idle boast.

THE WRAP-UP

Instead of an anecdote to complete this month's column, we are going to feature a letter from Allen Smith, 1205 St. Charles Ave., New Orleans, LA 70130, who reports that he has received information from America's Hobby Center (AHC) which offers some possibilities of picking up some components to old ignition engines.

In a telephone conversation with

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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.

R/C Frequency Receiving Converters. Tune, monitor 4 and 6 Meter R/C bands on AM radio or scanner. Information, schematics, PC boards, parts, converters, from John R Lange & Associates, P.O. Box 1395, Melrose Park, IL 60160.

Twelve full pages of ready-built models plus used equipment bargains in the last issue of "Hobby Swap News." Buy-Sell-Trade, your first ad free (35 words max, B&W photo $2 extra) with subscription $10/yr (10 issues), $19/2 yr., $27/3 yr. Add $3/yr. for 1st class postage, (required for Canada & Mexico). MC & Visa accepted. Hobby Swap News, Dept FLC-32, P.O. Box 834, Santa Maria, CA 93456.

WANTED: Old model airplane engines, gas model race cars, related items 1935-55. Arthur Suhr, W218 N5866 Maclynn Court, Menomonee Falls, WI 53051

WANTED — OLD MODEL ignition engines, cars, etc. Paying top dollar. Bill Simpson, 7413 Via Lorado, Rancho Palos Verdes, CA 90274 (213) 377-3532

GREAT GOLDEN AGE, WW1, WW2 built up flying models. World's largest (1400) authentic plans line. 7" to quarter-size. Master list SASE. Catalog 60¢. Cleveland Models, 10307X4 Detroit Ave., Cleveland, OH 44102

WANTED: A.J. Interceptor, Hornet, and small hand launch Interceptors, originals or replicas, top price. L.J.B., P.O. Box 997, Ocala, FL 32678

DECALS — 50 sheets assorted from discontinued U/C rubber kit line. $3 ppd. T. Crouss, 100 Smyrna, West Springfield, MA 01089

Old Time F/F — complete, original boxes: Civy Boy "24" (2) 020, Phoenix Imp "049", Jr. Phoenix "A", Phoenix Skipper (float) "A", Mini Hogan 45, Javelin "B", Strato Spear "B", Westerner "C", KC Terror "B", Buccaneer "30" rubber; Comet Whizzer U/C $300 plus shipping. Dave Bianchi, 210 W. Elm St., Kent, OH 44240, (216) 673-3066

Send $5 for collector's kit — sample issue of Aviation Collector's News magazine, pamphlet ad, booklet, label of early R/C model box, catalog sheets of back-issue magazines, books, and original early R/C plans. H. Watson, P.O. Box 72, Rosedale, LA 70772

AHC, he was informed if he had some machining facilities, the components they have in a bin in their basement might be sufficient to build a few Buzz and Thor engines. Al says he already has some components from which he can improvide a Buzz Class D engine.

"One of the joys of my boyhood was a Class D Buzz engine. As the name implies, it made the realistic sound of a combination motor boat engine and a B36 loafing along at 45,000 feet.

"I used the Buzz D on a Taibi Pacer C and later a huge Super Buccaneer. The sound and long slow takeoff were a revelation. I finally wore the engine out and traded it to Webster's Hobby Shop in Phoenix towards a Fox 59. The new engine (in my mind) did not replace the Buzz D for fun. Instead the model went straight up like a mortar shell, eliminating all the sedate grace from the Buccaneer. I tried entering the Buccaneer in a contest, but the weight required for cubic inch displacement at that time ruined everything.

"With the Fox 59 operating a 12-8 Power Prop the model was something to behold. However, I would rather have the Buzz D in its stead. Hence, I have written you about AHC and their mysterious basement. Who knows what is lingering amidst those Thor parts! Go gettum fellows!!" •

Tiger Shark .....*Continued from page 38*

being so light and so clean, it just floated like a balloon.

The tail-dragger configuration is not bad to handle on takeoff. I feed the throttle in slow, and at the same time, ease in some right rudder. I use half throttle until she's up on her mains, then come in with the rest of the throttle.

The rudder is big and effective, but if you have to fly off a narrow runway like I have to, and have to take off crosswind much of the time, be extra careful as she will tend to weather vane into the wind.

To you modelers out there who do

build this beautiful flying machine, I hope you enjoy her as much as I do. . . Happy flying.

P.S. I've got a 100% enlargement on the board now, using a Senior Falcon wing, with retracts and flaps! •

Workbench . . . *Continued from page 6*

foot span) could also be made, requiring three sheets to make up the main plan.

Obviously, wood sizes would have to be modified to accommodate the larger scale models, but at least all the correct size ribs and bulkheads would be available. The question remains. . . Do our plans buyers want it? We estimate the two-inch scale plans would cost about $12.00, while three-inch scale plans would run approximately $18.00. Let us know if you're interested.

POST OFFICE GEMS

We received a pink slip from the Newport Beach Post Office branch, indicating that we had a piece of flat mail that had to be picked up. Great . . . we're at the office all day in Costa Mesa, and had to take time to make a special trip to the N.B. branch. Finally made it after a week and a half . . . it turned out to be a Christmas card from a friend in a neighboring town on which the stamp had been held down with clear plastic tape . . . not allowed, says the P.O. Had to plunk down an additional 20 cents to get the card!

While waiting in line to pick up the 40-cent postaged greeting card, we overheard the lady in front of us trying to find out why the letter she had mailed three times kept coming back. "Your fault, lady. You put your return address on the center of the back of the envelope instead of the upper left front." During sorting, the letter apparently managed to come through backside up, and the P.O. employees, not, looking at the side with the stamp, dumped it in the return address sack, and back it came. The lady crossed out her address, moved it to the front, and mailed it once more . . . Post Office 2, customers O.

RIP-STOP FOUND

Thanks to reader Tom Lucas, Rockville, Connecticut, our search for the rip-stop parachute nylon source has been found. We're sure there are others, but the company we used to buy from in bulk for our Delaware R/C Club is Pioneer Parachute Co., Pioneer Industrial Park, Manchester, CT 06040. We have no idea what the prices or minimum quantities may be, but if you write to Pioneer, tell 'em where you read about it.

Incidentally, Tom comments that he has two Senior Playboys covered with the material. He feels it's the strongest (and lightest) fabric covering made, but that it "sun rots" . . . a model lost for two weeks in the sun will have to be recovered. My own experience contradicts that information. The original Big John went almost two seasons, with a much longer total exposure to summer sun, and there was no evidence of this problem. Could have something to do with the type of dope used and the number of coats applied.

And speaking of dope applied to fabric, be sure to read Dave Thornburg's dissertation on covering with silk, in this issue. Coincidentally, here's a hint from the Albuquerque Aeromodelers Newsletter (Dave lives in Albuquerque) credited to Jim Bressette, of Santa Fe. To avoid the problem of the first coats of dope soaking through silk and leaving unsightly blobs, dissolve one packet of Knox plain gelatin in one-half cup of *boiling* water, stirring for several minutes until completely dissolved. Paint one or two coats on the silk before applying dope. It will fill the silk with a light film that needs only two or three thin coats of dope for a beautiful finish. Actually, the rip-stop nylon has such a fine weave that this procedure is really unnecessary.

THE EXPERT

Bob Beckstein, Biloxi, Mississippi, says that our quote on page 104 of the February '81 issue, "An expert really doesn't know any more than you do. He is merely better organized and has slides," is pretty good, but he has a better one. "An expert is someone who is far enough away from home that his reputation has not preceded him."

Bob could be right. . . •

Vega . . . . . *Continued from page 21*

ther with the wing, it is important that the plywood wing mounting rib No. 2 alignment with fuselage wing mount piece "O" be checked with the nylon bolt in place. This is the last chance during the construction procedure to make corrections to the rib. Add the peg support spars No. 16 and the auxiliary spar to complete the basic structure. The wing mounting pegs are now cut to length from dowel. Drill 1/16-inch retaining dowels in the pegs. Before the aileron controls are installed, it is advisable to cover only the upper surface of the wing for added rigidity. Sandpaper the structure and re-cement all joints. Cement standard balsa sheets together to form the proper chord width. Apply plenty of cement on the ribs, spar, leading edge and auxiliary spars and press the covering in place. Note how the covering runs over the leading edge. Hold the covering in place with straight pins until cement is dry.

AILERON CONTROLS are started by constructing the ailerons with spar, ribs and balsa covering. Firmly epoxy the sheet aluminum control horn into each aileron as it is being assembled. Be sure to bend the horn and pass it through the rib for a firm installation. The full size Vega had no visible control horns, so we decided not to use commercial aileron control horns. We also prefer push rods instead of torque tubes. The horn must be located at the very bottom of the aileron, as the plans illustrate, in order to operate properly. A hole must be cut into the lower part of the auxiliary spar to allow for adequate clevis movement. Firmly epoxy the commercial hinges to the aileron upper covering and spar. When dry, glue the other end of the hinge to the wing upper covering and auxiliary spar.

The bellcranks are bolted to the plywood mounts which are cemented into the slots in the ribs and to the spar. Install the servo and run the control rods, with clevis ends, between the servo, bellcranks and control horns. Be certain the ailerons are level when the servo is in the neutral position and check the aileron operation.

WING COVERING is completed now.

First trim the leading and trailing edge of the upper covering to follow the contour of the lower surface of the airfoil. This bevel will enable the lower covering to meet the upper covering at the trailing edge with greater cementing surface and an uninterrupted undercamber curve. It is important that some structure be added to the wing bottom in way of the aileron servo because the servo should remain uncovered and accessible. This structure will compensate for the opening in the covering. The lower covering is installed in the same manner as the upper covering, using plenty of cement and pins to hold in place. *(The pointed leading edge shown can cause stalling at low speeds, such as landing approaches. The equivalent of wing tip washout can be achieved by leaving the leading edge pointed at the root, then gradually increasing the radius to a full round at the tip, with careful application of a sanding block. wcn)*

WING TIPS are cut from soft balsa and laminated, cross-grained. Cement to the wing and let cement dry overnight, then carve and sandpaper to final shape, consulting the plans and photographs.

COWL can be constructed from balsa or layers of 6-ounce fiberglass cloth and resin or epoxy. The plans illustrate a balsa cowl which can be covered with light fiberglass cloth and resin if desired. Cut the dummy engine plywood disc to shape and sandpaper the cylinders; rounding off the corners. Each cylinder should be wrapped with thin non-plastic cord-type fish line to simulate the cylinder cooling fins. Wipe the fins with cement to hold the lines in place. Cut the balsa cowl ring to shape and assemble to form the circle. Sandpaper the inner circle carefully with the sandpaper wrapped around a one-inch dowel and then cement it to the dummy engine disc. While this is drying, the twelve 1/2-inch balsa cowl segments are cut to length. Notice the bevelled sides which enable the pieces to form the curvature as they are assembled. Because the cowl changes shape from a circular section at the front to an elliptical section at the rear, the bevels must change angle as shown on sections "A" and "B." In addition, the arrangement of the segments at the rear must form an ellipse into which bulkhead "C" can fit after the cowl is carved and hollowed as shown. The segments should be trial fitted as cutting and carving progresses; pinned to each other and to the dummy engine disc. When all fits well, the segments are cemented very firmly to each other and set aside to dry thoroughly. Using a sharp knife (X-Acto No. 26 blade) and an X-Acto gouge, carefully hollow the cowl as the plans illustrate. The cowl exterior should only be roughly carved oversized at this time. Use bulkhead "C" as a guide for hollowing at the rear of the cowl. The fact that the cowl is open at both ends simplifies the interior carving considerably. Continue fitting bulkhead "C" into the cowl and stop carving when the fit is neat but a bit snug. Apply several coats of sealer to the cowl interior and sandpaper lightly. Then epoxy the cowl to the dummy engine disc, being certain that the cylinders are properly oriented with the odd cylinder at the top. When the epoxy is thoroughly dry, install the cowl using wood screws through the dummy engine disc and into the engine mounts. Be certain to drill pilot holes so the screws don't split the mounts. Now, the cowl exterior can be completely carved and sandpapered to shape.

As an alternative, the cowl can be carved from a balsa block, however we found segments to be easier, faster, and cheaper than a block. Press fillet compound into any cracks between the cowl pieces and sandpaper smooth. Mark off the location of the side mounting bolts at the rear of the cowl and then remove the cowl. The .032 x 1/2 x 1 inch brass angle clips are cut out, drilled and bent to shape. Solder a nut to the inside of each clip as shown. Epoxy can be used as a substitute, but in this case it won't hold as well as the solder. Screw and epoxy the clips to bulkhead "C" and hold the cowl in place again with the forward screws into the mounts. Cut a recess into the side of the cowl to fit a 1/2 x 1/2 inch plywood reinforcement which is necessary to withstand the pressure of the bolt head. When the holes in the clip and cowl are in alignment the plywood is epoxied into the recess. Countersink the hole for the bolt head and sandpaper the insert flush with the cowl. Add fillet compound and sandpaper again to make the recessed plywood inconspicuous. This should result in a firm cowl attachment. Remove the cowl.

PRIMER-SEALER should be applied over the entire model exterior as well as the cowl interior, engine mounts and bulkhead "C" after the entire model is sandpapered smooth. Considerable strength can be gained and a grain sealing advantage attained by covering the entire model with a fabric and a sealing adhesive. Silk and sanding sealer; 3/4-oz. fiberglass cloth and resin; or even the old standby of silkspan and clear dope can be used. Once completely covered, the model should receive additional applications of the sealer with a careful sandpapering after each coat is thoroughly dry. Start with extra fine sandpaper and wind up the last few coats with 400 wet-or-dry sandpaper used wet. The quality of the finish depends upon the diligence of the model builder and the applications of primer-sealer to the model. The last few coats should be applied thinned with about ten percent thinner. We used silk and sanding sealer for lightness.

TAILWHEEL should be installed at this time and the pant fabricated as was the main wheel pant, except that only three layers of 1/4-inch balsa are required. The center layer should be cut out to clear the wheel before the pant is assembled over the installed wheel. Sandpaper and seal well.

FILLETS are made from fillet compound such as Sig Epoxolite or Duro Easy Does It. The wing requires no fillet, however the fin and stabilizer joints with the fuselage have fillets which should be added now. The edge of the fillets does not fair into the fuselage or tail surfaces. Instead, the edges should be raised off the surfaces about 1/32 inch. This accomplished by carefully applying several layers of paper masking tape along the outside of the fillet outline which is shown on the plans. This is best done by stacking layer upon layer of tape on a sheet of clean glass and then cutting a thin strip of tape with a sharp razor blade and a metal straightedge. Apply the tape to the fin, stabilizer and fuselage. This will act as a dam and gauge for the fillet compound which should be built up to the height of the tape at the edges. Care must be taken during sandpapering not to destroy the ledge. This can also be cleaned up with a sharp razor blade.

PAINTING Mattern's Vega is real fun, and requires more patience than skill. Be certain that all miscellaneous surface details such as fuel tank expansion trunk blisters and landing gear blister fairings are in place and sealed. Fill and sand any blemishes on the model and be sure the surface is as you want the finished product to appear, because the paint won't cover any imperfections on the surface.

Begin by painting the entire model white. Several applications will be required; thinning the last few coats with about ten percent thinner. Sandpaper lightly after the first few coats. White Vegas are beautiful, and you will be tempted to leave the model as is, but we must move onward to the next step; the application of the paper masking tape. Stick strips of tape on a clean glass pane and cut into thin strips from 1/16 to 3/32 inch wide. It will be necessary to mark the model here and there at key points as a guide for the tape

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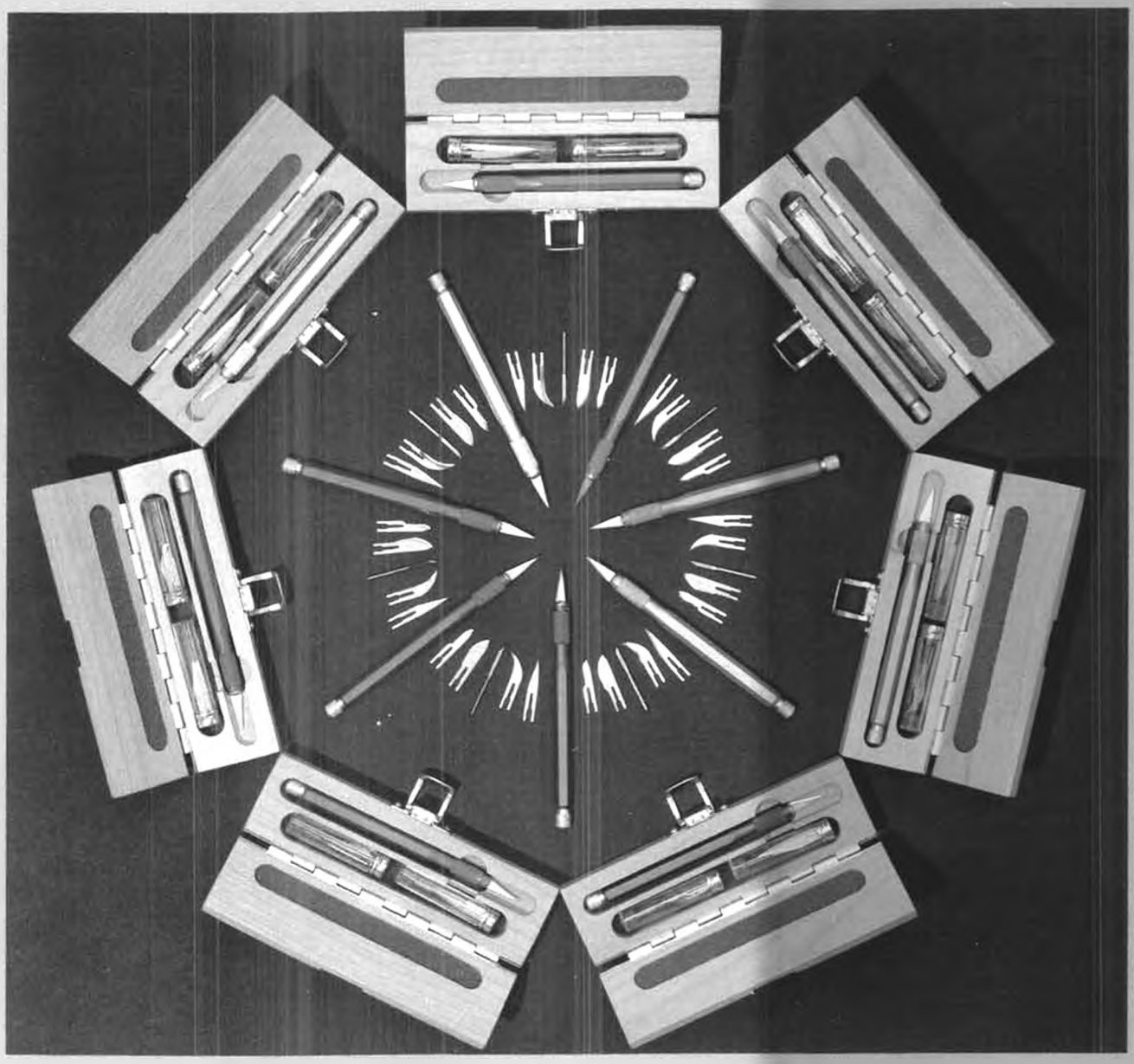

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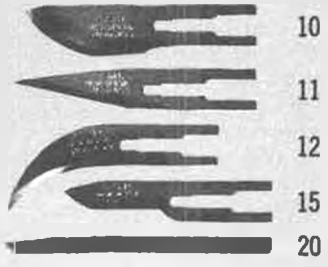

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application, and a China Marking Pencil is recommended for this purpose. The pencil is able to write on a glass-smooth surface without scratching the surface. Use the China Marking Pencil sparingly and lightly, because it could impair the adhesive qualities of the tape, and be sure to wipe off the pencil marks prior to painting the area. Apply the strips of tape to the fuselage, wing and tail; defining the eagle head and body feathers, wing outline and feathers plus registration number, and white border of the tail. The tape should be applied with the aim of isolating and protecting all white areas from the red and blue areas. It will be observed that the red and blue areas have no common border. They are always separated by white. Therefore, once all white areas are masked with tape, all that remains is to paint the red and blue areas very carefully. We used a brush to apply all color to the model. This color scheme doesn't lend itself to spray painting. When all tape is in place and in agreement with the plans and photographs, as well as the builder's aesthetic taste, the red and blue colors can be applied. Start painting, very carefully, along the edges of the masking tape, letting the color overlap onto the tape to be sure the paint covers up the taped line. *(The old trick of first applying clear to the tape edge prevents color from sneaking under the tape. wcn)* Gradually paint all spaces between the taped off areas and let dry thoroughly. Pay careful attention to which areas are red, blue, or white, because it is very easy, in the heat of excited enthusiasm, to apply several brush strokes in a white area before the error is discovered. Three or four coats should be applied. Let the paint dry thoroughly and then gently remove the tape. All surfaces can be carefully rubbed with compound and a very soft, clean flannel cloth to enhance the finish.

COCKPIT or pilot's cabin can be outfitted now. The interior can be painted gray or tan. The rudder pedals are bent from soft wire in a squared off "U" shape, 5/8 inch wide, and cemented to the bulkhead. The instrument panel can be assembled with commercial instruments on a black balsa panel, or the full size plan instrument panel can be cut from the plan and cemented to balsa sheet if desired. The throttle knob can be a cut-off hat pin or a map pin and cemented and pressed into the instrument panel. The knob is white. Seat is carved from 1/2-inch balsa; sanded; sealed and painted brown or pale blue and cemented to the bulkhead. Control stick is soft wire with a balsa or small fuel line grip. Fire extinguisher is cemented to the bulkhead. Pedals and stick are black.

CABIN ENCLOSURE can be constructed once the cockpit is complete. Begin by cutting the windshield to shape and bending where noted on the pattern drawing. Trial fit into place and trim and bend until the fit is good. If the fit is not perfect, don't hesitate to cut a new one. Cement in place to the fuselage and plywood piece "O." The windshield can be held firmly in place with strips of paper masking tape until the cement is thoroughly dry. While this is drying, cut out and install the cockpit side windows. These should be a snug fit and glued about half way through the plywood thickness. The cockpit overhead hatch on our model slides open over the wing and is optional. If this is not desired, the hatch can be cemented in place now and the framework added. This sliding hatch is very simple. The flat sheet plastic hatch is held in place by sheet aluminum guides. The guides are cut into 1/4-inch wide strips and bent 90 degrees to form 1/8 x 1/8 inch angles which are positioned on the fuselage and wing with one leg glued into a slit in the structure and the other leg extending toward the centerline of the plane about 1/32 inch above the surface. One section of the hatch guide is attached to the wing while the other section is attached to the top of piece "O" of the fuselage. Another piece of fabricated angle acts as a sliding hatch stop as well as the frame for the top of the windshield. The hatch stop and guide should meet with a neat joint and smoothly cemented. The sheet plastic hatch is inserted by bending it slightly to shorten its side to side dimension and letting it expand into the slot formed by the guide. The hatch must be a firm and tight fit to prevent it from opening during flight. The frame for the remainder of the windshield is made from 3/16-inch strips of aluminum bent to form an angle which should conform to angles of the windshield corners. Paint white and cement in place.

We installed the switch in the cockpit; a natural!

MISCELLANEOUS DETAILS such as pitot tube, venturi, and nose and tail markings are added now. The pitot airspeed indicator is bent from 1/16 inch wire, soldered and painted white. It is then cemented into a hole in the leading edge. The flight records on each side of the nose are made with Letraset rub-off lettering. The lettering is applied on a white solid color decal sheet which has been applied to the fuselage just below the cabin windows. The name "Jimmie Mattern" near the cockpit is applied with white Letraset rub-off lettering available at any good art supply counter. The registration letters on the rudder are cut from white solid color decals as is the Lockheed star insignia; the word Lockheed is white Letraset. The Letraset must be protected from the fuel, etc., with a coat of clear fuel proofer or similar liquid. The venturi is located on the right side of the fuselage in the center of the flight records, consisting of two scrap balsa cones joined tip-to-tip and painted white. This is held to the fuselage with a straight pin and cement. We painted our propeller silver gray with red, white, and blue tips to make it appear sort of scale-like. The back of the blades from the halfway mark to the tip are painted black. The dummy engine is dull black and the push rods can be black or aluminum.

Engine is bolted in place with slight down thrust, so slip washers under the lug rear holes.

FUEL TANK is held against the bulkhead "C" and the engine mounts with silicone glue and sealer and sheet brass straps. The silicone glue (G.E., Loctite, etc.) would probably have enough holding power without the straps, but we added 3/8-inch wide straps of shim brass around the tank; screwed to the bulkhead and the engine mounts for safety.

Cowl is held in place with two bolts and two screws. We remove the cowl to fill the tank.

FLYING the Vega is a pleasure; almost foolproof. It has plenty of zip with a .40 cu.in. engine swinging a 10 x 6 propeller, so there is no reason why a good .36 cu.in. engine can't be used. A very light model could even take a hot .29 cu.in. powerplant. Because of the wheel pants, we never fly from grassy areas and don't recommend it. A paved surface is ideal for takeoffs and landings.

Happy Flying!! ●

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