MODEL BUILDER

ICD 08545

SEPTEMBER 1983

$ 2.50

volume 13, number 140

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Recognized for Quality
THE WORLD OVER


Staggerwing Beech
1/5 scale


P-51 Mustang
1/5 scale


Christen Eagle II
1/3 scale


A-36 Beech
1/6 scale


V-35 B Bonanza
1/6 scale

F-86 Sabre Jet
Avail. in D & H
models (ducted fan)
1/8 scale


A-4 Skyhawk (ducted fan)
1/7 scale


T-34B Mentor
1/6 scale

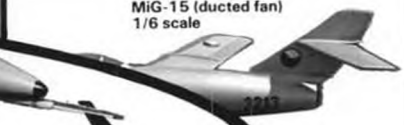
General information about these new product releases found in catalog.

NEW for '83

F-16 (ducted fan)
1/8 scale


Kfir
1/7 scale


MiG-15 (ducted fan)
1/6 scale


MiG-15 (ducted fan)
1/6 scale

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F-33A Beechcraft
1/6 scale


Byro-Jet ducted fan
(for .60 engines)


Pitts Special
1/3 scale

Beech Baron 58
1/6 scale

T-34C Mentor
1/6 scale

Mirage (ducted fan)
1/7 scale

CAP 21
1/4 scale

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SEPTEMBER

1983

volume 13, number 140

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Imagine what it must have been like to be a young aviation cadet about to graduate from primary flight school, and to have been out for a solo flight with your best buddy without the watchful supervision of a flight instructor. Suddenly, your friend decides to issue the challenge, "catch me", without even giving it a second thought, you answer the unspoken challenge by following the lead Stearman's breakaway maneuver. Bob Benjamin has done it again with another beautiful acrylic on canvas painting.

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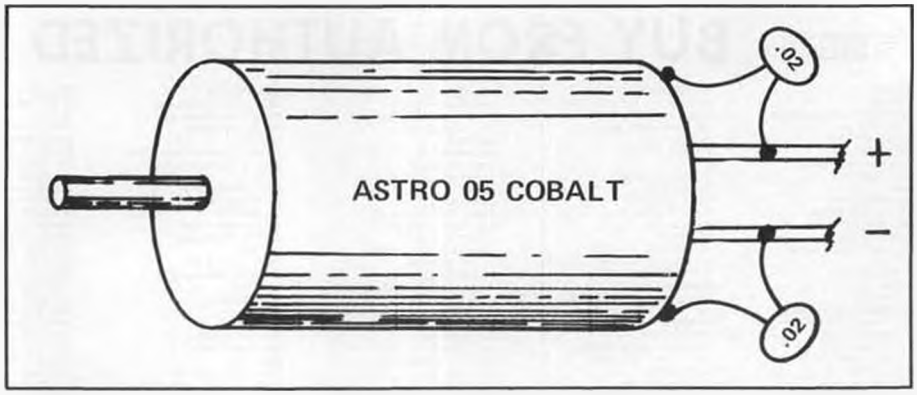
111 E Mengelo St
KENT
Kent Hobby
1313 W Meeker
PUYALLUP
Fargrove Model Supply
10611 136th St East
PH 845 7675
SEATTLE
Wooster Supply Co
17818 Aurora Ave N.
TACOMA
Bill's Hobby Town
14914 Pacific Ave
PH 206-531 8111
WALLA WALLA
Harley's R C
Route 1, Box 277A
PH 509-529 2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W Washington St
WISCONSIN
MARSHFIELD
Mid Wisconsin Hobby Center
Northway Mall
503 E Ives St
MENOMONIE
True Value Hardware
1512 9th Street
L Mart Shopping Ctr
MILWAUKEE
Casanova's Hobby
1423 S Muskego Ave
PH 414-672-2700
WAUSAU
Pope's Hobby Land
640 South 3rd Ave
CANADA
BAWLF, ALBERTA
B & P Transport Ltd
Box 6
PH 373-3953
CALGARY, ALBERTA
Hobby World Canada
Box 968 Stn M
CALGARY, ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINNIPEG, MANITOBA
Cellar Dweller Hobby Ltd
1354 Main St
PH 589 2037
WINNIPEG, MANITOBA
Gooch's Hobbies
646 Portage Ave
ST JOHN'S, NFLD
Capitol Hobby Centre, Ltd
6 Freshwater Road
DUNDAS, ONTARIO
Skycraft Hobbies Inc
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave E.
PH 416-755 1766
WILLOWDALE, ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH 222-4721
ARVIDA QUEBEC
LeModele Reduit Enr
118 Mathias CP 341
PH 418 548 2136
HAUTERIVE QUEBEC
La Centre Du Modelisle
Allard 1223 Lestrat
MONTREAL, QUEBEC
Can-Am Hobbies
5850 Gouin Blvd Ouest
PH 514-332 3565
SASKATOON SASKATCH
Cyclers' Aero-Craft
238 First Ave North
PH 652-4775
YORKTON, SASKATCH
Radio Control Hobbies
39 Betts Ave
AUSTRALIA
BRISBANE, QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA, S. AMERICA
Agromoda los Britanos Ltda
Apartado (P O Box) 52530
Bogota 2, Columbus
PH 212 7309
NEW ZEALAND
INVERCARGILL
Model Shop
55 Arcade Dee St
PH 89439
SWEDEN
S-871 02 HARNOSAND
Modell Produkter
Box 2060
VENEZUELA
CARACAS 1070 A
Hobby World C.A. (Dist)
Apartado Postal 75054
PH (02) 34 33 02

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

from Bill Northrop's workbench



In a recent phone call from Bill Young, it was revealed to us that the mysterious radio interference which plagued last month's Northrop N9M-A feature aircraft was finally cured. After trying four different radio systems, various noise suppressors and chokes, Bill came across a winning combination for "glitch-free" flight: an Ace Silver Seven receiver, and two .02 micro-farad (mfd) capacitors between each motor lead and the motor case.

PEANUTS

"Seems like only yesterday," but it has been two-and-a-half years since we published a complete list of the Peanut Scale plans that have appeared (full-size, naturally) in **Model Builder**. During that time period, 27 more Peanuts have been featured, bringing the grand total to 133.

Our peanut plan feature has been a very popular part of Model Builder's identity through the years, and we have no intention of stopping it. Because it has been so popular . . . with all types of modelers, not just those who specialize in F/F rubber scale showing interest . . . we felt it was time to again publish a complete, up-to-date list. All of the plans are still available, but in various ways. Please read the following explanation carefully so you'll know how to order any plan that may interest you.

First of all, most plans are available by simply purchasing the back-issue in which they appeared. The issue date is shown in the list. *If the issue is still available, you must purchase the issue to obtain the plan.* Back issues sell for $2 (up through December '80), or $2.50 (January '81 and later). If the back-issue is sold out, we will send you a print of the Peanut plan from that issue (with instructions) for $2. All of above prices are postpaid. *(The plan-only price is an increase of the previous price, and becomes effective with the publication of this issue, August 1, 1983.)*

Issues marked with an asterisk (*) are those which are sold out. Until any given issue is sold out, you will receive the whole magazine. If it's sold out, you will receive a copy of the plan and article. You'll receive a refund if you ordered a $2.50 magazine/plan that is sold out.

The updated list of Peanuts can be found at the end of this column.

DEAR JAKE

Just to the right you'll see a cartoon depicting a typical modeler's workshop . . . not just a "workbench" as shown above, but the whole shot. As indicated in the cartoon, "Dear Jake" is the title of a new, and different column that will appear every month, usually toward the end of R/C World (which will return next month, by the way). Obviously, the tone of this material is a mixture of tongue-in-cheek, humor, sarcasm, and far left field. "Jake's real name shall remain anonymous, but we'll give you one hint, the author has not been a regular contributing editor to **Model Builder**. We hope most of you will enjoy the column, and will have an urge to join in the fun by feeding Jake with some leading questions that he can answer.

Speaking of new columns, we hope that control line modelers . . . once and for all, should it be *control line* or *controline?* . . . will be happy to note that the . . . er . . . Ukie column has resumed, with a new contributing editor, Mike Hazel, in charge. Although some readers wrote in with the concern that we were discontinuing this column, it wasn't so. Just taking a breather while

Continued on page 92

ADVICE FOR THE PROPWORN

— By JAKE

Dear Jake:

I recently moved. My new club has fourteen guys on 72.960. Wouldn't you know, that's my frequency! I have three sets and none of them have plug-in frequency modules. How expensive is it to have the factory change the frequency on my radio?

Overcrowded in Omaha

Dear Overcrowded:

Don't bother. There's an easier way. The first three times you go flying, crash your airplane and yell, "I got hit! I got hit!" After the third time, those other fourteen guys will be changing *their* frequency. Glad to be of help.

Jake

★ ★ ★

Dear Jake:

What is elevator throw?

Perplexed in Pittsburgh

Dear Perplexed:

It's an Olympic track and field event dominated by the Communist Bloc countries.

Jake

Dear Jake:

I recently saw a picture in one of the mags of a guy named Jake Pasarelli. He was standing next to the wreckage of a

Continued on page 94

OVER THE COUNTER

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

Coverite Gee Bee Model E racer kit for .40 glow engines.

• Whether you're into R/C helicopters, Formula One-40 pylon racing, or large fixed-wing scale aircraft, Bavarian Precision Products Co., P.O. Box 6, New Canaan, CT 06840, has an engine for you!

The powerful HB.61 Helicopter Engine (No. 7000) now has a little brother! The H.B. Engines HB .25 Hubi-Helicopter Engine (No. 2500H), also known as the HB .25H, is nothing short of a beast, with *real* power and a very dependable idle. The HB .25H offers power not usually found in engines of this size and design; it's an ideal small helicopter power plant. Rated at 0.61 hp at 16,400 rpm. Features: double ball bearings, Perry carb, beam or radial engine mounts, and its own muffler.

For Formula One-40 pylon racers or scale model enthusiasts looking for a good .40-sized engine, Bavarian offers the HB .40 Blitz (No. 002112), a new version of the now famous HB .40 PDP. This engine has a touch more rpm and torque to help give the "competitive edge" to pylon racers or scale modelers. Rated at 1.22 hp at 17,500 rpm. Features: double ball bearings, improved porting, a new crankshaft, chromed sleeve, and the new HB Multi-Mix Carburetor.

Pattern fliers, BIG Bird fliers, and large scale model fliers will be interested in the third new engine from Bavarian, the HB .61 Blitz (No. 002120). H.B. Engines took its impressive HB .61 PDP engine and improved it to arrive at this remarkable new engine. The increased performance will make the difference in that hot new pattern ship or in one of the new larger scale models. It gives higher rpm, greater torque, and cooler running. Rated at 1.85 hp at 16,000 rpm. Features: double ball bearings, improved porting, new crankshaft, chromed sleeve, and the new HB Multi-Mix Carburetor.

Lastly, we want to tell you about some of the new engine accessories from H.B. Engines.

The new Engine Back Radial Mounting Bracket mounts in place of the crankcase back plate and allows mounting the engine directly to the firewall. (Part No. 002606 for HB .40s and .50s; No. 002607 for HB .61s.)

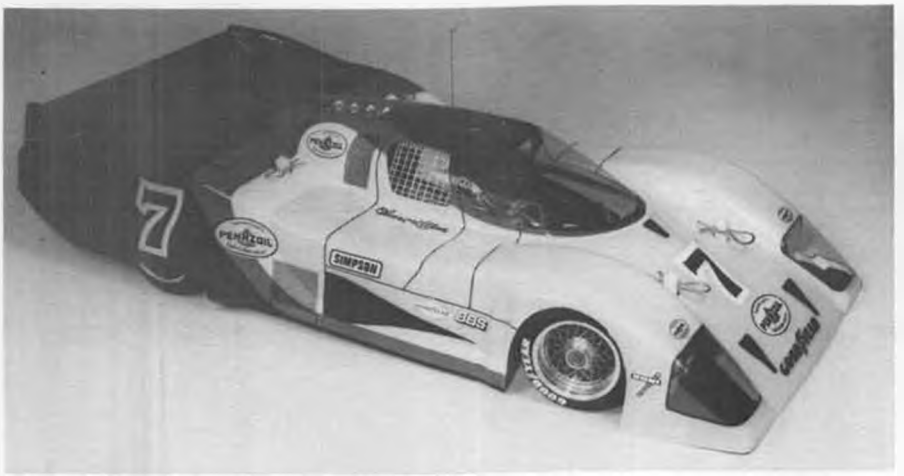
The acorn type Safety Spinner Nut replaces the hex nut supplied with engines, and will allow the use of electric starters. (Part No. 002672 for HB .12s through .15s; No. 002671 for HB .20s and larger.)

H.B. Engines' new Exhaust Stack Spacers increase muffler to crankcase clearance. Spacers will fit all HB engines size .40 through size .61. Comes complete with bolts. (Part No. 7003 provides 0.4 inches clearance; No. 7021 provides 0.8 inches clearance.)

Write to Bavarian Precision Products for more information on these or other fine H.B. products.

★ ★ ★

New Skybrite paints from Sig. For spray or brush application.



Associated Electrics, Inc. new 1/12 scale Mirage GP-C body . . . and more!

Coverite's newest kit release is the Gee Bee Model E, a magnificent example of the Golden Era's dazzling racers. This .40 powered model, designed by Henry Haffke, once again proves that a model can be designed to fly very stably and still have all the charisma of the original. The span of this model is 56 inches, and it weighs between 4-1/2 and 5-1/2 pounds.

The Model E is built of machine and die cut balsa and plywood parts with complete airframe construction requiring only 20 to 25 hours of building time. A full hardware package is included in the kit, including many scale detail parts. Formed wheel fairings and a scale radial cowl with molded dummy Warner engine are also included. The multi-colored decal sheet features complete markings for Skip Tibert's red and white version, just one of four color schemes that are described in the construction manual, which includes original photos of each of the different "Es," plus historical background of each craft.

The Gee Bee Model E is now available at your favorite R/C dealer, or write Coverite, 420 Babylon Rd., Horsham, PA 19044.

★ ★ ★

Associated Electrics, Inc., 1928 E. Edinger, Santa Ana, CA 92705, has announced a slew of new products for R/C car modelers. At the head of the list is the new 1/12-scale Mirage GP-C body (pictured). It is ready now, and available at your local Associated dealer's shop, ask for part No. 3168.

For those who like to identify with a winning team (and who doesn't?), Associated has a new sew-on patch for your shirt or coat which is actually the Associated logo. This one's part No. SP28.

New Endbell Motor Tape will replace the worn-out, old tape around your modified motor. It's heavy-duty, high temperature tolerant, and it comes in 60-yard rolls. Ask for part No. 3509.

Associated now has titanium replacement rod for all of those steel pins in your RC500 racer. Use it as rear bumper stock, too. It will cut three ounces off of your car's weight! Available in 1/8-inch diameter, three-foot lengths; ask for part No. 5129.

For improved handling, Associated now has a new Rear Shock Mount Kit (No. 5290) for your RC500 racer. This mount repositions the shocks closer to the rear tires.

Coming soon from Associated is its new Jaguar body (part No. 3169). Look for it at your local Associated dealer's shop.

★ ★ ★

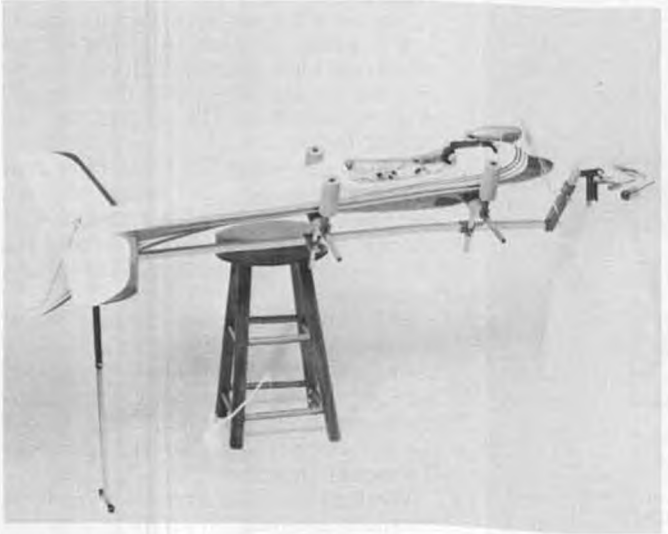
New Speed Stix disposable sanding tools.

Sig Manufacturing Co., Inc., Montezuma, IA 50171, has just announced an exciting new line of paints called Skybrite. Skybrite paints are one-part, no-mix paints that come in the following colors: red, yellow, white, black, orange, silver, blue, and a clear top coat (slight amber tint). These colors are perfectly matched to a super-easy sanding white primer for a great painting system for models. If you're interested in a beautiful painted finish with a minimum amount of work, check out these features: ready to use right out of the can, no mixing or measuring; completely fuel proof; excellent adhesion to metal, plastic, wood, fiberglass and epoxy resins, nitrate dope, cloth and paper coverings; fast drying (tack free in 20 to 30 minutes); quick filling, easy sanding primer for a perfect color base; high gloss, deep, brilliant colors; excellent coverage and hiding properties (means less coats, less weight); brushes beautifully (simple to make quick, invisible repairs); an exceptional dollar value.

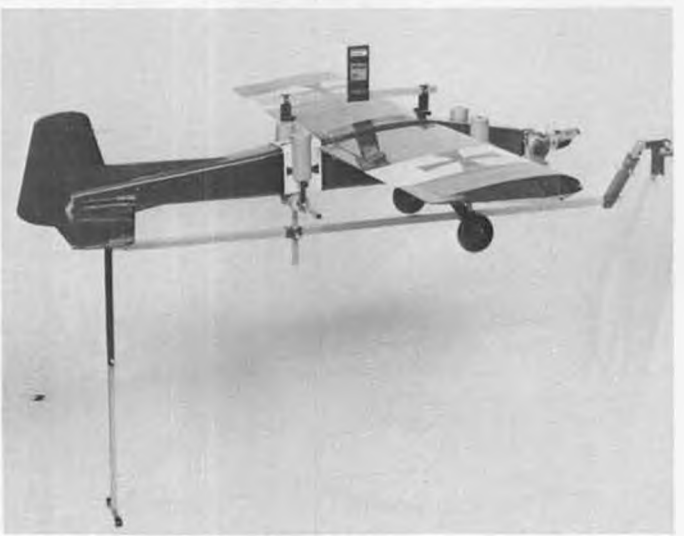
For more information on these great new paints, write to Sig and ask for the pamphlet entitled, "Using the Sig Skybrite Paint System," by Dave Falkenhagen.

★ ★ ★

Tide Distributors, Inc., P.O. Box 317, Dept. MBM, Minto, ND 58261 has come up with the solution to a bunch of



Tide Distributors, Inc. Master Jig 400 in use.



Tide Distributors, Inc. Master Jig 400 in use.

Bavarian Precision Prod. improved HB .61, the Blitz.

Bavarian Precision Prod. helicopter engines: HB .61H and HB .25H.

Bavarian Precision Prod. new accessories: mounting bracket, spinner nut, exhaust spacers.

Bavarian's new HB .40 Blitz.

frustrating building problems. For the modeler with only two hands (and we assume that includes most of you), the Master Jig 400 can hold your next building or painting project in any one of an almost infinite number of positions, thus allowing you the freedom of painting, covering, or installing radios or engines without the model getting in its own way. It also allows you to more easily check out things like wing warps and incidence angles.

The Master Jig 400 comes with a money-back guarantee (30-day limited time offer) so that you can be the judge of the time saving, quality enhancing capabilities of this remarkable tool. For a free brochure containing more information about the Master Jig 400, write to Tide Distributors at the above address.

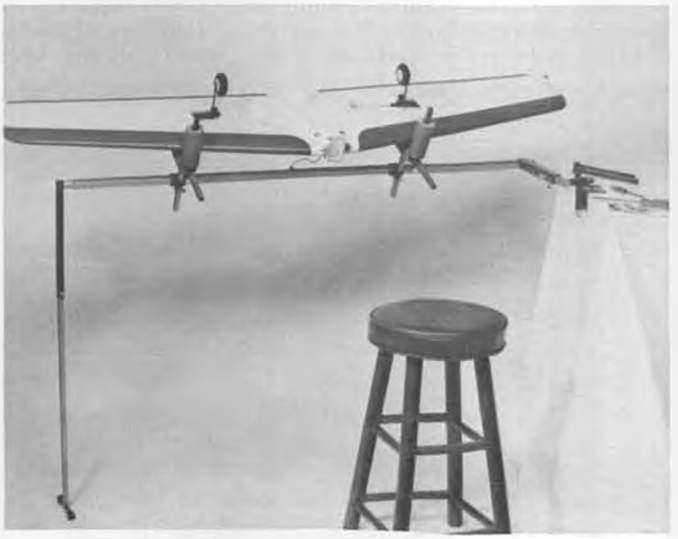
★ ★ ★

An even handier version of Speed Stix has joined the family of regular Speed Stix and Mini Speed Stix produced by Precision Sanding Tools, 2930 Skyview Ave., Pueblo, CO 81005.

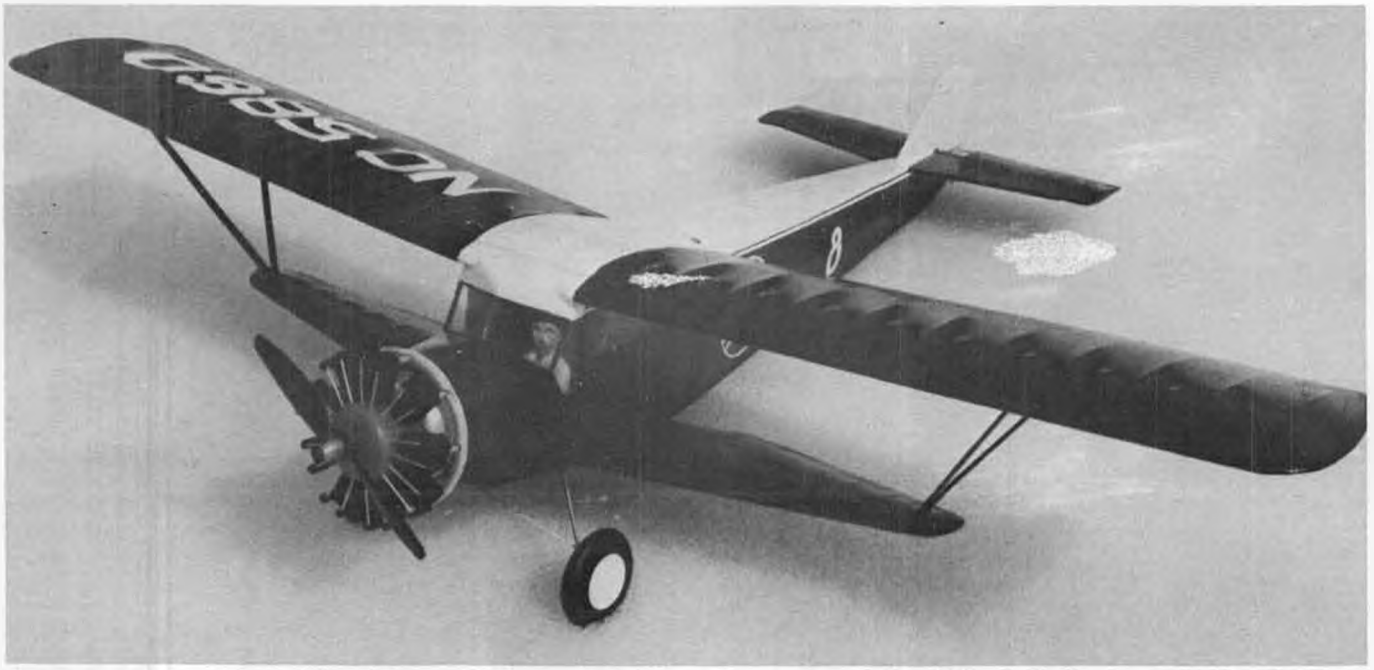
The new Flat Speed Stix are wedge-shaped flat sticks which enable the modeler to get into even more places,

Continued on page 88

Tide Distributors, Inc. Master Jig 400 in use.



Tide Distributors, Inc. Master Jig 400 . . . you guessed it! . . . in use.



According to Webster's Seventh New Collegiate Dictionary, *sesqui-* means "one and a half times." The Buhl Airsedan you see here has not one, not two, but one and a half wings . . . therefore, it is not a monoplane, nor a biplane, but a sesquiplane!

BUHL AIRSEDAN

By JONATHAN McPHEE . . . Would you like to build a scale model that won't take three months to finish? How about one that you can fly after work at the local school yard? Read on bro', this is it!

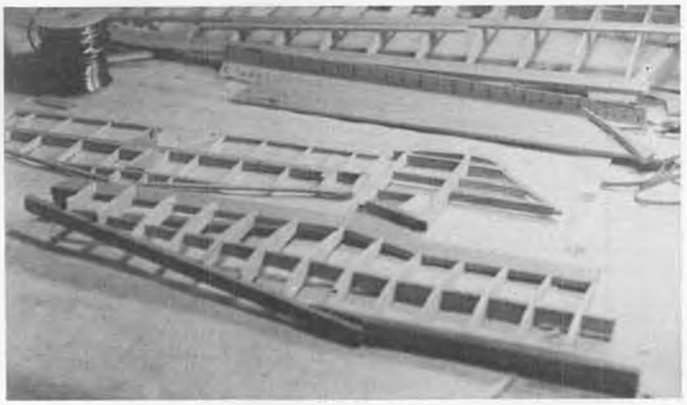
• A host of fascinating aircraft designs were spawned by the dozens of companies that grew up along with America's infatuation with the fledgling science of aerodynamics in the years just prior to the 1929 stock market crash. The Buhl Aircraft Company, of Maryville, Michigan, was not least in putting forward some new approaches. From 1927 to 1932 the company produced a line of aircraft bearing the designation "Airsedan," embracing at least eight distinct types that still shared a common, corporate "look." Alfred Verville, and later Etienne Dormoy (of 1924, ultralight "Bathtub" fame) were the designers.

These aircraft were almost unique for their time in providing indoor accommodations for passengers *and* pilot. They were generally powered by the reliable Wright nine-cylinder "Whirlwinds," and they offered relatively high performance. Despite a lack of serious marketing, they sold well.

While the first two Airsedans were true biplanes, albeit with somewhat atrophied lower wings, later versions, including the one modeled here, were "sesquiplanes" with one and a half wings. This arrangement looked about as useful to me as udders on a bull, with the drag of a bipe and without all of its lift. But it provides for a strong wing structure, and it also works aerodynamically. One Airsedan set a shortlived in-flight duration record, with mid-air refueling, of 246 hours. Another finished sixth in the 1928 New York to Los Angeles Air Derby and 10th in the 1928 National Air Tour. Sadly, an earlier version disappeared into the Pacific during the 1927 Dole Derby race to Hawaii.

My interest in this series began with a 1965 set of British plans for the "Junior Airsedan," a sports car version of the aerial Oldsmobile modeled here. I flew this version free flight, and it was put out to pasture until resurrected six years ago to accommodate a recently completed Ace digital kit radio. It gave me a great many pleasant evening flights (albeit sometimes hairy due to its short tail moment), until its terminal snap roll when the wing spar gave up. The resulting "dead duck" descent buried the engine to the firewall, but its new

This Airsedan uses a three element push rod system based on the old stand-by, the Gold-N-Rod. The outer nlyon rod is securely fastened to the fuselage, the inner rod has a friction tight wire wrapped around it, and there is another wire inside for rudder.



The author prefers not to cut individual tip ribs for the lower half-wing, so instead, he makes them the correct length, depth, and with the correct spar notches, then, using the root ribs as templates, simply sands in the airfoil shape. Simple, effective.

This 3/4 rear view graphically depicts the long tail moment of the Airsedan which aids stability in a 1/2A-size model.

The dummy Whirlwind engine really "makes" this model. Take the time to do it right; it's worth it!

From this angle, the Buhl Airsedan resembles a Curtiss Robin. Vertical tail size is adequate for control and stability.

The front end of the Gold-N-Rod shows the working side of the three element system. Use some Super 'T' to secure elevator rod.

Silkspun Coverite kept all the parts lined up, and Hot Stuff and baking soda soon had it all back together.

I wanted to build a similar plane, with more favorable moments, and recalled an old *Air Trails* article on the Buhl series. Inquiries at local libraries led me to the Smithsonian Institution in Washington, D.C., which has the nation's best aviation library. A phone call brought a listing of available resources and copies of useful documents, especially a three-view from Volume I of *U.S. Civil Aviation*, (Aero Publishers, 1962) and data from the *1929 Aircraft Yearbook* (Aeronautical Chamber of Commerce). Photos are also available for scale presentations at a very fair price.

The aircraft modeled here is the Model CA-3C "Sport Airsedan," which first flew in 1928 bearing Approved Type Certificate No. 46. This $11,000 plane seated four passengers and a pilot, and was powered by a Whirlwind J-5 of 220 hp driving a ground-adjustable metal prop. It had the following characteristics:

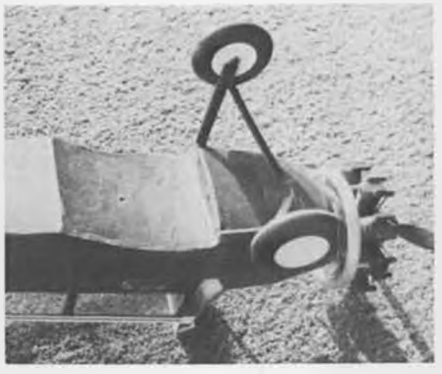
Span: Upper	36 ft.
Lower	20 ft. 10 in.
Wing area	240 sq. ft.
Length	28 ft.
Empty weight	1760 lb.
Useful load	1440 lb.
Max. level speed	134 mph
Cruise speed	112 mph

These dimensions made it ideal for a one inch equals one foot Schoolyard Scale project, and it has proved to be a delightful flyer. The long moments damp some of the 1/2A wildness, and the exotic appearance catches people's eyes. The plane flies well with exact scale outlines and areas in the tailfeathers, so change these at your own risk. The stick construction also mimics the steel tube and spruce forms of the original.

CONSTRUCTION

The construction methods detailed in this project are light, but quite strong enough. The original weighed in at 18 ounces with a heavy paint job, a tired Babe Bee, and an Ace mini-servo setup. Please don't deviate from the wood sizes or qualities shown on the plans . . . overweight and under-strength aircraft are bad for the designer's reputation, unless

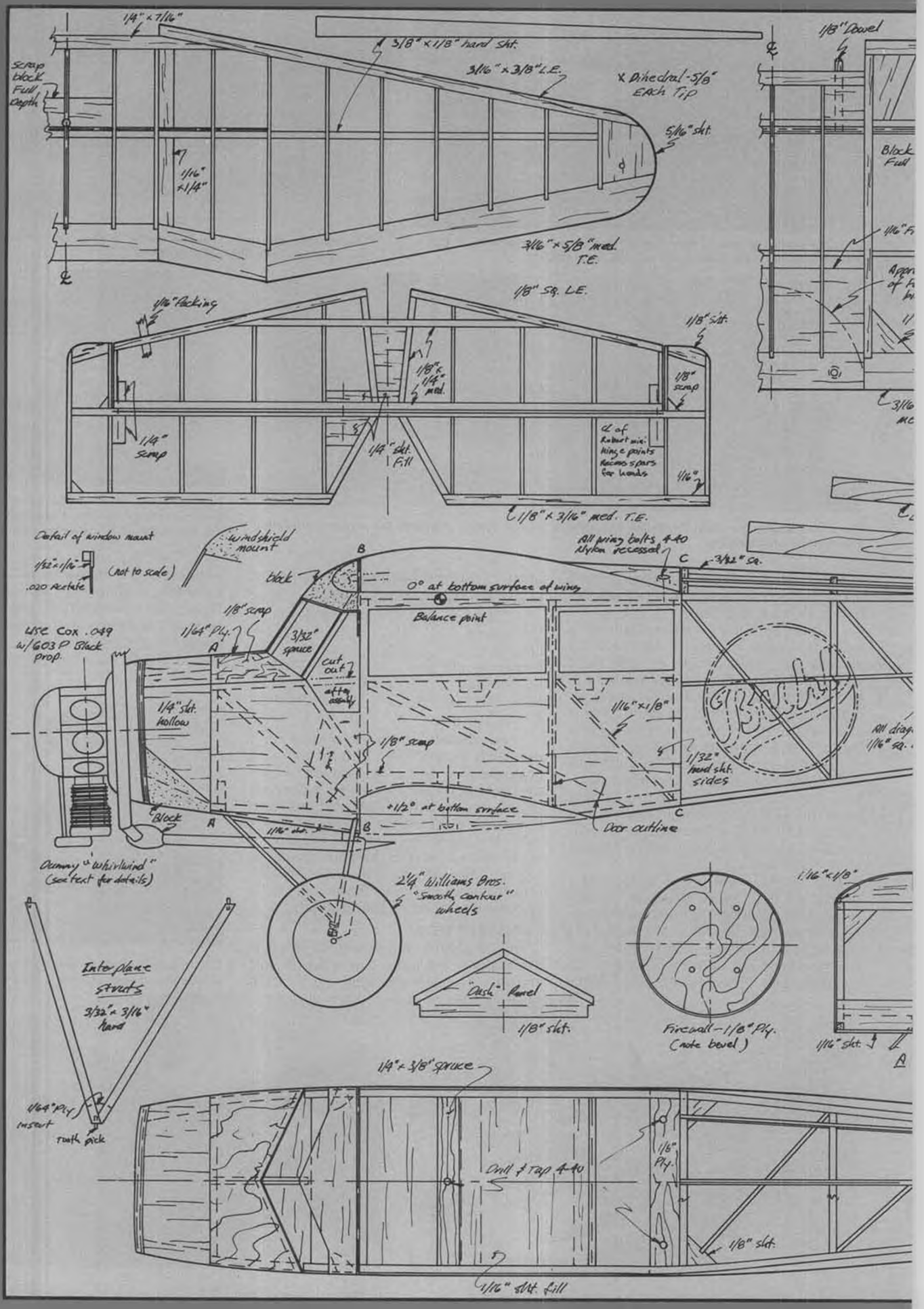
Continued on page 77

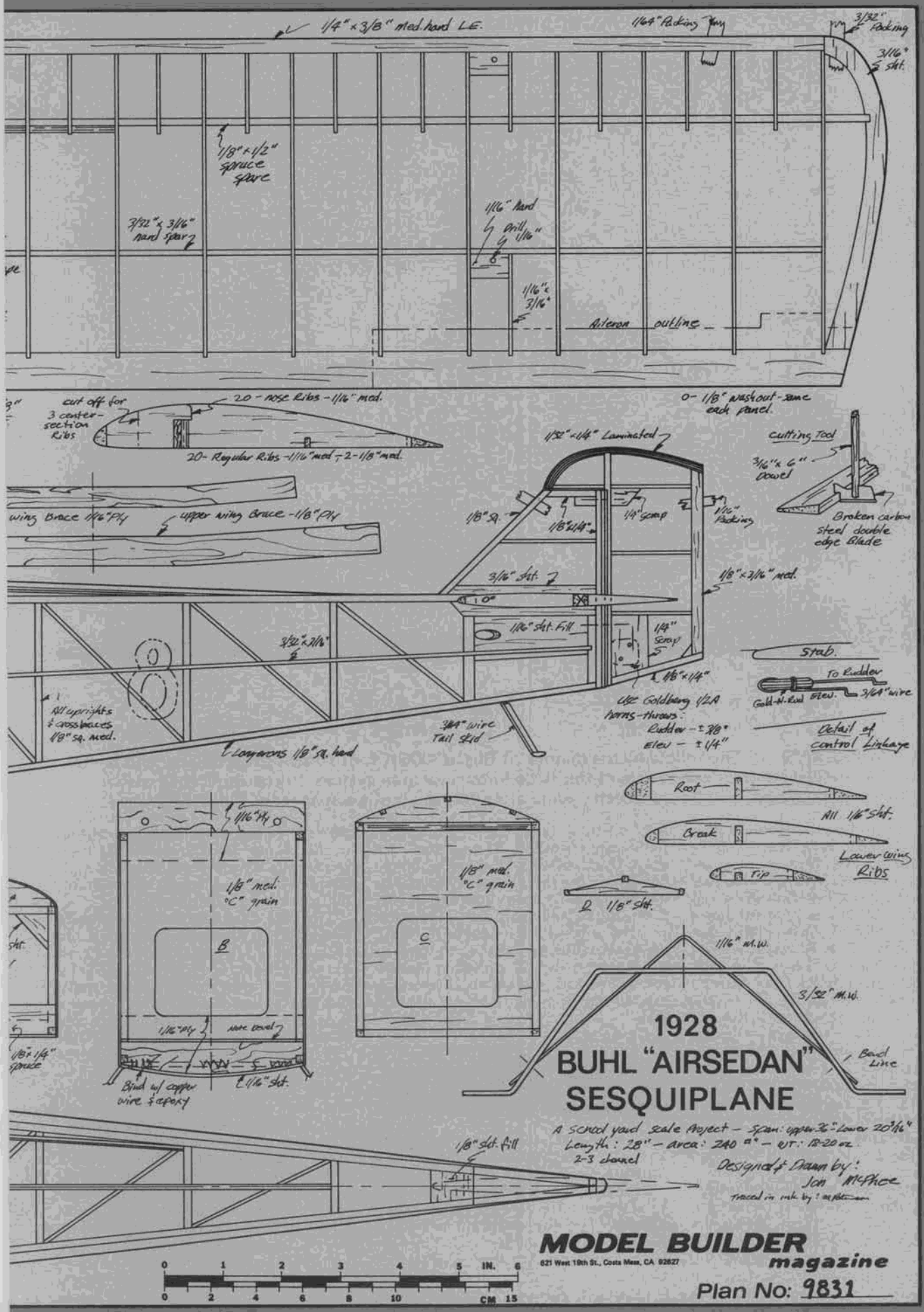


No, it didn't crash, it was turned on its back to show you some fuselage details

An early free flight Airsedan, a "Junior Airsedan", was built by the author from British plans back in 1965. It rests in background.

Bottom view of the 1/2A Airsedan reveals the landing gear setup, and the method of mounting the lower half-wing.


1/4" x 7/16"
3/8" x 1/8" hard sht.
3/16" x 3/8" L.E.
x Dihedral - 5/8" EACH Tip
5/16" sht.
1/16" x 1/4"
3/16" x 5/8" med. T.E.
1/8" Dowel
1/16" Packing
1/8" sq. L.E.
1/8" sht.
1/8" x 1/4" med.
1/4" Scrap
1/4" sht. F.11
1/8" scrap
1/16"
1/8" x 3/16" med. T.E.
Detail of window mount
1/32" x 1/16"
.020 Acetate
(not to scale)
Windshield mount
All wing bolts 4-40 Nylon recessed
3/32" sq.
0° at bottom surface of wing
Balance point
1/8" scrap
1/64" Ply
3/32" spruce
cut out after assy
USE COX .049 w/603P Black prop.
1/4" sht. Hollow
1/16" x 1/8"
1/32" med sht. sides
1/8" scrap
+1/2° at bottom surface
Door outline
Block
1/16" sht.
Dummy "Whirlwind" (see text for details)
2 1/4" Williams Bros. "Smooth contour" wheels
Interplane Struts
3/32" x 3/16" Hard
"Dash" Panel
1/8" sht.
Firewall - 1/8" Ply. (note bevel)
1/16" x 1/8"
1/16" sht.
1/64" Ply insert
tooth pick
1/4" x 3/8" spruce
Drill & Tap 4-40
1/16" Ply.
1/8" sht.
1/16" sht. fill


1/4" x 3/8" med. hard LE.
1/64" Packing
3/32" Packing
3/16" Slot.
1/8" x 1/2" spruce spar
3/32" x 3/16" hard spar
1/16" Hard
Drill 1/16"
1/16" x 3/16"
Aileron outline
cut off for 3 center-section Ribs
20 - nose Ribs - 1/16" med.
20- Regular Ribs - 1/16" med. & 2 - 1/8" med.
0 - 1/8" washout - same each panel.
upper wing Brace - 1/8" Ply
1/32" - 1/4" Laminated
1/8" Sq.
1/8" x 1/4"
1/4" Scrap
1/16" Packing
3/16" Slot.
1/8" x 3/16" med.
1/16" Slot. Fill
3/32" x 3/16"
All uprights & crossbraces 1/8" sq. med.
Longerons 1/8" sq. hard
3/64" wire Tail Skid
1/8" x 1/4"
Use Goldberg 1/2A horns - throws: Rudder - ± 3/8" Elev - ± 1/4"
Cutting Tool
3/16" x 6" Dowel
Broken carbon steel double edge Blade
Stab.
To Rudder
Gold-N-Rod Elev.
3/64" wire
Detail of control Linkage
Root
Break
Tip
All 1/16" Slot.
Lower wing Ribs
2 1/8" Slot.
1/16" Ply
1/8" med. "C" grain
B
C
1/16" Ply
wire towel
Bind w/ copper wire & epoxy
1/16" Slot.
1/8" x 1/4" Spruce
1/16" M.W.
3/32" M.W.
Band Line
1/8" Slot. fill
1928
BUHL "AIRSEDAN"
SESQUIPLANE
A school yard scale Project - Span: upper 36" Lower 20 3/16"
Length: 28" - area: 240 sq" - WT: 18-20 oz.
2-3 channel
Designed & Drawn by:
Jon McPhee
Traced in ink by: [illegible]
MODEL BUILDER magazine
621 West 19th St., Costa Mesa, CA 92627
Plan No: 9831
0 1 2 3 4 5 IN. 6
0 2 4 6 8 10 CM 15

PART ONE

Russian OSA Missile Boats

By WALT MUSCIANO . . . The following is a history of Russia's OSA Fast Attack Craft-Missile, and is the first part of a detailed construction article of this little-known weapon system. If you think that cruise missiles are something new, you haven't been paying attention to your newspaper for the last 20 years!

• Cruise missiles have been the subject of heated discussions by Western military strategists and politicians in recent years, and yet the Soviet Union has had cruise missile firing Fast Patrol Boats in service for over 20 years! At the latest count, the USSR had constructed about 170 of these craft, 120 of which are the four-missile Osa class boats. Not only have the Osa (Fast Attack Craft-Missile) boats have been operated by the Soviets, but many have been exported to Russia's allies and military hardware clients: Algeria (3); Bulgaria (3); China (17); Cuba (2); Egypt (12); East Germany (12); India (8); Iraq (5); Poland (12); Romania (5); Syria (5); and Yugoslavia (10). Battle proven in the hands of Soviet clients, these missile craft have come to appear very potent in the eyes of Western observers.

The strategy and tactics of the principal navies of the world were thrown into chaos by a military action during the 1967 Arab-Israeli war. On October 21, 1967, the Israeli 2,500-ton destroyer, the *Elath*, was on patrol off the Egyptian coast. This British-built vessel (ex-*HMS Zealous*) was a formidable warship with four 4.5-inch guns, eight 21-inch torpedo tubes, and six 40-millimeter AA guns. The *Elath* was well able to confront any ship in the Egyptian navy. Suddenly, a miniature aircraft approached at very low altitude and high speed. So great was the surprise, that before the *Elath* could take defensive action, the aircraft struck the mast and exploded. Before the smoke had cleared, another miniature aircraft appeared, striking the hull

with an enormous explosion. A third aircraft struck the sinking ship, while a fourth companion struck the turbulent waters under which the ship had sunk! Four direct hits fired by an unseen enemy! The four miniature aircraft were, in fact, Soviet Styx cruise missiles launched from Egyptian Fast Attack Craft about 15 miles away.

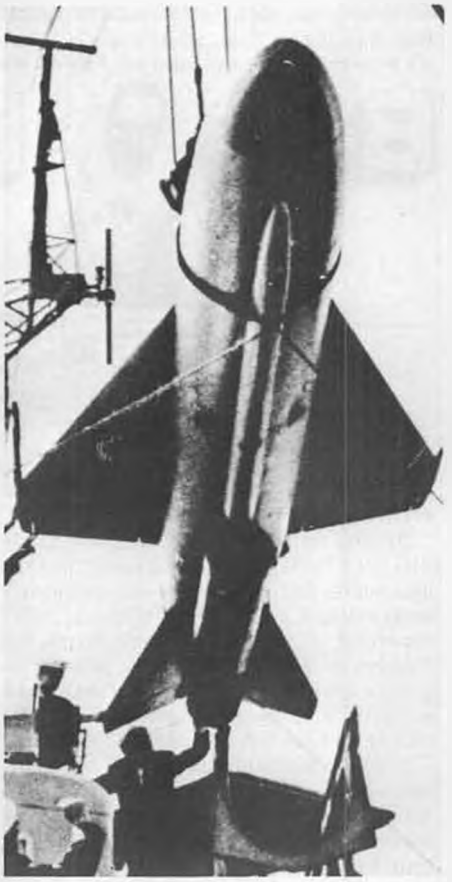
During the India-Pakistan war of December 1971, the Indian Osa boats proved very successful with Styx missiles in nocturnal operations against merchant ships which were trying to supply Pakistan. The Osa helped considerably in ensuring an Indian victory.

The Osa Fast Attack Craft-Missile proved a revolution in naval tactics and shipbuilding. These 200-ton steel craft are powered by three unusual 4,800 hp M-504 multi-row liquid-cooled radial diesel engines; each driving its own propeller. The top speed is 38 knots and range is 800 miles at 25 knots. A crew of 25 can operate the craft as well as handle missile launching.

The Osa boats are usually towed to and from patrol and combat areas in order to conserve wear on their powerful engines, and because of their limited range. They are often refueled at sea, but generally are confined to coastal operations where they could prove lethal to any invading force or convoy. Four Styx cruise missiles are carried on deck in combination hanger/launchers which are loaded at dockside, or at sea from a larger supply ship. The biggest threat to these craft is air attack, so, in addition to their speed and maneuver-

The sinking of this Israeli warship, the *Elath*, with four Soviet-built, Egyptian-fired Styx missiles from an OSA Fast Patrol Boat really put Western strategists into a state of deep concern back in the 1967 Six-Day War. The crew of the *Elath* never saw the enemy vessel!

Speeding along at 38 knots, this OSA is seen firing a Styx missile from its port after hangar. Three multi-row, liquid cooled, diesel radial engines each produce 4,800 hp inside the OSA.



Soviet sailors load a deadly Styx missile into one of four launcher-hangars aboad the OSA.

ability, the Osa boats depend upon four 30 mm rapid-fire AA guns for aerial defense. The guns are fitted in two twin-mounts — one set forward and one set aft — which are aimed and fired by a very sophisticated fire control director. Because these craft were developed expressly to launch the surface-to-surface Styx missile, there is not much space on board for heavy defensive armament. The entire design is devoted to the storage, launching, and guidance. of the Styx missile.

As with the patrol boats of most navies, the Osa craft bear numbers, instead of names; however, the Soviets often give these boats names which do not appear on the craft. Some known names for Osa are: Brestaskii Komsomolets; Tambovskii Komsomolets (No. 85); and Kirovskii Komsomolets.

Styx is the NATO code name assigned to the Soviet surface-to-surface SSN-2 cruise missile. As any model builder knows, a cruise missile is nothing more than a pilotless aircraft, and with a wingspan of only 106 inches, the Styx is little more than a heavy model airplane.

Of course, the idea of a flying bomb is not new, having been conceived, and prototypes built, in the post-World War One years. The German gryoscopically-controlled V-1 "Buzz Bomb" cruise missile of World War Two was the first military application of the idea; however, the absence of a substantial guidance system gave the V-1 little more

Continued on page 77

This aerial view of the Fast Attack Craft-Missile (OSA) shows its business-like layout.

Another loading photo. Note solid propellant rocket booster, guide rails under missile.

Ikon Northwest's Emile Neely poses with his 17-pound, Quadra powered Super Cub. Naturally, it's an excellent plane to learn on. This pic is proof of occasional dry weather in Washington.

BIG BIRDS

By AL ALMAN

HYBRID BOLTS

Betcha thought those "Custom-Made BIG Bird Bolts" presented some months ago were just a figment of someone's imagination. Frankly, I did too . . . till I received a 7 x 10 package from Bill Cohen of Santa Ana, California. With great curiosity, I tore off the plain brown wrapper and found . . . the collection of "REAL" Hybrid Bolts pictured here.

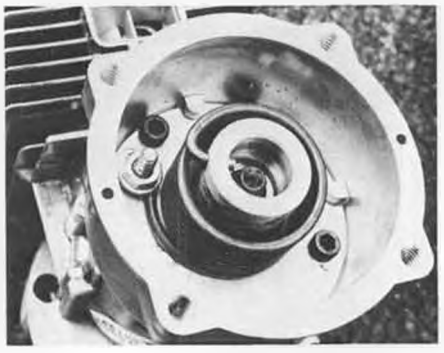
I was absolutely delighted with my new hardware package because these much-needed bolts turned out to be more than one dimensional drawings, and because they're beautifully made and included a few innovations I hadn't thought of . . . like the bolt "for redrilled holes that still don't match" (bottom center), and the "round head for vise grip/pipe wrench torquing" (top right). Surely these two additional computer-designed problem solvers will be of untold value to "professionals" like ourselves, who are constantly faced with the need for nonstandard hardware. With a set of these Hybrid Bolts in his workshop, the discriminating craftsman will never again have a valid excuse for not completing any BIG Bird, regardless of the amount and size of non-precision holes drilled randomly throughout the airframe.

By the way, Bill's BIG Birds are all Old Timers . . . by necessity. His first love has always been free flight, but because he's limited to a wheelchair, he's had to compromise a bit . . . and now flies Old Timers "with R/C assist." Bill's an avid flyer, and having gotten hooked on OTs myself some years ago, I can appreciate how he feels about this kind of relaxed and easy-going flying.

CARDBOARD AIRPLANE ADDENDUM

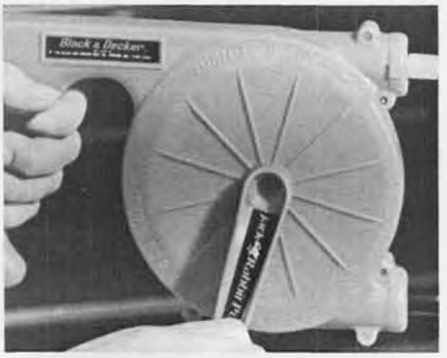
Back in the June issue, Marv Reese explained how to go about building your own cardboard airplane. Although Marv didn't skimp on the details, I somehow left out many of the specs . . . which many of you guys have recently demanded. Sooooo, to keep from getting beat about the ears anymore than I have to, here's the data that should have been included in the June column. . . .

"Mooney No. 1 weighed about 20 pounds with a Quadra, and Mooney No. 2 was 14 pounds with an OS Twin . . . both about 1100 squares . . . and as I recall, about 86 inches in span. Both were fantastic fliers utilizing a nonscale NACA 2417 airfoil with one to two degrees washout and one degree positive incidence with stab at zero."



PK Products Super Starter installed on the backside of a Quadra. Works very well!

No comment!



Black & Decker's Jackrabbit pump. It really puts out the fluids, whatever they may be!

Marv asked that the credit be given to the right person. "Can't you just say that you got the cardboard info from a reliable source? If not, really, Dennis Reichenberger is the 'Cardboard King' in this area. I did it a couple of times, and see the value in it, but doubt I will build many more all-cardboards only because I'm more of a scale fan and find that it takes too much work to hide the corregations, unless I were building a Trimotor. Don't misunderstand . . . I was really proud of that Mooney No. 2, but mostly because I was able to disguise the cardboard to the point that you couldn't tell it was cardboard . . . and because it was another challenge."

Sorry about this, Marv, but I done let the cat out of the bag before I received your second letter. However, for your humble honesty and true confession you will be awarded two and a half "Atta-boys." Hope it makes up for being put on the spot. . . .

"JACKRABBIT"

Too many of us are bent out of shape about manual fuel pumps cuz we haven't found the salvation we've been looking for after switching from electric; these manual units crap out too soon, and/or leak badly . . . and most definitely require a furious amount of cranking in order to transfer the petrol.

All in all, a very sad affair, indeed. But take heart, gang, because here's a product which seems to have none of the aforementioned shortcomings: it's Black & Decker's "Jackrabbit" pump, and although it costs a bit more (got mine on sale for eleven bucks), it *WORKS*. It's no surprise to find out that the Jackrabbit was not designed with modelers in mind, but, in spite of this

Oh no, not more BIG Bird Bolts! We have to admit that they are real problem solvers, however, as most discriminating modelers have used them from time to time, or *wish* they had used them! Would you believe these beauties are patented? Well, neither would we!

Traci Crowe (top) holds Bert Striegler's Giant ROG, a test bed for his imported English Magnum engines. Aluminum tube spars, fuselage. Hawaii's Jim Miura loves R&R Models designs, like this rendition of the Stinger (bottom), 16 lbs of Quadra powered flyin' machine.

oversight, one of the many things it does well is transfer fuel. Need more justification other than it works so much better? Okay, how about being able to change oil in both my TRC and VW van faster and with far less fuss and mess than usual.

That's not all! The Jackrabbit will also spray chemicals, insecticides or plant food, pump water from hard-to-reach places, drain radiators from the top to add anti-freeze, drain lawnmower oil and gas at the end of the season, and fill or drain your aquarium or humidifier.

Of course, all this extra-curricular activity is gonna mess up the insides of your Jackrabbit . . . but all you've gotta do is flush it out with warm water and detergent. You can tailor the crank installation to your particular needs: left or right-hand operation. Another great plus is this pump's ability to *DELIVER*. In spite of the claims made for them, the hand pumps sold in hobby shops require much cranking and are kinda wimpy when it comes to output per turn of the crank. Also, you can rely on the B&D quality! These pumps are well made and stand up to all sorts of abuse . . . and keep functioning.

Naturally you get a complete package: an oil changing tube; a seven-foot discharge hose; a five-foot suction hose; an adjustable spray nozzle; a weight filter (we call 'em clunk filters); and all the necessary hose clamps, O-rings and connectors . . . topped off by a decent set of instructions. Even the orange color has a distinct use and advantage. It's very easy to spot, no matter how messy your field box is, or high the grass may be.

Try a Jackrabbit and find out how nice it is to have an aggravation-free fuel pump. You deserve to have a good time!

AERONCA C-3 "MASTER"

I've been rather surprised at the number of queries about plans for the C-3 "Master." It seems that my bird, the C-3 "Collegian," doesn't have the same draw or appeal . . . although to the untrained eye, both appear to be about the same.

Until my favorite editor gets his C-3 plans finished (gad, it's so nice to know that other people have weaknesses, too), the only readily available plans I'm aware of can be had from Vogel Aviation (Box 54, Bldg. 6, Reseda, CA 91335). I wouldn't call 'em the best set of plans I've ever seen, but they are adequate . . . and anyone with some building experience shouldn't have any trouble turning out their own quarter-sized version of the Master. The plans are blueline

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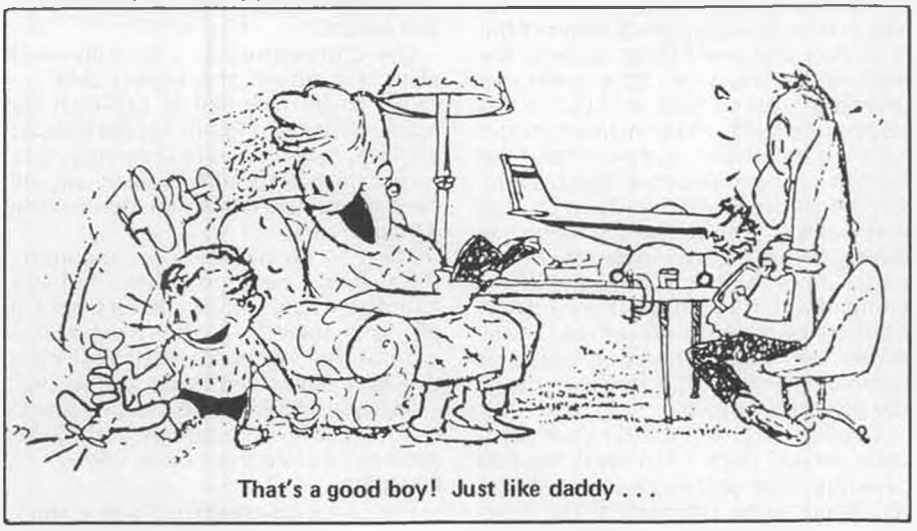
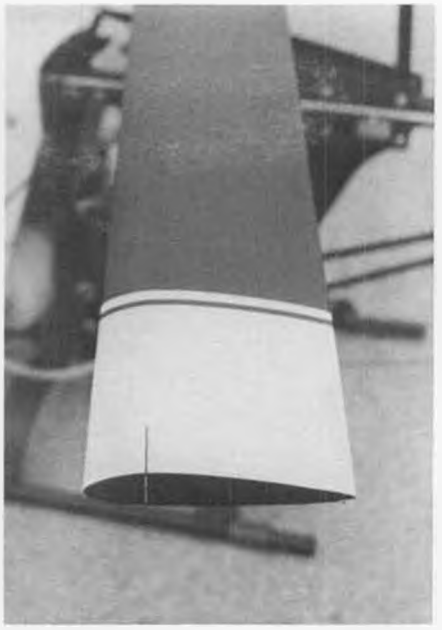


That's a good boy! Just like daddy . . .

The Competitor's canopy is joined by first tack gluing it together with Hot Stuff, then by applying acetone with a Q-Tip along the seam. This method dries clearly and neatly.



The black line on the main rotor blade is a reference point for setting lead/lag. The airfoil used has been carefully selected.

CHOPPER CHATTER

By RAY HOSTETLER
PHOTOS BY AUTHOR

• This month is part two of the GMP Competitor review. If you missed last month's column, try to find an extra issue, or borrow one from a friend. To pick up where I left off. . .

RADIO INSTALLATION

The basic arrangement and installation of all servos is excellent. The laminated servo trays give a very strong base that will withstand any type of crash. The only problem is fitting the wooden trays to the helicopter! The instructions don't say much about all the little slots that need to be made in the back of the trays, so I have given you several photos to help you out in this respect. Basically, you have to cut and try for each installation. For instance, I ran my top canopy mounting block all the way across the top of the tray so I had to drill holes in it to get to the mounting screws. If you use two separate pieces on each side of the tray you won't have to contend with these holes. Incidentally, I used my own basswood rail for canopy mounting. The instructions suggest laminating scraps from the cutouts of the plywood servo tray.

Once the tray is fitted for your particular servos, paint it flat black for fuel proofing, then install all servos. There has been some criticism of the horizontal mounting of the collective and throttle servos by pointing out that the collective servo is too spongy in the rubber grommets when collective forces are applied. (The collective servo is horizontal, not vertical as is "standard".) This criticism has validity, but the solution is so simple that the initial problem won't exist. Simply squeeze a bead of silicone between the two servos at the bottom of their cases. This lets each servo support the other, and a firm servo unit results.

The Competitor has a base plywood plate that allows the battery and receiver to be wrapped in half-inch Sig foam rubber and lightly rubberbanded in place. *Please do not use servo tape to secure the battery and receiver,* you will have an accident if vibration detunes the RX pots.

There is no provision for mounting the switch. I have provided a full-size template which can be cut out from 1/8 ply and bolted to the front frame (photo). This works extremely well, even though I can't claim credit for the idea.

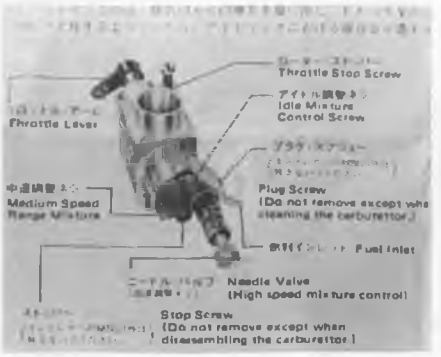
Make sure the RX antenna runs directly out the side of the canopy, and is as far away as possible from other wiring.

CANOPY

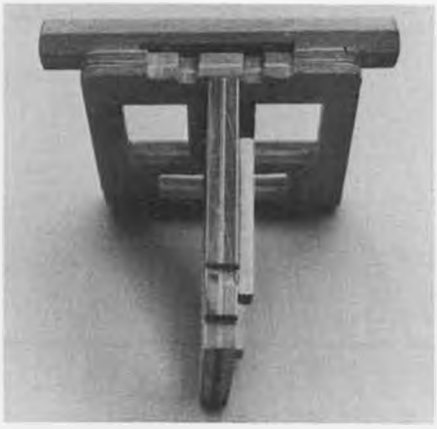
The canopy is made from a nice, thick material. Two halves are joined down the center *a la* Heli-Boy. How to join the halves can be a trick in itself. I would suggest trimming each half so there is about a 3/16-inch flange all the way around. Do this *before* the halves are joined. Scissors or tin snips work fine for this task.

Then, tack the canopy halves together with three drops of Hot Stuff. One on the top rear, one on the nose, and one on the bottom rear. If you use Hot Stuff to bond the entire canopy, it can leave a milky bonding mark along the seam. The secret here is to use some acetone and a Q-Tip. Dip the Q-Tip in acetone, and then rub the Q-Tip along the canopy seam. The acetone will wick into the joint and melt the two halves together with a perfectly clear seam. You can actually see the seam fill up with acetone. Use enough to gradually fill the entire seam. Any excess acetone in the seam will evaporate quickly. I was very pleased with the results by using this method. I'd urge you to try it on the Competitor. It may not work with other canopies made from different plastics, so experiment before you try it on something else.

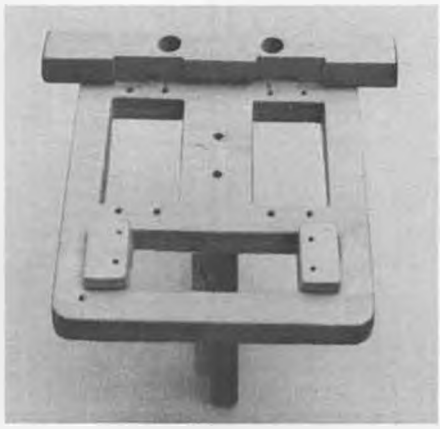
After the canopy joint has completely dried (I'd give it an hour or two at least),



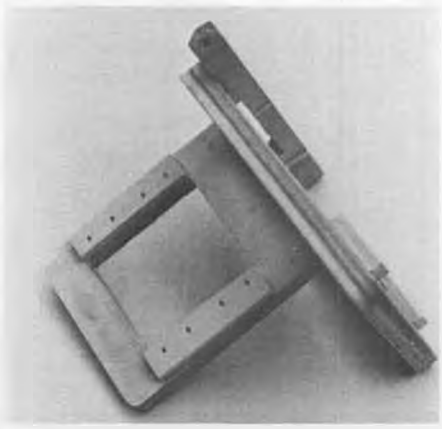
The new O.S. Max 7H carb is ideal for helicopters: has mid-range adjustment.



Rear view of servo tray. Note notches to clear screw heads which protrude from front frame



Top view of servo tray. Note two holes in canopy mounting block, tail rotor servo is slightly elevated.



Side view of servo mounting tray. Gap in the canopy mounting block allows throttle and collective servos to mount farther out.

use a block with 80-150 grit sandpaper to sand the joint so it is smooth and even. Take care here so you don't scratch the rest of the canopy by keeping the block perpendicular to the seam. After the seam is smooth, wash the canopy in warm soapy water before painting. Keep your greasy fingers off the areas to be painted!

I used Coverite's Black Baron Epoxy with excellent results. Didn't even use any primer. First, I sprayed a light mist coat, and let it dry for 15 minutes. Then, I came back on with the glossy coat. Let this coat dry for at least 24 hours, minimum. Don't try to cover the canopy all in one coat, it won't work.

I finished the canopy by trimming it with Gorham's Competitor decals and some striping tape. Sure wish the canopy photo was in color, it really does look sharp. The base coat is cream with stripes (top to bottom) of red, orange, yellow, and a quarter-inch stripe of red.

This method of canopy mounting works well. Use it.

I also used a black plastic dash unit to hide most of the radio gear. I trimmed it to fit, and tacked it in place with Hot Stuff. Then I used clear silicone rubber applied to the joints with my finger.

INSTRUCTIONS

Before setting up, a word on the instructions. The early Competitor instructions were absolutely horrid. I must have had my main frames together and apart three times before everything was right! John himself told me that his feedback had been, "Best flying helicopter, worst instructions. . ." Well, they were correct.

However, in the last month, GMP has entirely rewritten the complete manual, this time covering all the critical phases of construction except static coning. Static coning will be covered in a factory bulletin. Send in your registration card included with each kit to receive the factory updates.

SETTING UP THE COMPETITOR

The old as well as new instructions deal pretty well with setup, although the new instructions are even more complete, giving pushrod lengths from the head down to the bellcranks. This assures a ship to be setup "in the ballpark" to start with. Tail rotor throw and pitch angles are shown very well, along with recommended swash plate movement to the main rotor head.

The part that causes most people problems is something that no manufacturer can do much about. And that is to find the correct arcs on the servo wheel to give the desired pitch angles. This subject would be a complete article by itself. (More on the merchanics of pitch later on.) I detailed the philosophy of collective setup in the March '81 issue of *MB*. You may want to review that article so you understand exactly what you're after.

For the throttle linkage, set the carb barrel at about 5/8ths open at half stick, and the engine should be brought in as soon as possible, i.e. at low stick, low trim, the engine should still idle. At half to full trim, the clutch should engage. This will give you a more constant rotor speed over a setup which kills the engine in full low trim.

I have been pleased with the O.S. Max 7 H helicopter carburetor. I have run it with and without pressure, and personally find it much easier to dial in by using pressure. Without pressure, the engine just doesn't blend together throttle changes with collective movements. In short, the carburetor is much more temperamental to all adjustments

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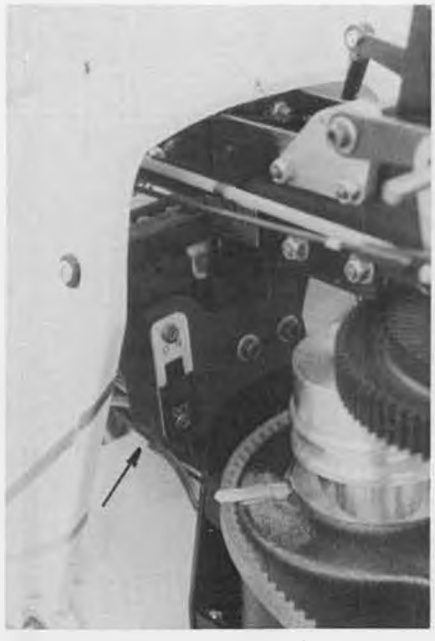
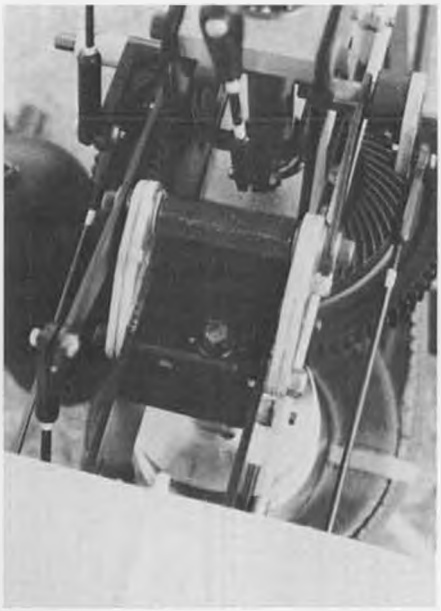
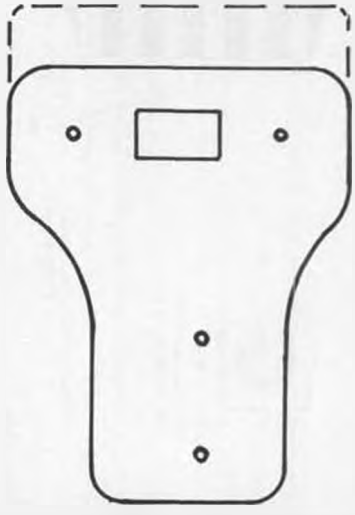


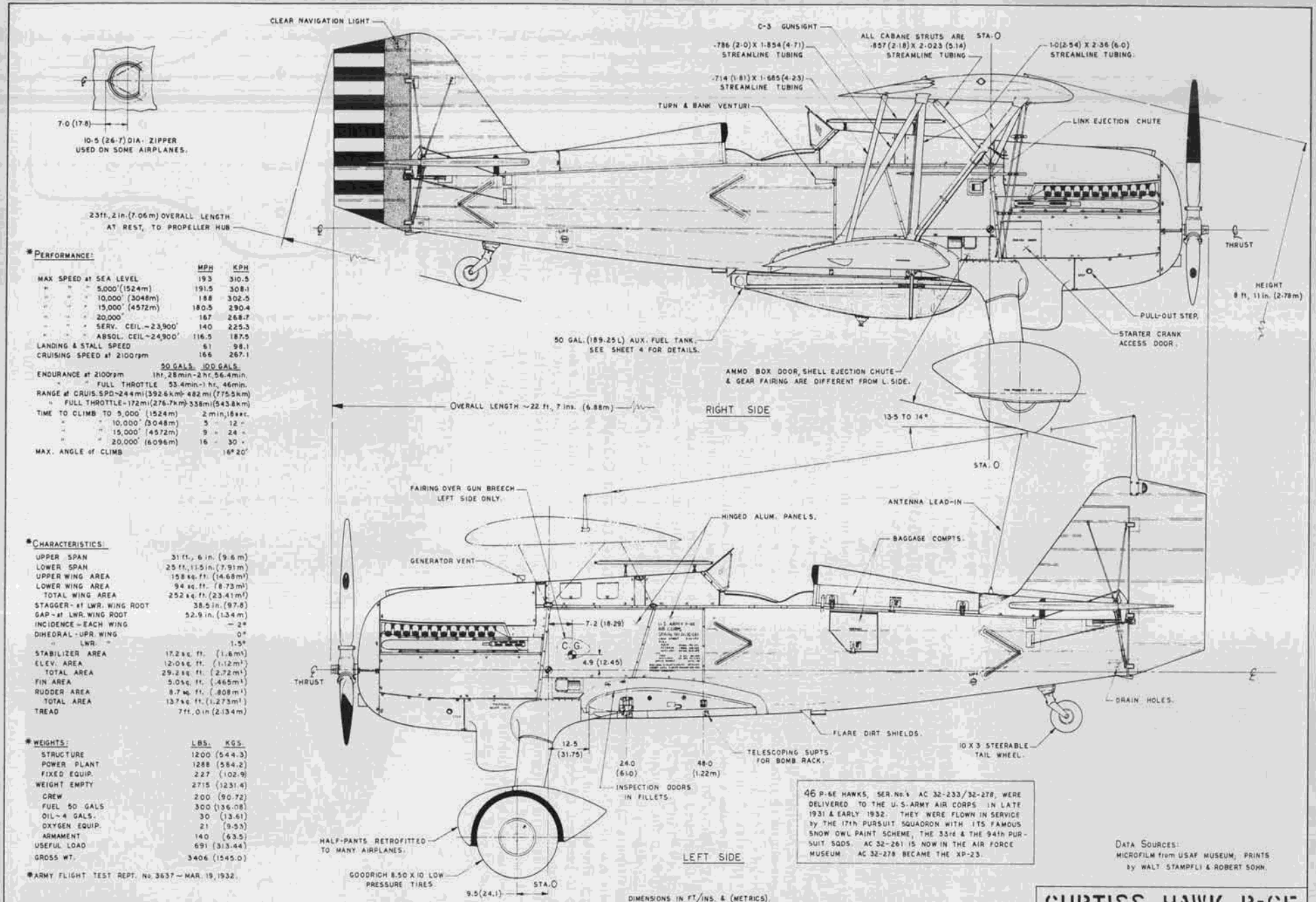
Plywood switch mount (center) is installed to the back of front frame.



Additional aluminum pieces (No. 478) are shown on each side of frame for collective arm support. Author's modifications.



On/off switch mounting plate (full size). May be extended on top to include chrage jack.



*Performance:

	MPH	KPH
MAX SPEED at SEA LEVEL	193	310.5
" " " 5,000' (1524m)	191.5	308.1
" " " 10,000' (3048m)	188	302.5
" " " 15,000' (4572m)	180.5	290.4
" " " 20,000'	167	268.7
" " " SERV. CEIL. ~ 23,900'	140	225.3
" " " ABSOL. CEIL ~ 24,900'	116.5	187.5
LANDING & STALL SPEED	61	98.1
CRUISING SPEED at 2100 rpm	166	267.1

	50 GALS.	100 GALS.
ENDURANCE at 2100 rpm	1hr. 28 min - 2 hr. 56.4 min.	
" " FULL THROTTLE	53.4 min - 1 hr. 46 min.	
RANGE at CRUIS. SPD ~ 244 mi (392.6 km)	482 mi (775.5 km)	
" FULL THROTTLE ~ 172 mi (276.7 km)	338 mi (543.8 km)	
TIME TO CLIMB TO 5,000' (1524m)	2 min, 18 sec.	
" " 10,000' (3048m)	5 "	12 "
" " 15,000' (4572m)	9 "	24 "
" " 20,000' (6096m)	16 "	30 "
MAX. ANGLE of CLIMB		16° 20'

*Characteristics:

UPPER SPAN	31 ft., 6 in. (9.6 m)
LOWER SPAN	25 ft., 11.5 in. (7.91 m)
UPPER WING AREA	158 sq. ft. (14.68 m²)
LOWER WING AREA	94 sq. ft. (8.73 m²)
TOTAL WING AREA	252 sq. ft. (23.41 m²)
STAGGER - at LWR. WING ROOT	38.5 in. (97.8)
GAP - at LWR. WING ROOT	52.9 in. (1.34 m)
INCIDENCE - EACH WING	- 2°
DIHEDRAL - UPR. WING	0°
" LWR. "	1.5°
STABILIZER AREA	17.2 sq. ft. (1.6 m²)
ELEV. AREA	12.04 sq. ft. (1.12 m²)
TOTAL AREA	29.2 sq. ft. (2.72 m²)
FIN AREA	5.04 sq. ft. (.465 m²)
RUDDER AREA	8.7 sq. ft. (.808 m²)
TOTAL AREA	13.7 sq. ft. (1.273 m²)
TREAD	7 ft., 0 in (2.134 m)

*Weights:

	LBS.	KGS.
STRUCTURE	1200	(544.3)
POWER PLANT	1288	(584.2)
FIXED EQUIP.	227	(102.9)
WEIGHT EMPTY	2715	(1231.4)
CREW	200	(90.72)
FUEL 50 GALS	300	(136.08)
OIL - 4 GALS.	30	(13.61)
OXYGEN EQUIP.	21	(9.53)
ARMAMENT	140	(63.5)
USEFUL LOAD	691	(313.44)
GROSS WT.	3406	(1545.0)

*ARMY FLIGHT TEST REPT. No. 3637 ~ MAR. 19, 1932.

46 P-6E HAWKS, SER. No.'s AC 32-233/32-278, WERE DELIVERED TO THE U.S. ARMY AIR CORPS IN LATE 1931 & EARLY 1932. THEY WERE FLOWN IN SERVICE by THE 17th PURSUIT SQUADRON WITH ITS FAMOUS SNOW OWL PAINT SCHEME, THE 33rd & THE 94th PURSUIT SQDS. AC 32-261 IS NOW IN THE AIR FORCE MUSEUM. AC 32-278 BECAME THE XP-23.

DATA SOURCES:
MICROFILM from USAF MUSEUM, PRINTS by WALT STAMPFLI & ROBERT SOHN.

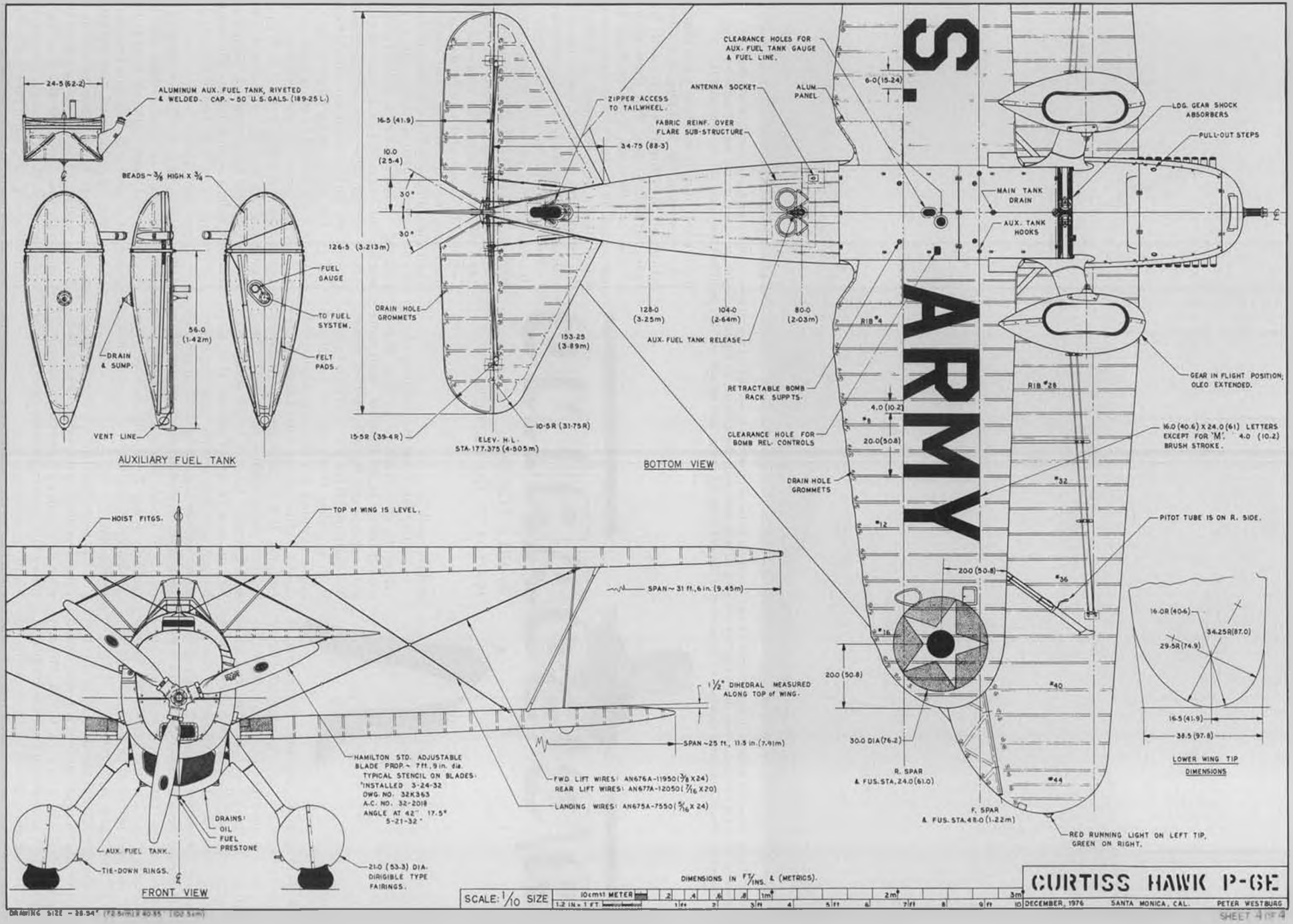
DIMENSIONS IN FT./INS. & (METRICS).

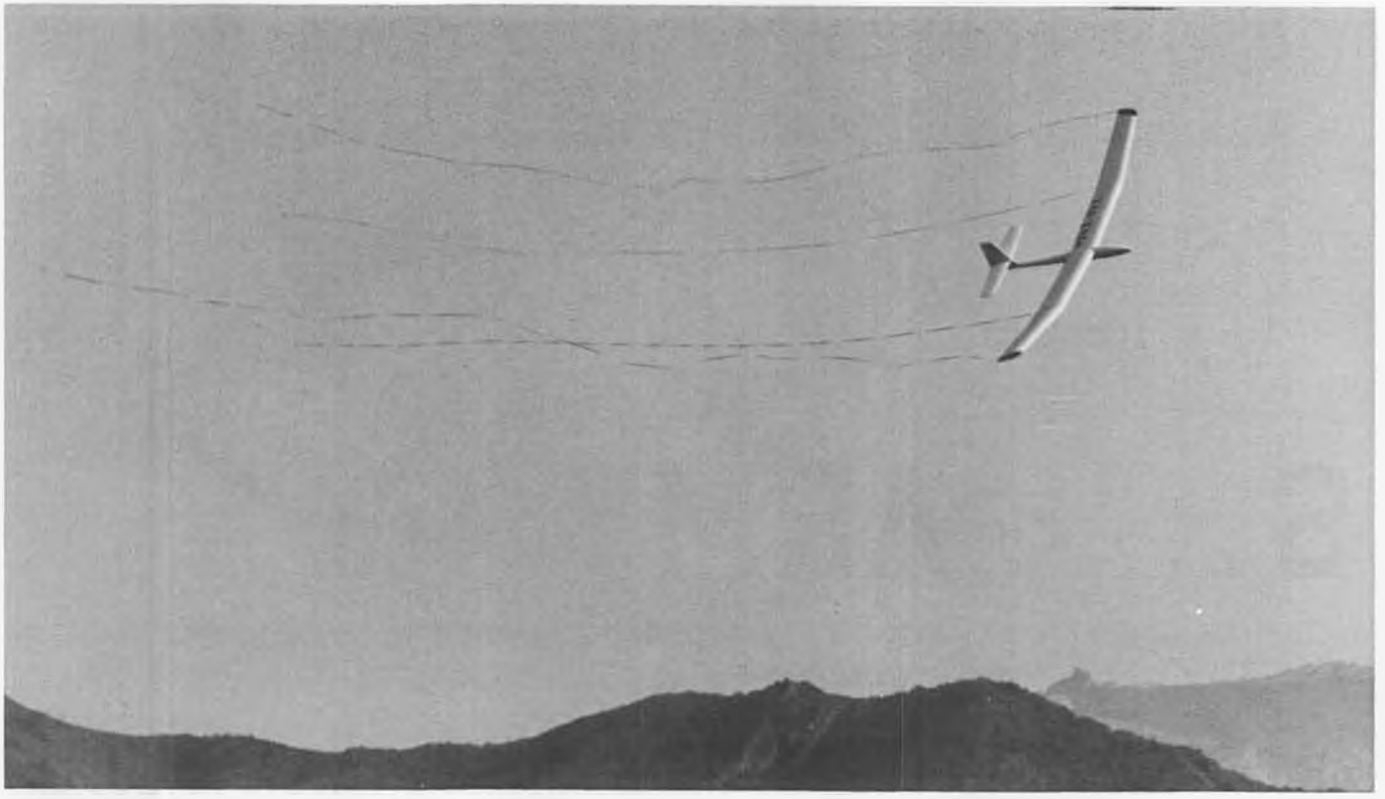
METRIC SYSTEM | SCALE: 1/10 SIZE | 10 cm = 1 METER | DRAWING SIZE ~ 28.54" (72.5 cm) X 40.35" (102.5 cm)

CURTISS HAWK P-6E

DECEMBER, 1976 SANTA MONICA, CAL. PETER WESTBURG

SHEET 1 OF 4


U.S. ARMY
ALUMINUM AUX. FUEL TANK, RIVETED & WELDED. CAP. ~ 50 U.S. GALS. (189.25 L.)
24.5 (62.2)
BEADS ~ 3/8 HIGH X 3/4
FUEL GAUGE
TO FUEL SYSTEM.
FELT PADS.
DRAIN & SUMP.
VENT LINE
56.0 (1.42m)
AUXILIARY FUEL TANK
126.5 (3.213m)
16.5 (41.9)
10.0 (2.5.4)
30°
30°
ZIPPER ACCESS TO TAILWHEEL.
34.75 (88.3)
DRAIN HOLE GROMMETS
153.25 (3.89m)
15.5R (39.4R)
10.5R (31.75R)
ELEV. H.L. STA. 177.375 (4.505m)
128.0 (3.25m)
104.0 (2.64m)
80.0 (2.03m)
AUX. FUEL TANK RELEASE
CLEARANCE HOLES FOR AUX. FUEL TANK GAUGE & FUEL LINE.
ANTENNA SOCKET
ALUM. PANEL
FABRIC REINF. OVER FLARE SUB-STRUCTURE
RETRACTABLE BOMB RACK SUPPTS.
CLEARANCE HOLE FOR BOMB REL. CONTROLS
BOTTOM VIEW
RIB #4
RIB #28
4.0 (10.2)
20.0 (50.8)
DRAIN HOLE GROMMETS
6.0 (15.24)
LDG. GEAR SHOCK ABSORBERS
PULL-OUT STEPS
MAIN TANK DRAIN
AUX. TANK HOOKS
GEAR IN FLIGHT POSITION, OLEO EXTENDED.
16.0 (40.6) X 24.0 (61) LETTERS EXCEPT FOR 'M', 4.0 (10.2) BRUSH STROKE.
PITOT TUBE IS ON R. SIDE.
20.0 (50.8)
30.0 DIA (76.2)
R. SPAR & FUS. STA. 24.0 (61.0)
F. SPAR & FUS. STA. 48.0 (1.22m)
RED RUNNING LIGHT ON LEFT TIP, GREEN ON RIGHT.
16.0R (40.6)
34.25R (87.0)
29.5R (74.9)
16.5 (41.9)
38.5 (97.8)
LOWER WING TIP DIMENSIONS
HOIST FITGS.
TOP of WING IS LEVEL.
SPAN ~ 31 ft., 6 in. (9.45m)
1 1/2° DIHEDRAL MEASURED ALONG TOP of WING.
SPAN ~ 25 ft., 11.5 in. (7.91m)
HAMILTON STD. ADJUSTABLE BLADE PROP. ~ 7 ft., 9 in. dia.
TYPICAL STENCIL ON BLADES:
"INSTALLED 3-24-32
DWG. NO. 32K363
A-C. NO. 32-2018
ANGLE AT 42" 17.5°
5-21-32"
FWD LIFT WIRES: AN676A-11950 (3/8 X 24)
REAR LIFT WIRES: AN677A-12050 (7/16 X 20)
LANDING WIRES: AN675A-7550 (5/16 X 24)
DRAINS: OIL FUEL PRESTONE
AUX. FUEL TANK.
TIE-DOWN RINGS.
21.0 (53.3) DIA. DIRIGIBLE TYPE FAIRINGS.
FRONT VIEW
DIMENSIONS IN FT/INS. & (METRICS).
SCALE: 1/10 SIZE
10cm=1 METER
1.2 IN = 1 FT
CURTISS HAWK P-6E
DECEMBER, 1976
SANTA MONICA, CAL.
PETER WESTBURG
SHEET 4 OF 4
DRAWING SIZE - 88.94" (72.5cm) X 40.55" (102.5cm)



Alex Bower's Tai-Tai sweeps in for a camera pass. Attached to its wing tips are recording tape streamers which very graphically show the presence of wing tip vortices. They mean that air is trying to spill over from the bottom of the wing (higher pressure) to the top of the wing (lower pressure) which translates to a loss of performance. Sound wing tip design will minimize this condition, but never totally eliminate it.

R/C SOARING

By BILL FORREY

PHOTOS BY THE AUTHOR

• If it weren't for big, or important contests on my soaring calendar, I don't think I would get nearly as many airplanes in the air as I do now. In a good year, I will usually crank out two or three sailplanes, many of which last me for years. My latest project is a good example of how contest deadlines force me to work harder, and produce more results. I speak of the Two Meter World Cup, and my new two-meter, which I call the "Goat Hill Special".

(Before Costa Mesa, California, became an incorporated city, it was called Goat Hill. As I live in Costa Mesa, I thought it was an appropriate name . . . unfortunately, my friends thought so too, and this unglamorous name more-or-less stuck!)

I used to be a fanatic builder, often saying to other glider guiders that I would rather build than fly. Well, time and experience have balanced things out quite nicely for me, and now I enjoy both equally. That's not so say that I enjoy building any less than I once did, rather, I enjoy *flying* what I build *more*. Perhaps this is because I'm a better builder today than I was "yesterday," and because what I build today flies better as a result. Perhaps it is also because my flying skills have improved along with my building skills, and now I am less often embarrassed in front of my peers, I don't know. Whatever the reason, flying R/C sailplanes is more satisfying to me these days than it has ever been.

It has been said that a wise man never stops learning. Now, I don't claim to be wise (that's an unwise thing to do), but I never fail to learn something every time I build a model.

I'd like to share with you some building tips this month, as well as a few things I've learned while building the GHS. Some of the things I write will be nothing new to you, but then again, maybe not. Besides, it never hurts to learn another person's techniques, even if you have a better method (and if you do, I hope you will share it with me and with all the other readers of this column).

The Goat Hill Special has a fully-sheeted foam core wing (Eppler 205), ailerons with coupled, built-up rudder, a built-up, all-moving horizontal stabilizer (which is actually a sawed-off Gemini MTS stab), and a molded epoxy-fiberglass fuselage of my own design. The radio I'm using in the GHS is an Ace Silver Seven with which I am very pleased . . . not just because the system works, but because I built most of the system myself. The only prefabricated part of the GHS is its foam core which was cut for me by Mike Bame of Santa Monica, California. The wing span is (of course) two meters. Its area is 660 square inches determined by a 9-1/2 inch root chord and a 7-1/2 inch tip chord. The model's weight is a whopping 56 ounces without ballast which brings the wing loading up to a rather heavy 12 ounces per square foot. Gasp!

Believe it or not, the GHS is no goat! (Har, har!) I am amazed at how well it thermals, and even more amazed at its speed range and L/D. This one smokes! As you may have guessed, this performance, which I will have to admit I didn't expect, is the first thing I want to share with you. Don't be afraid of high wing loadings. What you may give up in minimum sink (and I don't think it's that much), you gain back in ability to cover

Protect wing skins with masking tape; rough shape LE with plane; continue airfoil curve with coarse sandpaper; round LE radius with fine paper. Use shadows to find irregularities. Photo by Kathy Forrey.

Alex Bower's Tai-Tai with streamers. Observers noted that vortices were largest at times when the pilot would pull high-G maneuvers. As aspect ratio increases, wing tip losses become less significant because they affect a smaller percentage of the wing's span. Gary Ittner photos.

ground and find lift.

Enough about what the plane is and what it does, Bill, let's hear a little about what you learned! Okay, here it is.

THE GHS WING

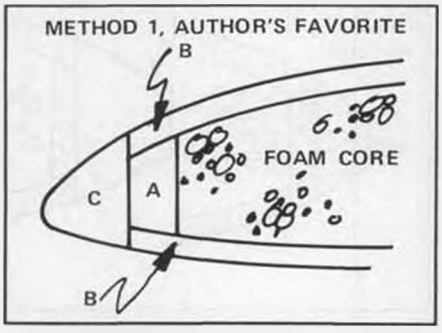
As I said, the "Goat" has a foam core wing, and it was cut by Mike Bame. If the truth must be known, I borrowed the templates from another customer of Mike's (who shall remain nameless) without him knowing it. You see, I was in Mike's garage when these other cores were being cut, and it was very convenient to say, "Hey Mike, cut me some cores with those templates, will you?" Of course, it was very easy for Mike to say yes, after all, he makes a few bucks with his operation . . . and the next day I was the proud owner of two 54-inch F3B cores.

Wait a minute, didn't you say the Goat was a two-meter? Yes, it is. However, it was originally intended as an F3B ship . . . which explains why it has 1/2 by 1/4-inch spruce spar caps on the top and 1/2 by 3/16-inch spruce spar caps on the bottom. Overkill, you say? Perhaps, but I find it strangely reassuring that there isn't a winch in Southern California that will break that spar. Anyway, I took those 54-inch cores and literally broke them off at 39 inches and *converted* them! Normally, I don't waste cores in this manner, but the World Cup waits for no man, and I was out of time to order a set of two-meter cores . . . whack-a!

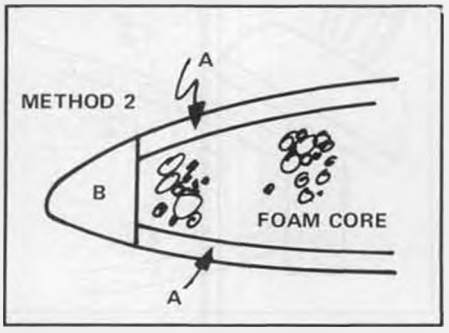
What a learned from these cores is that you should allow at least 3/8ths of an inch at the leading edge for balsa leading edge pieces. The cores I received had room for only a quarter-inch of leading edge material. I find this too little for my method of carving leading edges. (See sketch of Method 1.) What happened is that I ended up with only a 1/16-inch false leading edge (or sub-leading edge, if you please), labeled *A* in the sketch. Normally, I would have preferred 1/8th balsa as this gives a broader gluing surface when applying the 1/16 balsa wing skins and more wood for ding resistance. The 1/16 wood I picked had to be hard C-grain to equal the ding resistance of the normal, soft A- or B-grain wood I would have chosen.

The leading edge width that I ended up with (labeled C in the sketch) was 3/16ths of an inch. In places, this was even less (1/8 inch) due to the fact that the cores had a very slight thinning tendency toward the tapered tip. This lack of LE width caused the glue joints between *C* and the wing skins (*B*) to come very close to the front of the leading edge shape. This isn't good because glue sands at a different rate than balsa, and it is very difficult NOT to get a ridge along the seam. End of lesson one.

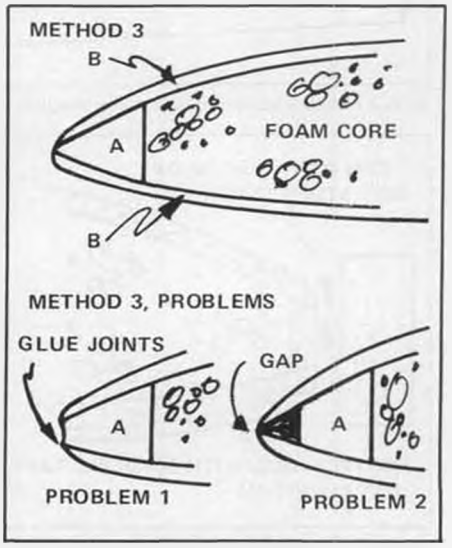
Lesson two was caused more by the change of span from 108 inches to 78 inches, than from poor planning. The original F3B wing was not going to have a tapered spar. For weight reasons, slightly more important in a two-meter, I decided to taper the width of the spar to an almost square 3/16 x 1/4 at the tip. As the



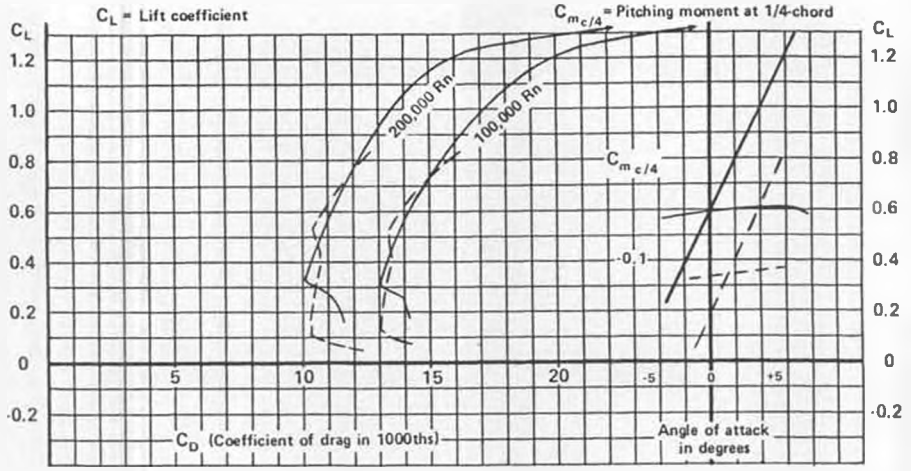
Two-piece leading edge construction method. Easier to get accurate LE this way.



One-piece leading edge construction method. A lot depends on strength of foam at LE.



Method 3 is the most difficult to execute perfectly. Glue joints at LE radius sand poorly.



Theoretical glide polars for the Eppler 214 airfoil. Dashed lines indicate theoretical performance with a flap of 25% chord at -6 degrees deflection (up). Information obtained from *Eppler-Profile 8. Auflage*, available at Wilshire Model Center (see ad).
NOTE: Theoretical data is not always reliable in this Reynolds number range.

E-214 coordinates:

X:	100.0	99.67	98.74	97.31	95.43	93.08
Y:	00.00	0.104	0.422	0.916	1.501	2.139
X:	90.28	87.07	83.51	79.63	75.46	71.04
Y:	2.833	3.576	4.344	5.105	5.841	6.544
X:	66.43	61.68	56.85	51.99	47.14	42.35
Y:	7.207	7.813	8.344	8.776	9.093	9.281
X:	37.64	33.08	28.67	24.47	20.51	16.82
Y:	9.332	9.241	9.008	8.639	8.142	7.532
X:	13.42	10.36	7.665	5.349	3.434	1.934
Y:	6.822	6.028	5.168	4.258	3.321	2.379
X:	0.856	0.210	0.005	0.360	1.326	2.830
Y:	1.465	0.619	0.086	-0.632	-1.087	-1.475
X:	4.858	7.390	10.41	13.87	17.76	22.02
Y:	-1.784	-2.011	-2.161	-2.236	-2.245	-2.193
X:	26.60	31.45	36.51	41.71	47.03	52.45
Y:	-2.086	-1.928	-1.721	-1.453	-1.100	-0.678
X:	57.93	63.40	68.77	73.96	78.88	83.46
Y:	-0.245	0.155	0.495	0.756	0.923	0.994
X:	87.61	91.26	94.35	96.81	98.58	99.65
Y:	0.970	0.862	0.684	0.461	0.235	0.065
X:	100.0					
Y:	00.00					

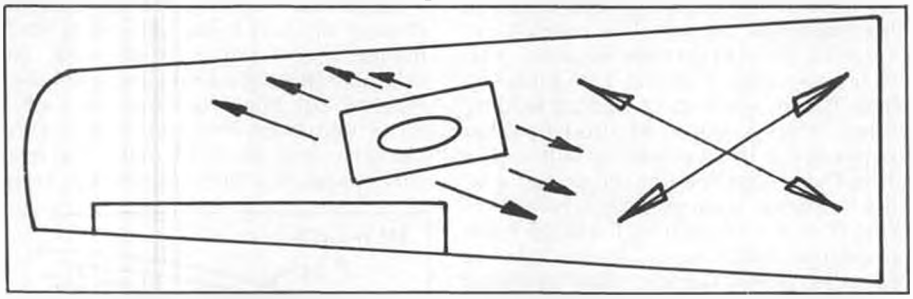
spar channel that was cut by Mike Bame was 1/4 x 1/2 all the way out to the tip, this left a lot of empty air along the length of the spar from a point about ten inches from the root where I began the taper. It would have been a lot smarter to have tapered the thickness of the spar caps instead and increased the depth of the shear webs accordingly, but I was in too much of a hurry and thought it would be faster to taper the width. The net result as actually acceptable, as there is no indication (externally) that there is anything amiss under the wing skins.

Speaking of the wing skins, I was really pleased with the way the Goat's wing skins came out. I don't think the untrained eye or the casual glance could tell whether or not the skins were molded fiberglass or merely plastic coated balsa. The way I contour balsa sheeted wings is very effective. Let me share it with you.

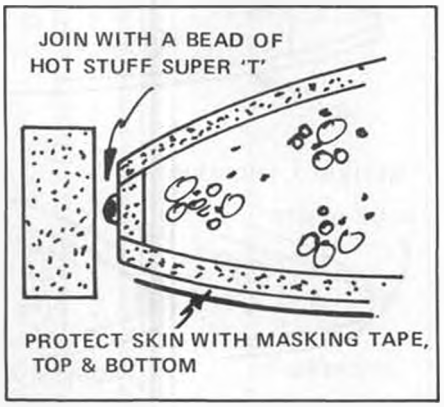
The first step in obtaining a smooth wing is to start out with a smooth sheet of balsa big enough to more than cover the entire wing with enough left over to trim off after the skin is applied to the core. I allow 1/2 inch of overhang for the leading and trailing edges. I don't worry about the tip too much as this usually gets cut off about two inches for the tip block. The sheeting should be keyed to the root of the core so that when it is perfectly lined up, and you let the skin lie down on the core, there is no uncovered foam. To get that smooth surface, you can special order 12-inch wide sheeting from the balsa "factory" (some hobby stores carry this in stock), or you can make up your own, as I did.

I had a lot of pretty light 1/16 balsa sheeting of three-inch width in my collection of wood. I decided to edge-glue three of them together (four-foot lengths) to form the basic skins. Because of my 9-1/2 inch root dimension, I also added some scrap, of which I have tons. The glue of choice was Hot Stuff. Hot Stuff is perfect for this application as it is fast curing, highly penetrative, relatively easy to sand compared to most other glues, and strong! I would recommend using either wax paper or Glad Wrap to protect your table top and to prevent gluing the sheeting to same. Make sure the seams are invisible by sanding them with 400 grit sandpaper and a sanding block. Don't use your hands as a backing for the sandpaper or you will have a grooved or uneven surface when you are through.

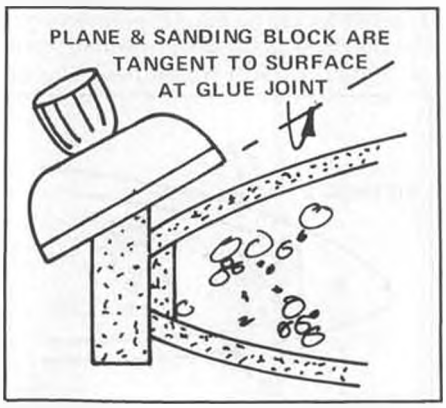
When you have the skins prepared,



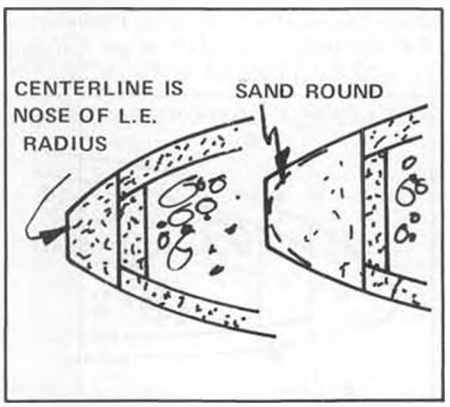
ALWAYS use a sanding block when shaping wing. Stroke at 30-45 degree angle. Use shadows!



Depicts author's favorite method of making leading edges. Don't overdo Hot Stuff!

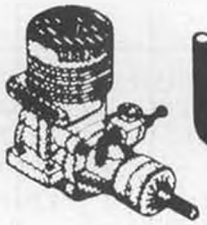


When you feel plane cutting glue at the joint, it's time to get out the sanding block.



Continue curve of wing skin with sanding block. Round off nose with fine grit (400).

FUEL LINES



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

• As a general rule, I am not inclined to merely print reader letters together with my responses each and every month. Nevertheless, there are occasions when the subjects of some letters obviously would have broad reader interest. A couple of those recently came from Chuck Large of Pacific Palisades, California.

Chuck is involved in a variety of modeling events and flying, as well as being a modest engine collector. Without quoting his various letters in detail, Chuck brought up some problems that we all face from time to time. Specifically, and brutally brief, how does one go about preserving, and then later degunking an engine? Or vice versa.

If you've been around model engines for any length of time, you've surely resurrected an engine from one of your cubby holes. Neat! Except, that it almost seems as though someone had epoxied the parts together. Everything's stuck! Right? You *don't* want to resort to brute force . . . please! What to do?

Well guys, I'm not saying that the following suggestion will cure all frozen engines, but it is sure worth a try before mangling the parts with vise grip pliers or what have you.

I found out about these products (from Kano Laboratories) about three years ago. I wish it had been about thirty! At any rate, I suggest that you might want to try some of their products. I won't go into detail about all of them. Rather, I'll highlight one or two, and then tell you where you can get detailed information, and how to obtain the goodies.

Let's start with a product called Kroil. It's a chemical solvent for loosening frozen parts. Kano claims it creeps into spaces smaller than a millionth of an inch! It really does dissolve gum, rust and corrosion. If things are stuck together, use some Kroil . . . according to instructions . . . and the chances are that you'll again be able to turn over your many-years-gunked-up engine with your fingers.

At this point let me add a strong bit of urging. We're all human. If the lable says, "Wait four hours," we usually test things after about *two*. Guys, don't short change the waiting (working) period of the solvent. In fact, I'd suggest you double it as well as the dosage. You can't hurt anything with Kroil.

Here's another of their products: Exrust. It's a concentrated chemical rust remover. Hopefully your engines are not badly rusted. I mention it only because it has so many other applications.

Here are some other products from Kano: *Silikroil:* Kroil with silicone added. *Kreen:* A four-cycle ring and valve motor tonic. *Microil:* Another oil and solvent that also contains graphite. *Floway:* A detergent emulsifier-cleaner for fast removal of dirt, grease and goo from exterior surfaces.

Those are a few of the Kano Laboratories products. They have some six more. If you think any of these products might be of interest to you, write to Kano Laboratories, 1000 Thompson Lane, Nashville, TN 37211. I can't vouch for all of them, but I do know that Kroil works great for freeing-up a long-forgotten engine. Cost? Well you can buy it in 55 gallon drums and really save, but you'll probably be more interested in a gallon can for about $10.00 or even a 10 ounce aerosol spray can for a lot less. I don't think you'll be disappointed.

Now that you've cleaned up those engines, what's a good way to preserve them? Everyone seems to have his favorite product, and I have no intention of getting into a so-called contest about which one is really best. I will repeat what I've mentioned previously in this column, WD-40 and Marvel Mystery Oil both do a fine job. So far, I haven't found a perfect product, but these two do well.

What else can you do to help the preservation process? Simply protect your engines from the elements. Even if you use a preservative, you're asking for future problems if you store your engine in a damp, cold unregulated environment. A couple of years in the typical garage or vegetable cellar simpy won't do it. Even if you're a wine connoisseur, such a storage place won't do. It's too cool, among other things.

Well, what's right? The answer's simple. Where are *you* personally comfortable? Modest temperature, low humidity, no dust, and . . . well . . . just imagine where you'd be very comfortable.

At this point, I feel compelled to unequivocably state that the foregoing conditions, as a practical matter, do not include your *bed*.

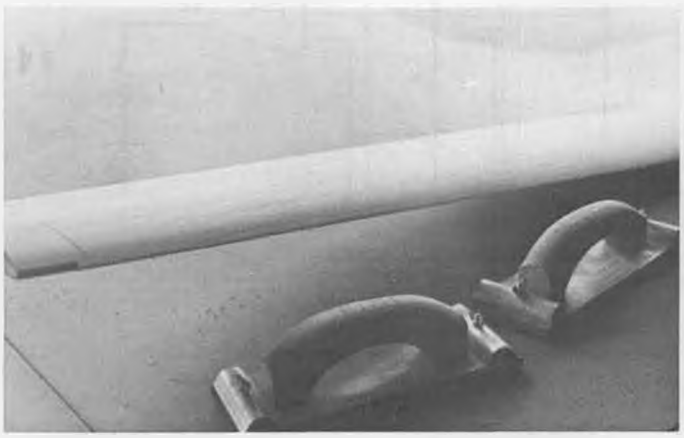
Goodnight guys! •

the next step is to prepare the foam cores. You can do this by very lightly sanding the surface of the cores with 400 grit paper to knock off the "little fuzzies" that are a byproduct of the hot wire passing through the expanded bead polystrene plastic. Do this *lightly* or you will chunk out pieces of foam, or cause the surface to form a rough "tooth" which will prevent a good bond further down the road. Thoroughly brush off, or better yet, vacuum off the surface to remove the dust left behind by the sanding.

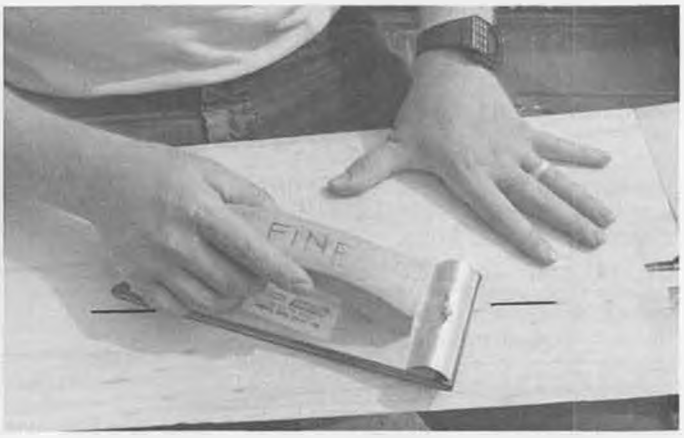
My favorite adhesive for foam cores is Hi Johnson Supertape as it is very light, very tacky, very strong, and reasonably easy to use. You can use epoxy resins if you wish, but that method takes a lot more patience and skill to master. Epoxy is messy stuff and very hard to sand off if any gets on the outside of the wing skins.

The way to use the Supertape is simple. First you prepare the balsa sheeting by going over it once more

Continued on page 82



You really can see any high spots when using the shadow method. If you sand at a 45 degree angle, they will disappear like magic.



Even though it appears that I am not sanding at an angle, I am. The black lines indicate contact area of sanding block. Comfortable grip.

Kraft Systems new "Dual Conversion FM Narrow Band Receiver" and a nine-volt transistor radio battery for size comparison.

SIX-METER FREQUENCIES ACCEPTABLE FOR USE IN AMA COMPETITION
(VALID AMATEUR RADIO LICENSE REQUIRED)
Effective May 1, 1983

Frequency	Channel No.	Flag Colors
53.100 MHz	None	Black & Brown
53.200	None	Black & Red
53.300	None	Black & Orange
53.400	None	Black & Yellow
53.500	None	Black & Green
53.600	None	Black & Blue
53.700	None	Black & Violet
53.800	None	Black & Gray
50.800	00	Black & Black
50.840	02	Black & Red
50.880	04	Black & Yellow
50.920	06	Black & Blue
50.960	08	Black & Gray

The new, numbered channels will use the same type flags as the new 72 MHz channels to distinguish them from existing frequency flags.

Electronics Corner

By ELOY MAREZ

FCC LICENSES FOR 27 AND 72 MHz

You are no longer required to have a Federal Communications Commission license to legally operate an R/C transmitter on those 27 and 72 MHz frequencies on which such operation is permitted. FCC Report No. 17467, dated 29 April, 1983, and entitled "INDIVIDUAL LICENSING OF RADIO CONTROL AND CB STATIONS ELIMINATED," has done away with such a requirement. The commission appears to feel that all necessary control can be obtained through its type acceptance and operating rules. Type acceptance is something that the equipment manufacturer has to obtain before it can market its equipment to you and I, and the manufacturer is further required to include a copy of the operating rules with each system.

What does this mean to you? Well, it means that if you have recently applied for a new license, or renewal of an old one, you'll be getting it back with no action being taken. It means that you won't be required to show an FCC license at the next contest . . . *if* your equipment is on either the 27 or the 72 MHz band. (More about that later.) Obviously, it also means that there is one less thing to remember . . . the expiration date of your present license, if you already hold *(held!)* one.

There has been some word that our AMA is considering some sort of a transmitter registration in place of the now defunct FCC licensing, but as of this writing there is no news one way or another. Frankly, I see no need for such a registration, my AMA license gives me the privilege of participating in AMA sanctioned events, providing of course that I and my equipment meet all other licensing and/or certification requirements. Assuming that we do, AMA transmitter registration would accomplish little, except for giving the AMA and the R/C industry some idea of the number of R/C systems in use in competition. It would not, however, give that type of information for the number of systems actually manufactured or imported, and sold.

What I am concerned about is that this will be looked upon as purely a money making proposition, and we will all be required to pay $10 for a 10¢ piece of paper so that we may fly in a contest. And yes, I know that administering such a project would take people, and money, but I for one am not convinced that the program is necessary. If such registration is something that we simply can't live without, it should be included as part of the annual AMA membership fee, at no increase in cost. If I am to be required to pay for transmitter registration, I feel it only fair that the control line flyer also be required to register his lines and handle, and the free-flighter his dethermalizer!

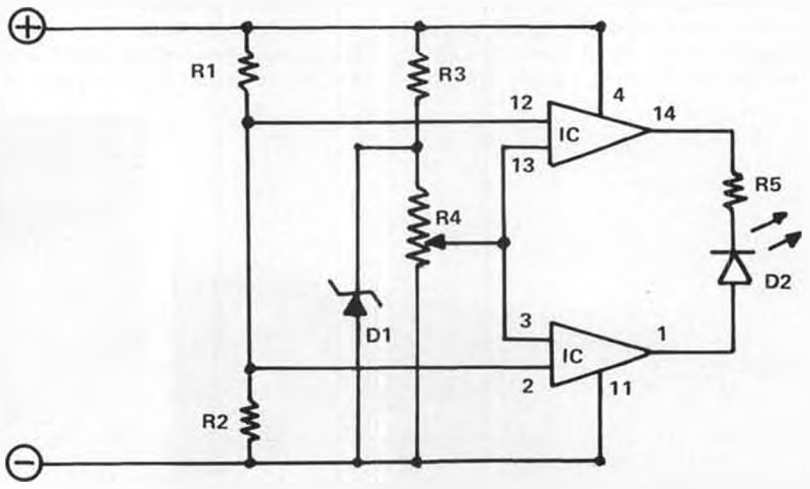
Maybe I am doing our AMA a disservice by writing about this hearsay report, but I have found it is always easier to *prevent* something from happening, than to attempt to change it later.

Anyway, those are the changes applicable to you 27 and 72 MHz fliers. One thing that hasn't changed in the same manner is:

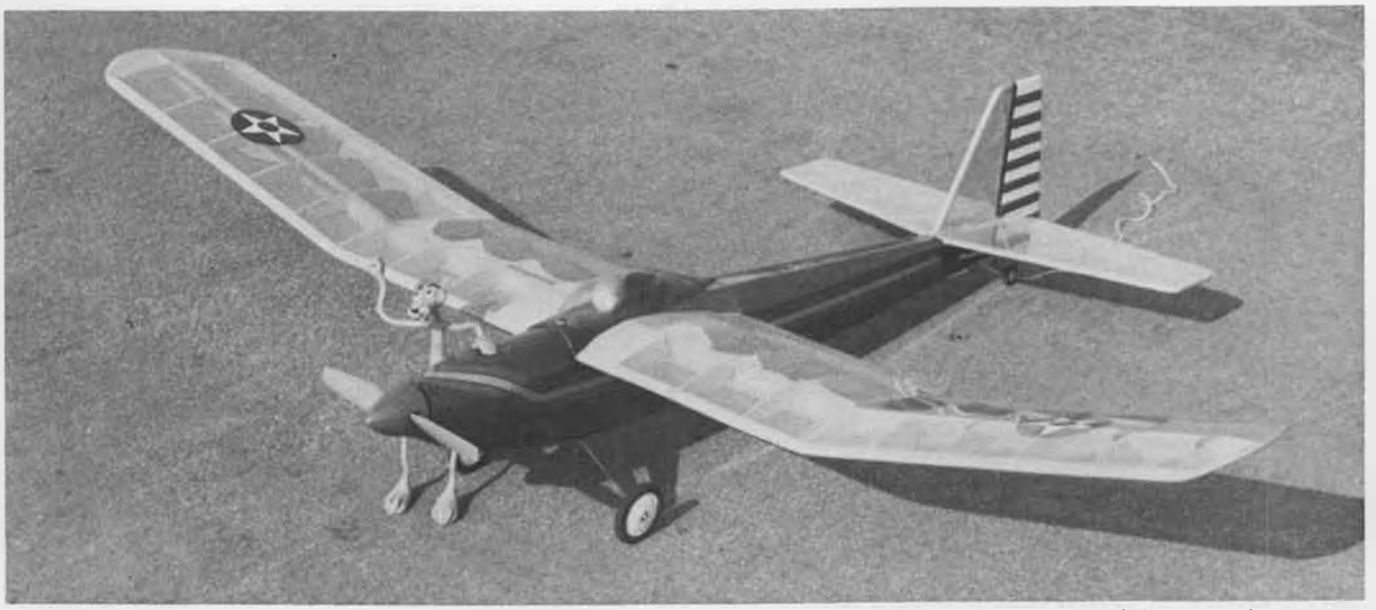
53 MHZ (SIX-METER) R/C LICENSES

Notice that all of the above referred only to 27 and 72 MHz R/C . . . no mention was made of R/C operation on

Continued on page 61



Dual-color LED voltage monitor. Parts: R1, R2 = 39 ohm (1/4 W); R3 = 100 ohm (1/4 W); R4 = 10K trimpot; R5 = 180 ohm (1/4 W); D1 = 5.1 V Zener (RS No. 276-565); D2 = tri-color LED (RS No. 276-035); IC = LM324 (RS No. 276-1711). See text for operation details.



Pseudo-scale Pink Panther waves "hello" to all you sport electric fliers out there who have been waiting for a small (42-inch span), aerobatic sport plane for fun flying at the school yard. If you want a noise maker up front, she'll fly with an .049 to .09 glow engine just as well.

'Lil' WHISTLER

By LARRY JOLLY . . . First of all, this little R/C fun plane is electric powered and is quite a performer with just a simple 05 motor . . . so throw away all those preconceived notions about doggy battery busters. Secondly, the Whistler has a very unusual "history" which we think will stimulate your imagination (and tug at your leg)!

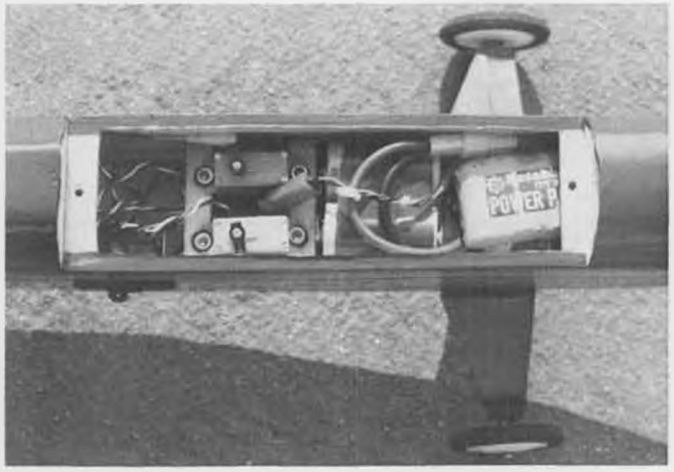
• The Whistler story goes back a long time. My association with the airplane started last year when Clyde Der Taubin sent me a fuzzy photo of his father taken in the early '20s. It seems that Clyde's father was a fighter pilot during World War I; with a name like Clay Der Taubin you can bet he didn't fly for the allies.

Anyway, as history goes, the Germans got a big kick out of sending huge rigid airships over England and dropping bombs on the folk below. As things sometimes go, the zeppelins as they were called, had one very serious flaw, as the United States was the only source of helium, the Germans had to use hydrogen, that's right, the same as in *bomb*. Well, the British soon found that all they had to do was place one glowing bullet into one of a zeppelin's gas cells, and instead of an airship the Germans soon had a glowing Chinese lantern plummeting from the sky. The Germans became very serious over these events and started working on ways to give their airships some protection. Clay and his squadron were soon involved in an experimental program involving parasitic fighters that would go with the airships on their raids, and if enemy fighters were encountered, they would be dropped from the airship, engage the enemy and return to the airship for the ride home.

Well as wars usually go, World War I got too expensive, and the Germans decided to call the whole thing off. As part of the treaty, the allies took possession of the remaining zeppelins; these were divied up between Great Britain and the USA. As it went, the US got Clay Der Taubin and his group.

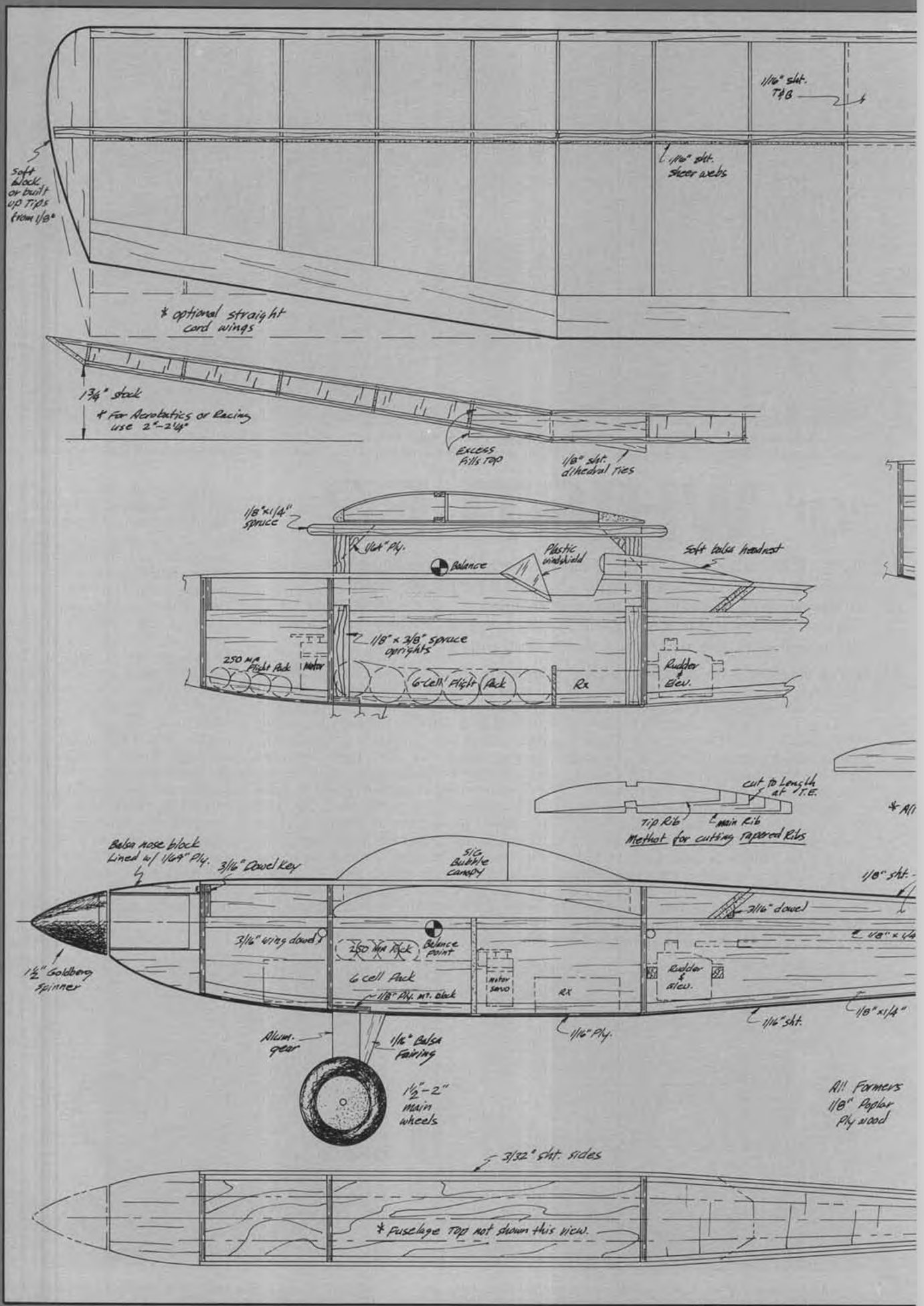
When the US found out what they had, they immediately shipped Clay off to Dayton and slapped a "Top Secret" classification over the entire program. It appears that the Germans didn't want anything flammable in or near their zeppelins. This, of course, left petrol motor powered aircraft out of the running. What the German engineers did was ingenious, in 1917 they designed an electric powered interceptor to be carried in their airships as protection. The picture Clyde sent me is of his father leaning against the wing of his personal aircraft dubbed *Whistler*. Of course, by the time it got to Dayton, it had been refinished in US colors. Unfortunately, the photo is so old that it won't repro-

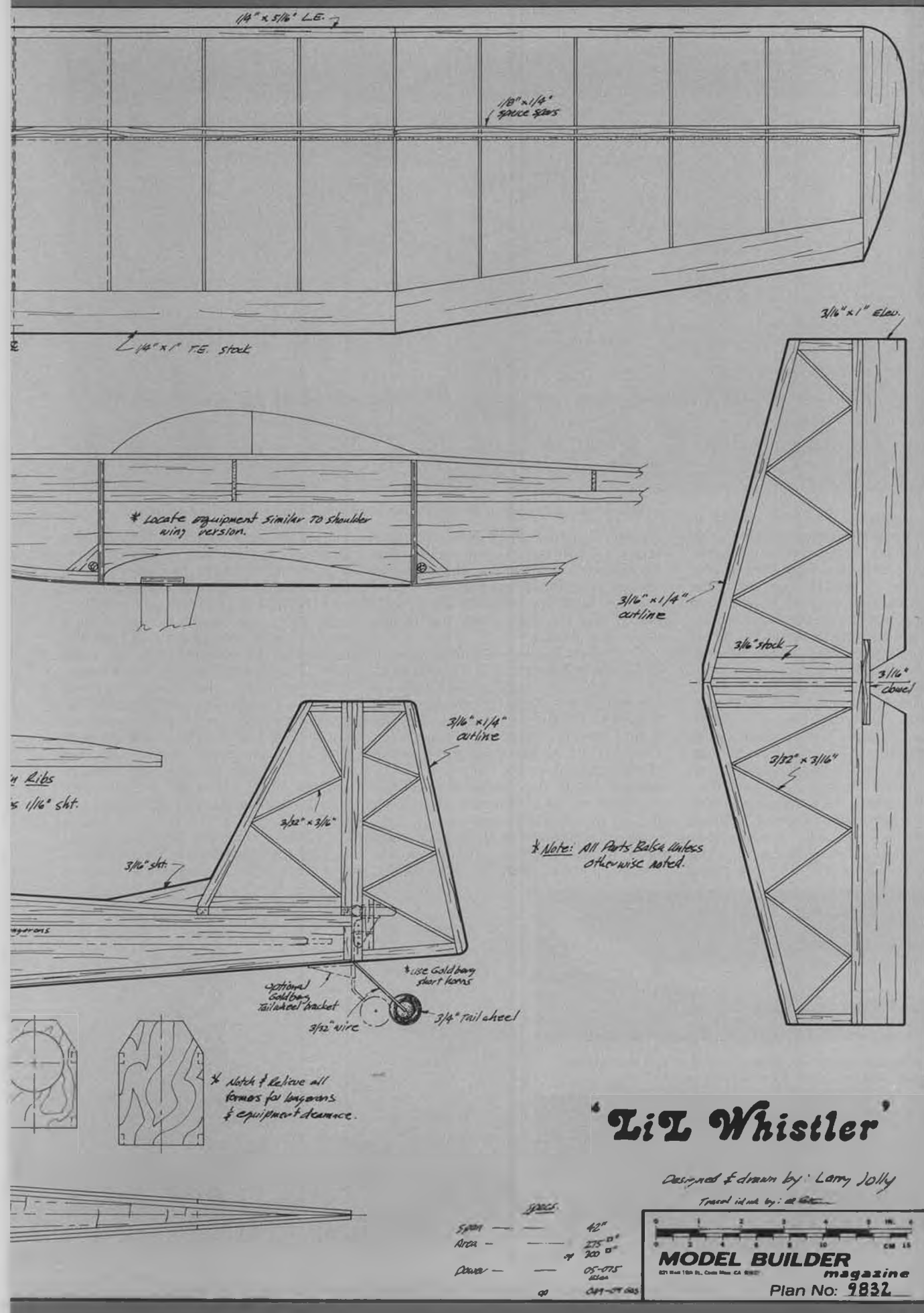
Continued on page 89

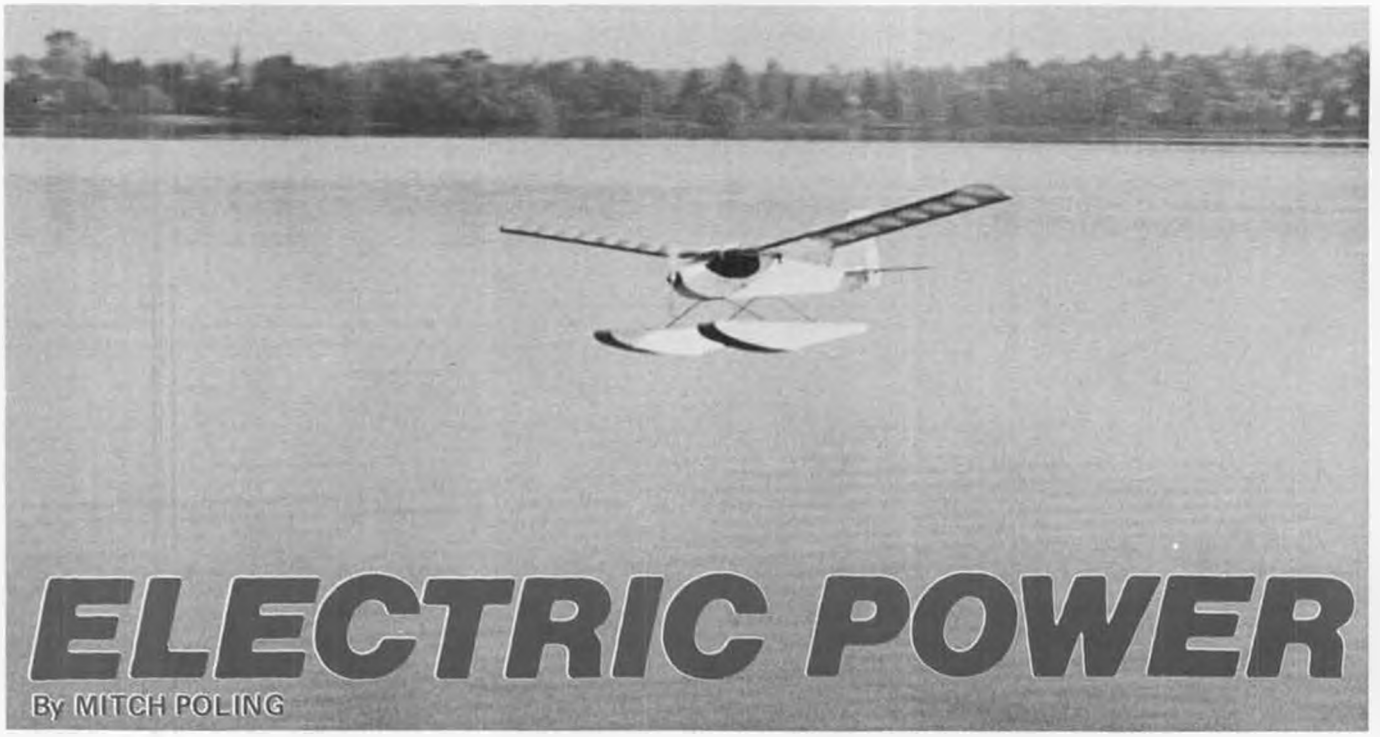


Installation details (l to r): Rx on/off switch, rudder & elevator servos (Novak's), 6-cell motor pack, Rx batt. pack, and lots of wires!

"C'mon, it's easy, I've seen daddy do this a hundred times!" Cherie Jolly may be a precocious child at two years, . . . but *this?!!*


1/16" sht. T&B
1/16" sht. sheer webs
soft block or built up T&B from 1/8"
* optional straight cord wings
1 3/4" stock
* For Aerobatics or Racing use 2"-2 1/4"
Excess fills TAP
1/8" sht. dihedral ties
1/8"x1/4" spruce
1/16" Ply.
Balance
Plastic windshield
Soft balsa headrest
1/8" x 3/8" spruce uprights
250 mA Flight Pack
Motor
6-cell Flight Pack
Rx
Rudder & Elev.
cut to Length at T.E.
Tip Rib
Main Rib
Method for cutting tapered Ribs
Balsa nose block Lined w/ 1/64" Ply.
3/16" Dowel Key
SIG Bubble canopy
1/8" sht.
3/16" dowel
3/16" wing dowel
250 mA Pack
Balance point
6 cell Pack
1/8" Ply. mt. block
Motor servo
Rx
Rudder & elev.
1/8" x 1/4"
1/2" Goldberg Spinner
1/16" Ply.
1/16" sht.
Alum. gear
1/16" Balsa Fairing
1 1/2"-2" Main wheels
All Formers 1/8" Poplar Ply wood
3/32" sht. sides
* Fuselage top not shown this view.


1/4" x 5/16" L.E.
1/8" x 1/4" spruce spars
1/4" x 1" T.E. stock
3/16" x 1" Elev.
* Locate equipment similar to shoulder wing version.
3/16" x 1/4" outline
3/16" stock
3/16" dowel
3/32" x 3/16"
* Note: All Parts Balsa unless otherwise noted.
3/16" x 1/4" outline
3/32" x 3/16"
3/16" sht.
* Use Goldberg short horns
optional Goldberg tailwheel bracket
3/32" wire
3/4" tail wheel
* Notch & Relieve all formers for longerons & equipment clearance.
'LiL Whistler'
Designed & drawn by: Larry Jolly
Traced in ink by:
SPECS
Span — 42"
Area — 275 sq in
200 sq in
Power — .05-.075 glow
.049-.07 ccs
MODEL BUILDER magazine
Plan No: 9832



ELECTRIC POWER

By MITCH POLING

In spite of the early hour (6:30 a.m.), quiet electric flights over water disturb nobody.

• Just a reminder! The KRC contest in Hatfield, PA, is on August 20th and 21st, and the Boeing Hawks contest in Seattle, WA, is on September 18th. Now, if only there were an electric contest in the Midwest, everyone could have one to go to! Both of the above contests, are fun-fly type get-togethers, and both will have an electric clinic to get electrics flying. Don't miss them!

Last month I talked about charging and chargers. Charging is an inexhaustable topic, like downwind turns or motor tuning, but I did leave some ends hanging loose, so let's get them tied up.

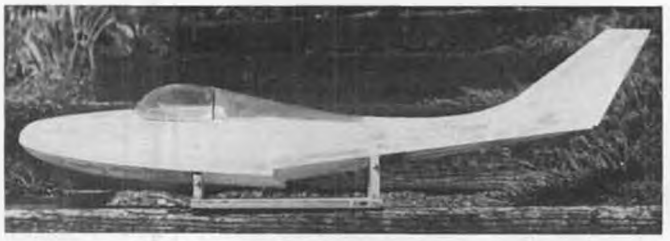
I talked about the effect of the charge current on the voltage peak, and concluded that it did affect the voltage peak. Some chargers have a constant voltage feature to take care of just this problem, but most don't. After I had written the column, I realized that I had no "hard numbers" to show just how much difference a constant current makes, so I decided to run some charge curves and see just what the differences were. I did this for both six-cell and seven-cell packs, and I'm glad I did, the results were educational.

The results for the six- and seven-cell packs are in Tables 1, 2, 3, 4. I used a six-cell sub-C Sanyo pack from Leisure Electronics and started the charge at 4.65 amperes on the Leisure Model 109 digital charger. I kept the charge at, or close to, 4.5 amperes for most of the charge, except for the last two minutes, where, due to the voltage drop in the transistor current controller, I had to let it drop to about 4.0 amperes.

Anyhow, the result was a very sharp peak in the last two minutes of the charge, jumping from 9.7 volts to 10.5 volts at the peak, with about 68 am in the pack. *(The term* am *means ampere-minute and indicates the capacity of the battery pack. wrf)* There is absolutely no way that this peak could be missed!

So much for constant current. How about "set it and forget it"? I set the current at 4.5 amperes (on the same pack) and let it do its thing. At the end of fifteen minutes, the charge rate was down to 3.5 amperes with 63 am in the pack. I reset the timer and charged for another minute, by which time the peak hit, at 66 am total. In the last two minutes of the charge, the voltage jumped from 9.75 volts to 10.25 volts. This is a sharp jump, and again, you can't miss it.

I ran out the pack both times on a Leisure LT05 pattern wind motor with a 6x4 prop. On the constant current



Nelson Whitman's quality fiberglass Shag III hull will soon become a flying boat. Nelson is from Simsbury, Connecticut.

Woody Woodward's 05 powered electric Powerhouse old timer is typical of the interest that's growing in the R/C O/T movement.

The author takes five after an early morning flight. The Aqua Sport 15 weighs 4-1/2 pounds dripping wet, flies like a champ.

charge, I got an initial 12,500 rpm and a 4:40 minute run time. On the "set and forget" run, I got 12,500 rpm and a 4:35 run. Hardly any difference! So, it looks like I was a little more pessimistic than I needed to be on the effect of "non-constant" current. It actually looks very good, which is good news as most of us are not likely to hand-adjust the current for fifteen minutes!

Here is a quick word on am for those who are not familiar with it: it is the ah (ampere-hour capacity) of the pack times 60. Am is a lot handier for electric flight than ah as we charge and fly in minutes, not hours. It also makes it easy to keep a running total of what is in the pack, as shown in the tables. Just keep a running total of the current going into the pack at the end of each minute, and you have a good idea of what you have in the pack. Hopefully it is less than the maximum capacity of the pack!

For those of you with good memories, I have said in the past that the Sanyo packs are 1.2 ah, which is 72 am. You will also notice that I did not get that much in the pack when I hit the voltage peak. I am basically chicken, and the Sanyo packs are my pride and joy, so I hate risking them, and I do stop right at the voltage peak. The car racer types are more daring, and they charge until the peak is passed and starts to fall. I'm sure that they get the full 72 am in! They also use up more battery packs!

The seven-cell pack I used is the Sanyo sub-C pack supplied with the Astro Sport 05 system. By the way, I feel that the 05 sport system is the best bargain around. You get a seven-cell Sanyo pack and a motor that will turn a 6-4 prop at 12,500 rpm (initially), plus run for six minutes (static, on the ground). This will give you ten-minute flights because the motor unloads in the air. The price is $50 retail, though I have seen it discounted at times.

Anyhow, the seven-cell pack turned out to be a very different breed of cat compared to the six-cell system. I couldn't use the digital charger to get a constant current, as it uses a transistor controller to adjust the current, and the voltage during the charge gets too close to the charge voltage for the controller. Another way of saying this is that a transistor controller uses up about .6 volt, and so a charge voltage of 12 volts on seven cells is not enough to keep the current up even with the controller on full.

Initially, the best I could do with that setup was 4.65 amperes, which dropped to 2.0 amperes at the end of the charge, which took 21 minutes. This is all right if you are patient, but I prefer 15 minute charges. This charge run did put in 72 am of charge, and the Leisure LT 50 pattern wind motor ran 4:35 minutes with a Cox 6-4 gray prop at an initial 13,500 rpm. This was very impressive as it ran almost as long as on six cells. This pack did show about 10 percent more capacity than the six-cell pack, probably

Continued on page 65

Splash and go passes are fun with water this smooth. ROW takeoffs are easy with conditions like these.

TABLE 1

The following data was recorded for a six-cell (sub-C) battery pack charged at a constant current rate. All readings were taken at one-minute intervals. The Leisure Electronics 109 Charger was not able to hold the 4.5-amp rate above 10 volts.

Voltage	Current	Total am
8.81	4.65	0
8.77	4.54	4.54
8.87	4.52	9.02
8.89	4.53	13.55
8.94	4.53	18.08
8.98	4.54	22.62
9.03	4.52	27.14
9.06	4.51	31.65
9.11	4.51	36.16
9.17	4.54	41.70
9.23	4.53	46.23
9.30	4.45	50.68
9.43	4.50	55.18
9.67	4.50	59.68
10.30	4.20	63.88
10.45	3.89	67.77

TABLE 2

The following data was taken under the same conditions as Table 1, except that the charging current was *not* constant.

Voltage	Current	Total am
8.64	4.54	0
8.70	4.50	4.50
8.73	4.45	8.95
8.78	4.38	13.33
8.84	4.39	17.72
8.90	4.35	22.07
8.96	4.29	26.36
8.99	4.27	30.63
9.02	4.20	34.83
9.06	4.20	39.03
9.11	4.20	43.23
9.18	4.15	47.38
9.26	4.13	51.51
9.42	4.04	55.55
9.76	3.78	59.33
10.08	3.56	62.89
10.24	3.43	66.32

TABLE 3

The following data was recorded for a seven-cell (sub-C) battery pack charged at a constant current rate. All reading were taken at one-minute intervals. Charging was done with a home-built charger with an adjustable resistor for current output variations.

Voltage	Current	Total am
9.72	4.5	0
9.80	4.7	4.7
9.82	4.6	9.3
9.87	4.4	13.7
9.88	4.0	17.7
10.08	4.8	22.5
10.15	5.0	27.5
10.20	5.0	32.5
10.26	5.2	37.7
10.33	5.0	42.7
10.37	4.75	47.45
10.37	4.3	51.75
10.52	4.4	56.15
10.67	4.3	60.45
11.10	4.8	65.25
11.18	4.5	69.75
11.21	4.3	74.05
11.35	4.0	78.05

TABLE 4

The following data was taken under the same conditions as Table 3, except that the charging current was *not* constant.

Voltage	Current	Total am
10.07	6.0	0
10.10	6.0	6.0
10.16	6.0	12.0
10.22	5.6	17.6
10.24	5.3	22.9
10.27	5.1	28.0
10.34	5.0	33.0
10.36	4.7	37.7
10.40	4.6	42.3
10.49	4.4	46.7
10.50	4.0	50.7
10.56	3.4	54.1
10.70	3.0	57.1
10.81	2.7	59.8
10.92	2.5	62.3
10.95	2.1	64.4
10.98	2.1	66.5
10.98	2.1	68.6

Pattern Flying

By DICK HANSON

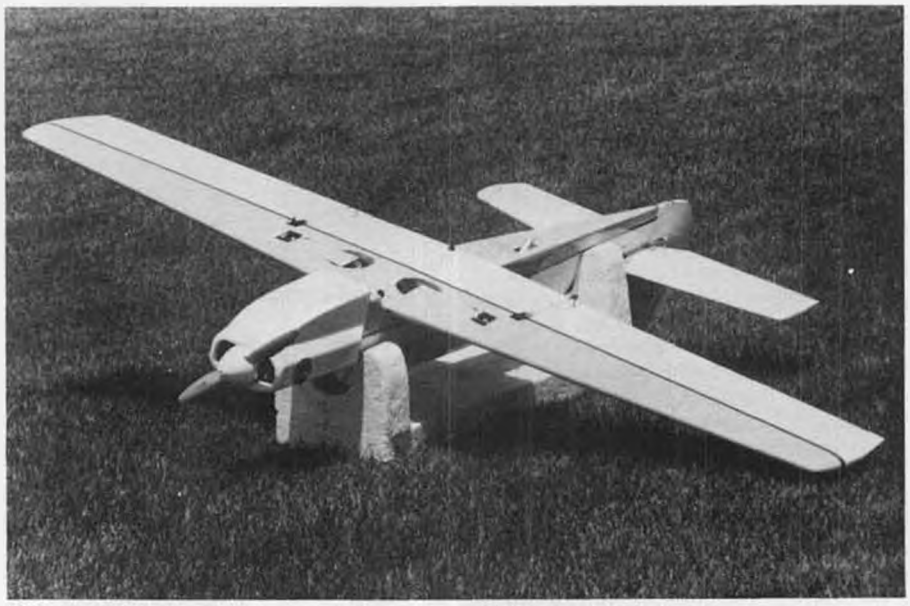
• One of our latest projects is a Rossi Longstroke equipped 825 square inch Dalotel. The above pictures were included this month to show two items that we added as an experiment. The most noticeable item is the addition of landing gear doors. These were added strictly to enhance the scale appearance but as the bottom view shows, they do clean up the wing. The other item was the air scoop which is directed at the radio receiver. We made the scoop from the rear end of a wheel pant half. It's the best use for wheel pants I've found.

The Rossi Longstroke has excellent low rpm power. Ours turns 12,000-plus on standard 12x8 Top Flite propellers. We really haven't sorted things out yet, but it looks like a handmade 12 or 13-inch prop having a pitch of about 10 would work well on an eight-pound model powered by this engine. We are very impressed with it.

During May, we attended a 1/4-scale meet (hearsay!) to see what we could see. The meet was held in Casper, Wyoming, and was absolutely one of the best *organized* and run events we have attended.

The three models we took were 1/4-scale. However, they were all legal, AMA pattern models. The two C.A.P. 21 ships weighed nine and ten pounds, while the 1/4-scale Dalotel weighed 10-3/4 pounds. The engines were O.S. VF gear drive models. The C.A.P.s have 1 to 1.4 gear boxes and the Dalotel was humming along with the 1 to 1.9 box. Propellers used were modified 14x8 Zingers on the C.A.P. models and a standard 16x10 Top Flite on the Dalotel. The 1/4-scale Dalotel has a 1200 square inch wing and I really didn't expect anywhere near the performance that the O.S. delivered. Now it's back to the drawing board for a serious shot at it.

Two new accessories on the market which we have tried are the V-Tech Muffler by Dave Brown Products and the new Perry Pump. The V-Tech works very well and we are adding it to our next project model. It's light and compact, and has the added feature of allowing the exhaust to exit forward of the wing. Our tachometer showed comparable readings on various props such as 11x7, 11x8, 12x6, 12x8, 13x6, 13x8 and was not the least bit tricky to adjust. The test pipe we used for comparison was the new Rossi Longstroke pipe.



The author's latest scale pattern airplane rests belly up to reveal mods to landing gear, namely, the addition of gear doors to "clean up" airflow on bottom surface of wing.

The new Perry Pump is the best pump (least critical) I've ever tested. We tried it on both O.S. gear box engines and experienced solid needle settings throughout the entire flight on both planes. Dave Stuart tried his pump before I tried mine, and we both noted exactly the same characteristics. The settings as outlined in the manufacturer's instructions didn't hold true on the gear box engine. We were forced to set the adjusting nut much richer than suggested. Perhaps the gearbox changed the amplitude of the vibrations which actuate the pumping slug. Whatever the case, the pump works well with none of the horrible mid-range problems associated with some other designs.

For those of you who are contemplating redesigning a model for "Turn Around" flying, I suggest you make two fairly major changes to the typical, current pattern model. First, increase the aileron area. On my faster models, I had been using approximately eight percent of the wing area for ailerons. This has been increased to between 11 percent and 18 percent. Flutter has not been a problem due to the slower flying speed. Also, we use individual servos directly linked to each aileron. This eliminates torque rod wind-up which is a common source of flutter.

The second change is to increase the elevator size. A thick section of approximately 35 to 50 percent of the total horizontal stabilizer is not excessive. It is very important that the stabilizer and elevators be as stiff as a poker. Otherwise, some very nasty results can occur . . . among these are flutter, stabilizer distortion, and unequal elevator deflection . . . all *no-noes*.

Our articles have been rather short for the past few months due to the unbelievably wet weather here in Utah and my bout with a bad leg. Both situations have prevented my attending flying sessions and some contests. However, it looks like fair weather is finally here, and things should return to normal. Of course, the positive side of things has been that there has been plenty of time to build new models while we sit on the floor and listen to the rain. •

Looking for a quick and easy airscoop for your next project? Try the rear half of a wheel pant on for size. This one cools off the receiver! Hey Dick, better get a new receiver!

1. Jack Albrecht holds his latest old timer, a double-size Kerswap. McCoy 60 is potent!

2. Winner of the Bent Prop Perpetual Trophy at the SAM 49 Fall Annual, George Wagner poses with his Powerhouse.

PLUG SPARKS

By JOHN POND

3. For extremely accurate weight measurements in any kind of weather, try this neat sling type setup. Bringgold and Targos.

• The contest season is upon us now, and everyone is wondering what is the latest, winning "hot item." Might as well start off with a description of two meets held on the same weekend, one at Taft and the other at Marysville.

The former is run by SAM 49 and supported by SAM 31, 41, and 26. Up north, the "Hayshakers" Club, SAM 30, opened its annual with support from SAM 21 and SAM 27. Can't say we didn't have enough action!

Weatherwise, things were upside down as the wind really turned on in Taft while 300 or 400 miles north, things were pretty nice in Marysville. With the goofy weather we have been having in California for the past five months, this should come as no great surprise.

As reported by Chuck Thompson, SAM 49 newsletter editor, if you didn't get your flights in before 11 a.m., you might as well have packed it in for the day. It was so darned windy that models could not be brought back once they flew downwind. More than one modeler hiked out in the boonies (*a la* free flight style!).

If the contestants thought Saturday was bad, Sunday was even *worse* with the wind starting before nine. At 9:30, the wind velocity was between 15 and 20 mph. Then it *really* started to blow at 10 a.m. Planes were drifting all over the sky.

Phil Bernhardt was an excellent example letting his model drift downwind. He finally had to ground it to keep the model from going out of sight! It took three fellows, Doc Patterson, Phil and Ernie Payne over a half hour to bring back the various parts. It had to be disassembled in the high wind.

Surprisingly, the same thing happened to Jim Adams with his super streamliner, the Laurie Experimental. However, it took Jim over 20 minutes to accomplish this feat. He could have won Texaco, but the big trick was trying to get the model back to the confines of the field.

What are the boys using this year? Photo No. 1 shows Jack Albrecht with a double-size Kerswap that won Class C for him with the time of 17:22. With the McCoy 60 in it, that model goes like his Torpedo 29 version! Lookout, La Junta!

Photo No. 2 shows George Wagner, newsletter editor of SAM 41, San Diego, with his Powerhouse that won the Bent Prop Perpetual Trophy which is regularly awarded at the SAM 49 Fall Annual. George is one of the spark plugs of SAM 41 who generally shows up for most of the meets.

Photo No. 3 gives the reader the correct method to weigh models with no obstructions to cause misreadings. Seen are Dick Bringgold of the Phoenix Chapter 31 having his Playboy weighed by Contest Director John Targos (SAM 49). Dick failed to place in Class C, but did manage to win the Texaco Event for that day. A real hero in that wind!

About time we ran a shot of Ernie Payne and his new Dallaire Sportster. Photo No. 4 shows exactly that with an

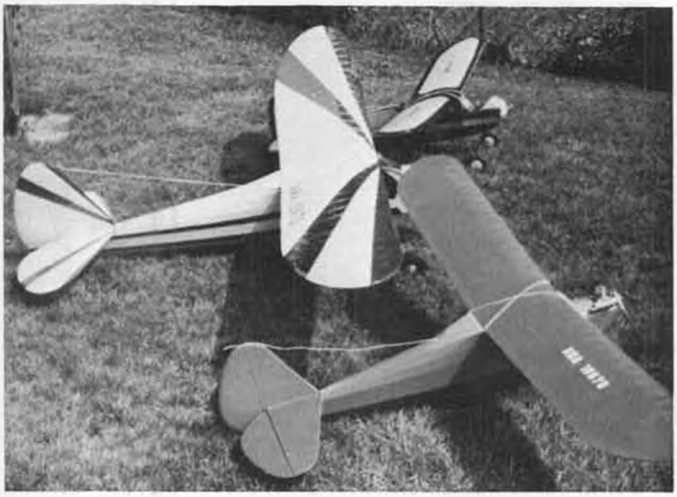
4. Ernie Payne's entry in the Texaco event was this beautiful Dallaire Sportster. OS .60 four-cycle powered.

5. "You tweak the needle valve like this." Ernie Payne gives a few engine running tips to Chuck Thompson.

6. Jim Kyncy congratulates Don Bekins on a job well done. Old timer Sailplane homed in on the field commode, clearing occupant!

7. SAM 30 contest winners line up for a mug shot, then crack up with tireless processor and recorder, Neva Nicholau. Spring Bash.

9. This great little 1/2A Texaco version of the famous Miss Delaware was built by O. Zitnay. Site is Westover AFB, 1982 SAM Champs.



8. Three of Steve Kowalik's models built by Charley Thuet. Top to bottom: Air Chief, Miss Delaware II, Miss Arpiem. Colors!!!

10. Charley Thuet says his Ideal Air Chief is the best darned flier for R/C old timer!

O.S. 60 four-cycle in the nose. This is the most popular combination in Texaco. About the only thing that beats a Dallaire with a four-cycle engine is another Dallaire with a four-cycle engine!

Talking about engines, Ernie decided to give Chuck Thompson a few pointers on how to tweak the needle valve on a Super Cyclone. Photo No. 5 shows Chuck's Lanzo Record Breaker. Note that the wing is off in that gale!

Inasmuch as the wind held down the number of entries and the amount of flying, we'll pass on the results and go on with the SAM 30 Annual Spring Bash.

Nick Nicholau, the sparkplug of SAM 30, writes to report that the club is convinced the Farmers Almanac is the only thing to use for predicting weather. Strange as it seems, while the rest of California was having wind and rain, the Marysville area (Northern California) was experiencing warm weather from Friday to Sunday. As Nick says, when the Almanac says it is going to be fair, the contest is a "go" regardless of what the U.S. Weather Service says . . . Haw-ww!

The thirty-minute max rule used in Texaco proves that it takes a little know-how to register two of them in a row. According to Nick, the unlimited time kills the poor guy waiting on the frequency for the pin. The good air generally disappears by then. Why did the

11. Memories! Dick Korda holds his 1938-39 "Diamond" while standing by his favorite full-size glider. Elgin photo.

12. An early dual carburetor setup for Mel Anderson's boat engine.

14. Now there's a real cutie! Jim Reynolds, SAM "1836", made this 1/2A Berkeley Brigidier for Texaco events. *MB* plan soon!

15. From West Germany comes this shot of a Falke R-5 as built by Erich Punke. Interesting story behind this one, see text.

hot dog come down? No air!

A new gimmick in awards was given this year. The Crying Towel Award was handed to Dave Marshall for trying to hurry his descent after "maxing out". Coming out of a snap loop, the wings parted company . . . goodbye model! The airplane returned in ten seconds, but the half-wing thermaled for 42 minutes! Award No. 1 for the "Crying Towel"!

With competition so hot these days, flyoffs are becoming quite common. The fly off for Class C brought out the best in the boys. Jim Kyncy's model shot up at about 60 degrees while Don Bekins Sailplane (receiver switch off, ha!) barely cleared the ground in low, banking right turn. What should loom up before the Sailplane but . . . the outhouse! We don't know who was in there, but he hasn't been heard from since.

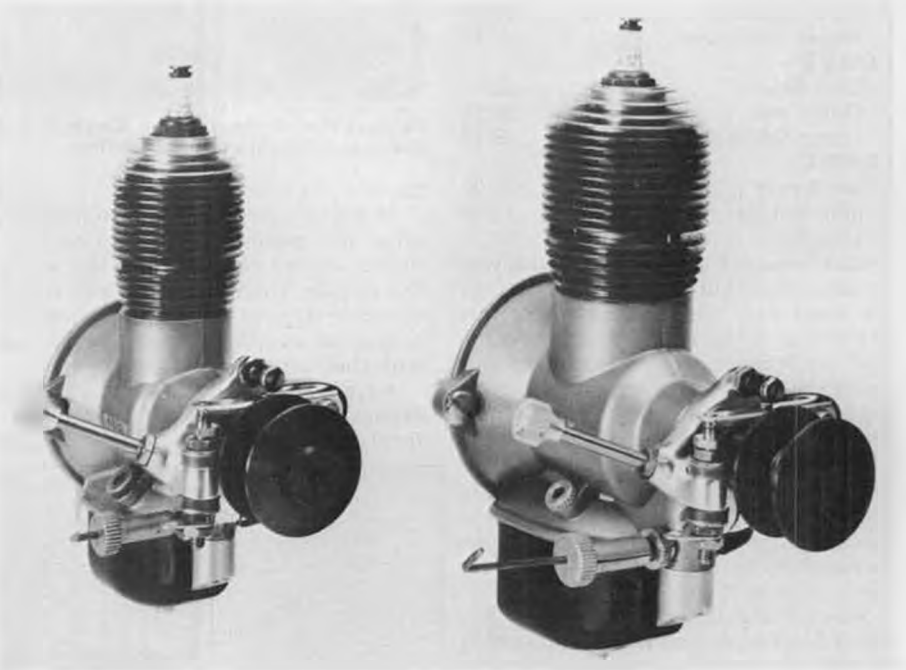
Photo No. 6 shows Class C winner, Jim Kyncy, congratulating Don Bekins for a well done job in clearing out the outhouse. (We could probably put it a little cruder, but you get the idea.) Believe it or not, Bekins repaired the Sailplane and had it flying in two weeks! Anyway, Don received "Crying Towel" No. 2.

This wouldn't be a normal column unless we hammed it up a little. Winners all, lunge toward the camera man in photo No. 7. Front, left to right: Bekins, Neva Nicholau, Kyncy, Vincent; rear: Staben, Solenberger, Schmidt, Pond, and Carll. Note the neat flying field that SAM 30 leases. Sure would want to make you leave the city!

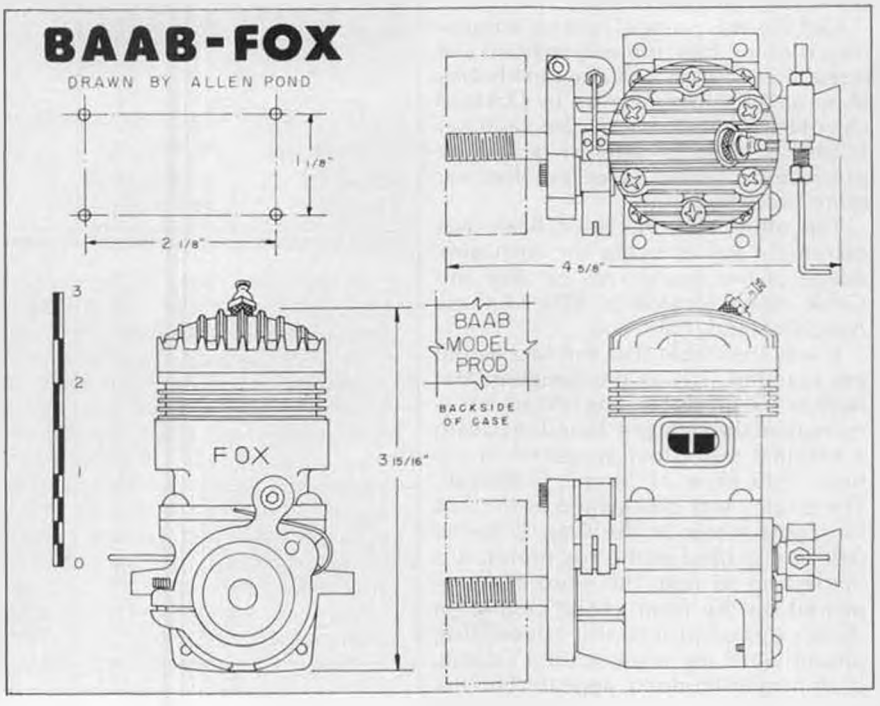
As Nick pointed out, SAM 30 badly needs a "Boo-Boo" award. Jim Kyncy could have won this hands-down as he brought three radios . . . all on the same frequency! Naturally, with everything going wrong, Jim hollered someone was on his frequency. Yep! you guessed it . . . inspection of the transmitters in the impound area showed that one of *Jim's* transmitters was on!

The way Jim was running between the model and his transmitters was hilarious. One wag suggested it might be easier if Jim simply stood by his transmitters and the officials could carry his models to him!

If the Boucher brothers could have been on hand for the electric event, they would have been pleased no end to see



13. At last! Timer assemblies for Arden .09 and .19 ignition engines. Timers are being produced by 77 Products.



the number of electric models flying. No less than *ten* were officially entered! Between Roland and Bob Boucher, electric flying has arrived! Results looked something like this after three separate flyoffs!

ELECTRIC
1. August Fabian 10:46
2. Ralph Ropp 10:44
3. Jim Ogg 9:30

1/2A TEXACO
1. Jim Kyncy 60:00
2. Tom Vincent 59:23
3. Don Bekins 54:45

ANTIQUE
1. Jim Kyncy 30:00
2. Grant Gordon 14:11
3. Loren Schmidt 14:08

CLASS A
1. Don Bekins 15:50
2. Loren Schmidt 10:51
3. Roger Tennyson 7:17

CLASS B
1. Don Bekins 20:47
2. Don Carll 16:56
3. Loren Schmidt 8:32

CLASS C
1. Jim Kyncy 28:00
2. Don Bekins 21:00
3. Jack Alten 13:35

With two such good meets, it truly was a shame that both meets had to fall on the same day. The only comment this writer has is thank goodness the O/T R/C movement has increased to the point where there are plenty of contestants for both!

ENGINE OF THE MONTH

This month's engine is another design emanating from the San Francisco Bay area. The engine described is the Baab-Fox as designed by Cliff Fox and manufactured by W. Lloyd Baab for race car performance.

Resembling in many ways the Ray Snow Hornet engine which was setting all sorts of records for speed and number of wins, the Fox design also had some advanced features seemingly derived by Bill Cubit's Atomic engine.

Cliff Fox was a model race car competitor running cars primarily in Proto and Streamliner classes. Fox also ran a hobby shop at 2915 61st Avenue in Oakland devoted extensively to the race car hobbyists. Also of interest is that he produced a "Proto" race car that was quite successful.

The other half, W. Lloyd Baab, was extremely active, being the managing editor of the model race car *Rail and Cable News* located at 8215 Outlook Ave., Oakland, California.

It was inevitable that the two would get together, Fox as the designer, and Baab as the producer. The first advancement (and the only one found to date in a national magazine) appeared in the June 1946 issue of Model Craftsman. The engine was proclaimed as the first four port motor in the Class C Speed field. Advertised as the Fox motor, it is interesting to note the word *FOX* appeared on the front of the casting (in direct opposition to the advertising photo) while the manufacturer's name, *Baab Model Products*, appeared on the back.

16. Australian *Airborne* editor, Mervin Buckmaster, prepares his Jasco Flamingo for flight. Flamingo is Mervin's favorite old timer.

At this time, we would like to acknowledge the generosity of Karl Carlson, noted engine collector, for the use of this engine. This is really the only way to compare against advertising photos in magazines as articles often take liberties with their air brushes.

Advertised by Baab Products, 1749 Pleasant Valley Ave., Oakland, California, the initial announcement stated "small quantities" would be available after May 30th. The price was listed as $38.00 with spark plug; higher than the Hornet and McCoy 60 engines at $35.00. This, no doubt, led to only one "small quantity" being produced.

In taking the engine apart for measurements, the bore was found to be .9375 inches, and the stroke, .875, giving

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Coronet

OLD TIMER Model of the Month

Designed by: E. Powell
Drawn by: Al Patterson
Text by: Bill Northrop

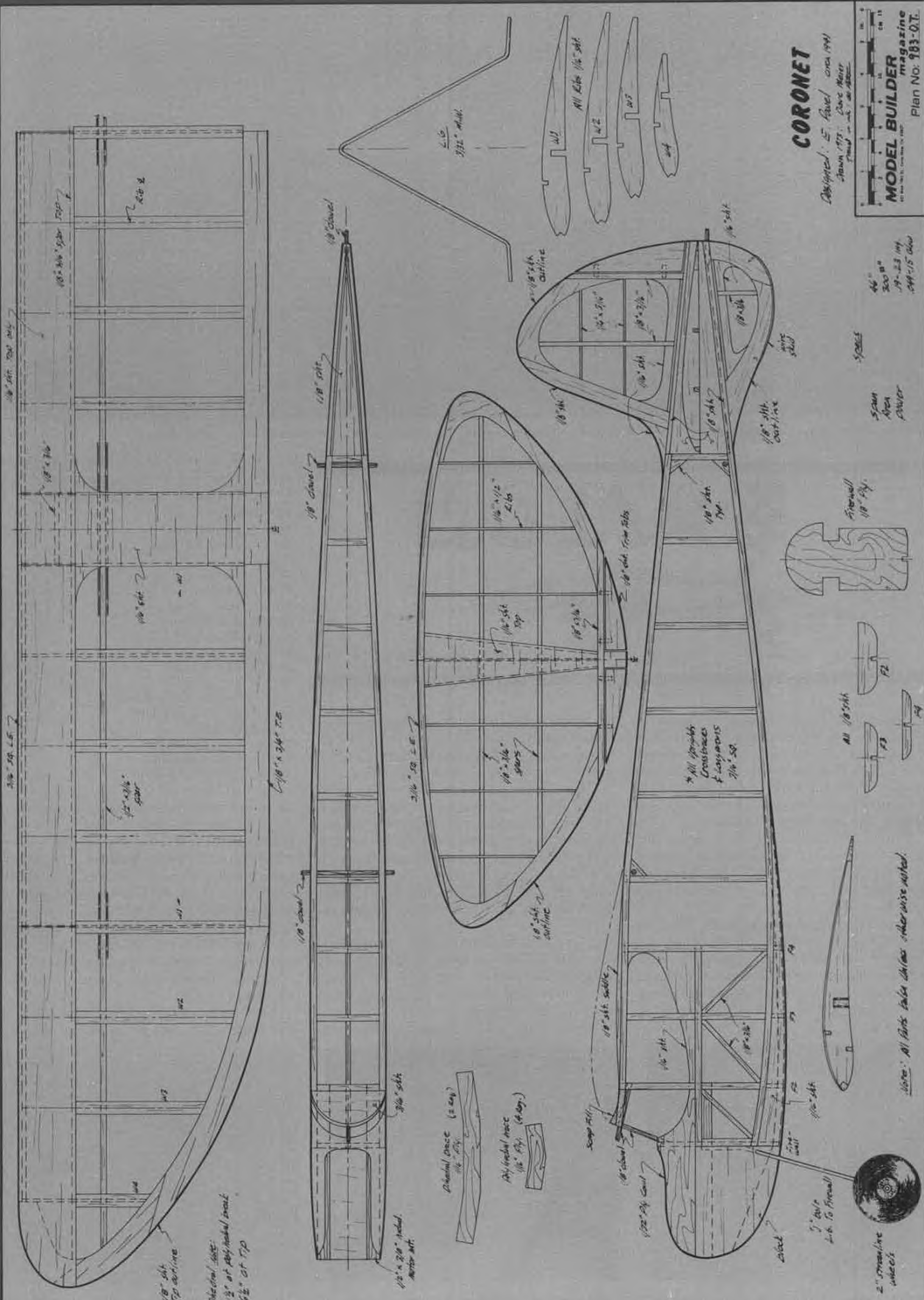
• In the June 1941 issue of *Model Airplane News,* Scientific Model Airplane Company introduced the *Coronet* as "A NEW Gas Model Airplane for Class 'A' or 'B'!" A lightweight cabin style model with a 46-1/2 inch wingspan (300 sq. in. area), the *Coronet* was claimed to have a climb rate of 2500 feet per minute and consistent soaring characteristics. Price of the kit was $1.95, which included a formed landing gear and bracket, finished landing gear clamp, and finished propeller.

Except for nationally known designs, kit manufacturers seldom give credit to the designers of most of their kit models. So it was with the *Coronet*. However, we may have an identity...

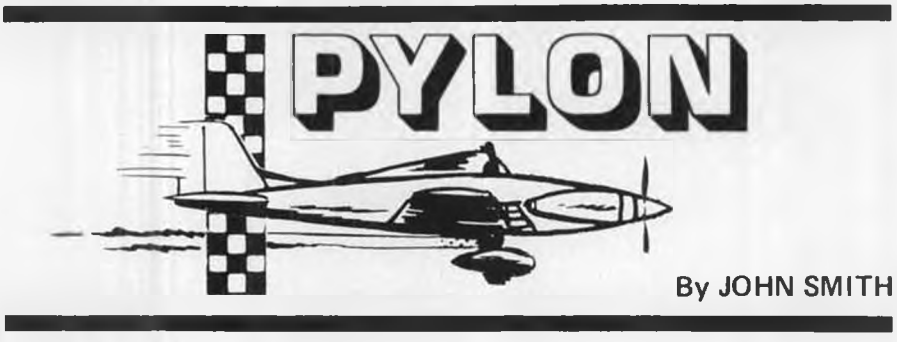
Back around 1975, a fellow by the name of Chuck Gill produced kits for the Taibi *Powerhouse* and the *Coronet*. We still have a sample of the *Coronet* kit, and our O.T. plans were made from the plans in the kit. The title block on these plans indicated that an E. Powell was the original designer. If anyone can enlarge on that information, we'd be happy to pass it on.

The O.T. R/C rule for engine size (.10 cu. in. per 225 sq. in. wing area) dictates a .13 cu. in. max displacement, which puts the *Coronet* in the stock .10 category. We personally don't favor scaling O.T.s up or down to match maximum engine sizes, so would power the ship with an R/C .10 such as an O.S. or Enya.

The *Coronet* is a nice, compact O.T. that will fit in any automobile. •


CORONET
MODEL BUILDER magazine
Plan No: 983-O.T.
Note: All Parts Balsa Unless Otherwise Noted.

Starting line action at the Hampshire County R/C Club's flying site in Hadley, Massachusetts. Formula 1 racer on its way!



By JOHN SMITH

• The pylon racing season is upon us again. Racing here in the Northeast is short-lived because of *cold* and *snow*, two words that racers in the Southwest and West don't often use. Because of this, we don't always have the luxury of bright sun and balmy weather.

The first Formula I and Quickie 500 race of the season to be held at Somers, New York on April 24th was drowned out. That race was to be the basis of this article.

The following week, May 1st, the weather gods smiled on us, and we trekked out to Hadley, Massachusetts for the Hampshire County Air Races (Formula I and Quickie 500). The Hampshire County R/C Club is the only club sponsoring Formula I races in Massachusetts. (Probably because of noise. More on that later.) Their club field is all grass and is situated out on flat farm land right next to the Connecticut River.

The Quickie 500 races are run under PRO (Pylon Racing Organization) rules. This organization was originally started by Bernice Williams and was formed to get workers for racing. In later times it was taken over by Larry Weddle who changed the format to more of a rules formulating and scheduling organization.

The Quickie 500 rules are simple. Any Quickie 500 kit can be used, but the only engine allowed is the K&B .40 Series 4011-8011. This is done to control the speed and the cost.

I won't go into a blow-by-blow description of the race, but will say there were some good close heats and low times. The race results are below.

FORMULA I

PLACE	STANDARD	TIME
1st	Larry Wright	1:41.4
2nd	Don McStay	1:47.8
3rd	Joe Sera	1:31.7
PLACE	**EXPERT**	**TIME**
1st	Tom Castellano	1:12.5
2nd	Bob Wallace	1:17.8
3rd	Pete Reed	1:22

FORMULA 500

PLACE	STANDARD	TIME
1st	Jim Tyler	2:01.3
2nd	Dennis Thibodeau	2:03.8
3rd	Bernice Williams	2:25
PLACE	**EXPERT**	**TIME**
1st	Guy Beaudoin	2:03
2nd	Tom Rebenlau	1:56
3rd	George Denault	2:02.5

In this month's article, I hope to promote two events that are near and dear to me. The first, Formula One-40, was first reported to you in the March 1983 issue of **Model Builder.** This event uses stock Formula I planes with stock K&B .40 Series 4011-8011 baffle piston engines with stock mufflers. These are the same engines used by many clubs for Quickie 500 racing. This gives the racing enthusiast the thrills and great looks of Formula I racing without the noise and expense.

Noise is especially important here in the Northeast with all clubs using some

Author's method of cutting prop blades: drill bit used as a pivot, saw cuts each blade same.

The result of careful set up and execution, these blades are ready for balancing.

After rounding the cut-off edges, the prop requires balancing. This is very important!

Time to relax. Typical between rounds scene.

Pete Reed and Bob Wallace fire up a Formula 1 racer. Ear protection is a necessity.

Pete Reed readies his Formula 1 for battle. (left), while Keith Palmer eagerly awaits the start of a race with Tom Castellano's F-1.

sort of muffler rule, wait awhile! The cost is lower due to not using racing engines, but using only stock baffle piston, .40 sport engines, and club supplied 15 percent fuel.

The second event, Quickie 500, is a simple event for anyone interested in getting into racing. The basic equipment needed is any one of the many good Quickie-type kits on the market which are simple and easy to build; a sport-type .40 engine, usually the baffle piston type; a stock, wood prop; and club supplied, 15 percent fuel. How simple can it be? *I hope it remains that way!*

With all this talk of .40 baffle piston motors, I would like to show you what some of us do to prepare our engines for racing both Formula One-40 and Quickie 500, i.e. K&B Series 4011-8011. This procedure can be used on any .40-size engine.

The first step is to partially disassemble the motor to check (visually) that all is well. As an old friend once told me, the first check is the eyeball check! Check for tiny bits of metal left over from manufacturing.

No matter how careful every engine manufacturer is (Note: all engine manufacturers take great care), there are some engines which occasionally slip by with minute bits of metal left inside. As this engine is to be used for racing, it is best to check. This is also a good time to chamfer edges to remove sharp corners. This can be done with a sharp Uber Skiver or X-Acto knife and a No. 11 blade, or with a carbide deburring tool available at tool supply stores. Do not remove the piston or the bearings as this is not necessary. You will need some cleaning solvent (kerosene is good), a toothbrush, and a few simple tools.

If you own an ultrasonic cleaner, so much the better. If not, or if you can't borrow one, then lift one of your wife's plastic bowls to imerse parts. You will also need a good oil to use when re-assembling your engine. This can also be

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Here's what you'll need to clean that engine of yours: a cleaning solvent (kerosene), small brush, disassembly tools.

No need to tear down an engine any more than this for just a routine cleaning.

At speed, the AMPS 3.5 Tunnel is an impressive sight. Optimum water conditions are wind-chop where its narrow width is an advantage.

R/C POWER BOATS

By JERRY DUNLAP

PRODUCT$ IN U$E — THE AMPS 3.5 AND 7.5 TUNNELS

International Hobbies, 111 East Drake, Suite 7051, Fort Collins, CO 80525, provided this month's "Boat of the Month." It seems like I've been doing considerable reviewing of boats for the last few months. So much so that I'm developing quite a fleet out in the garage!

International Hobbies is perhaps best known as the source for AMPS geared racing outboards. If things go according to what I've been told, I should have one of these outboards to review for a future issue. That, however, is in the future. In this issue, we'll focus on their line of fiberglass tunnel boats for 3.5 and 7.5 outboard engines.

The 3.5 and 7.5 AMPS Tunnels are very similar in appearance. They would seem to be patterned after the Van Der Velden full-scale tunnel boats that are very popular in European full-scale tunnel racing events. Certainly the rear cowl has been given the Velden appearance. The boats are of polyester fiberglass construction and feature a very smooth, high gloss gelcoat finish. The quality of the finish of the two boats I received is such that the only painting required was for purposes of trim. A driver is molded into the back cowl to meet the requirement of a scale appearing driver mandated by the North American Model Boat Association for its tunnel classes. Scale appearance and an excellent finish are certainly qualities found in the AMPS Tunnel boats.

The design concepts used on the AMPS Tunnels was of interest to me. Having designed a few model tunnel boats, I always enjoy finding out what other model designers are doing. Although I don't know this for certain, I suspect that the AMPS Tunnels were the work of someone at Agnew Models in England. Agnew Models provides the lower end housings and gear drive systems used on the AMP outboards. The Tunnels reflect more of the European ideas for tunnel hulls than what has been developed in this country. What I mean by that is the boats are narrower than the popular model tunnels designed here in the States both in tunnel width and overall width. The sponson width is not as wide as we are accustomed to in our boats.

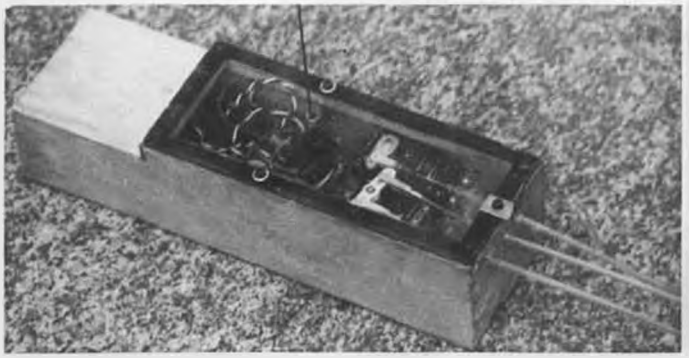
An interesting feature of the design was the inward canting of the tunnel sides. I would guess this was done in an attempt to get the boat to corner without the use of a turnfin. I did attempt to run both the 3.5 and 7.5 AMPS Tunnels without a turnfin. It soon became apparent to me that both boats were unpredictable through the corners without one. The use of a fairly small turnfin on the boats made cornering smoother and much more consistent. The turnfin on the 3.5 Tunnel was mounted 6-1/2 inches from the back edge of the sponson, and the distance on the 7.5 boat was 6-3/4 inches. As the fiberglass is rather thin in the area were the fins are attached, a piece of plywood at least 1/8-inch thick should be glued to the inside of the sponson side to accept the screws used for attaching the turnfins.

Ed Fisher concentrates on his driving skills while Bill Hornell orders two beers . . . or is he counting laps? Rick Grim looks on.

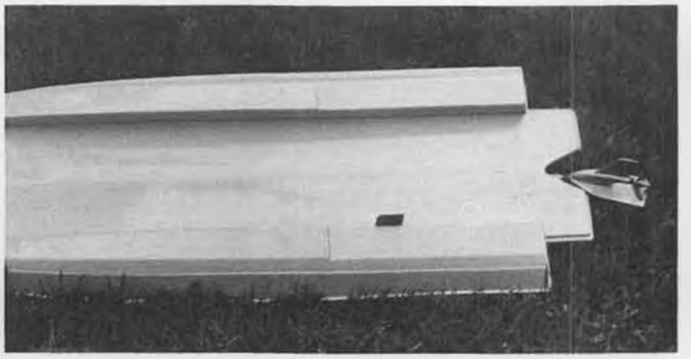
Radio installation in the AMPS Tunnels is accomplished through the use of a removable radio box. There is a wooden radio box designed for use in either boat available from International Hobbies. This radio box kit consists of the necessary plywood, plexiglass, hardwood, blind nuts, and bolts to construct a long, narrow compartment for the radio equipment. The material necessary for linkages must be purchased separately. I used the braided cable running inside a plastic tube method for both throttle and steering. The International Hobbies radio box was used on the 3.5 Tunnel, and a radio box from Magic Boats was used on the 7.5 Tunnel. because the limited amount of space available width wise on both boats, some radio boxes cannot be used because they are too wide. However, there is plenty of room lengthwise, and that is the reason for the required long and narrow type of radio box. To hold the radio boxes in position, simple wooden frameworks were glassed into the boats. Rubber bands attached to small, brass cup hooks hold the boxes in the frameworks.

The plans, instructions, or diagrams included with the boats consisted of a single sheet of paper with sketches of the radio box and engine mounting. For a new model boater, there wasn't much information on basic items like radio hookup, fuel tanks, or running the boat. Although such things are not problems for the person who has put a few boats together, they can be confusing for a new person to this hobby.

The use of adjustable motor mounts is



The radio box kit from International Hobbies. Futaba radio system shown. Braided wire and tubing used for throttle and steering.



The view from the bottom. AMPS 3.5 Tunnel needed a turnfin according to author. Note sponson break.

definitely something I recommend for both of these boats as well as any outboard powered boat. International Hobbies has an adjustable mount controlled by a third channel on the transmitter. I did not have access to this radio controlled mount and used standard adjustable mounts like those available from Prather Products or Teague's Model Marine. I cannot imagine trying to run these boats without this type of mount.

The adjustable motor mounts were attached as high as possible on the transoms. With the longer, lower unit skegs on both the K&B 3.5 and 7.5 outboards it is possible to use higher settings and still achieve acceptable cornering. Raising the engine higher will allow the use of bigger props and also let the engine turn a few more "r's." On both of the AMPS Tunnels, I found that the highest motor setting possible worked the best. However, there was a considerable difference between the two boats when it came to adjusting the motor under, or away, from the transom. In order to achieve maximum performance from the 3.5 hull, it was necessary to use considerable "kickback" on the motor. The mechanical leverage of the motor was needed to fly the 3.5 boat. Just the opposite turned out to be case with the 7.5 tunnel. On the bigger boat, "tuckunder" of the lowerunit was employed to achieve the desired running attitude.

Prop selection proved to be fairly common with other tunnel boats I've run. The Octura X-442 was a good performer on the 3.5 version of the AMPS Tunnel. The J.G. Products E-20 and E-20T also worked well on the 3.5 hull. Although I haven't tried the Octura X-440, I think it would also be very suitable. For the 7.5 tunnel, the Octura X-447 and X-450 did a fine job. The RH-25 and RI-25 propellers from J.G. Products should work well, also.

The 3.5 AMPS Tunnel has been entered in two contests, and I think I've had ample opportunity to observe its performance capabilities. This boat is never going to set any records for straightaway speed. Under normal water conditions, top end speed is adequate, but somewhat less than many boats using the same power source. With the use of a turnfin, handling characteristics while cornering are good. Left turns are not a problem. When flat running conditions prevail, the boat can be flown with the bow fairly high.

Optimum running conditions for the AMPS 3.5 Tunnel appear to be wind-chopped water conditions. Under these conditions, the boat's narrow tunnel width is an advantage. Such conditions often neutralize the advantages of smaller tunnel designs. As rough water conditions create additional lift, the amount of engine "kick-back" must be reduced when running under these conditions. The boat is actually faster when water conditions are rough.

Although I have not had the opportunity to race the 7.5 AMPS Tunnel, it is my belief that it shows more potential for speed than the smaller version. For its size, 37 inches overall length, the 7.5 version is light. At six and a half pounds, the 7.5 hull is less than a pound heavier than the 31-1/2 inch 3.5 hull. This was running weight less fuel. The 7.5 hull was weighed without any type of added paint or trim. The AMPS 7.5 Tunnel displayed very good handling characteristics through the corners when the turnfin was added. Neither of the AMPS boats required much rudder throw and proved sensitive to excessive rudder movement.

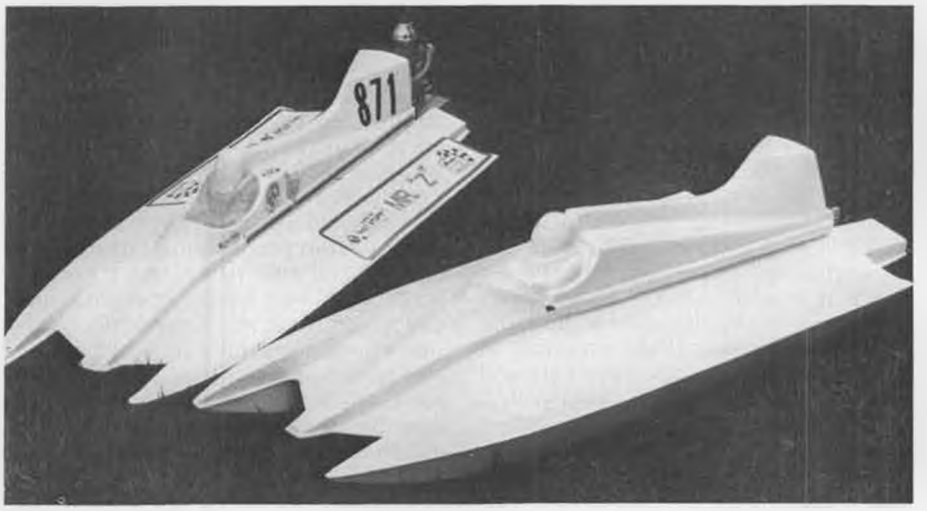
For the model boater desiring scale appearance in a fiberglass model tunnel boat, the AMPS 3.5 and 7.5 Tunnels are most realistic. The excellence of the gel coat finish allows the modeler to save time and effort in preparing the hull for painting. I would rate the competitive ability of the 3.5 version as average, and I believe the 7.5 version has good competitive potential. For those interested mostly in sport running, either boat would be an excellent choice.

K&B 3.5 Outboard with Teague mount (see text). Octura X-442 prop does the pushing.

IMPROVING 7.5 TUNNEL PERFORMANCE

Although I haven't been flooded with letters the last few months, it seems that most of the ones I have received were asking questions about 7.5 tunnel boats.

Continued on page 70



The AMPS 3.5 Tunnel (left) and the 7.5 Tunnel (right) are distributed by International Hobbies, Ft. Collins, CO. Fiberglass construction, drivers are molded into cowls.

PRODUCT$ IN U$E

Look closely and you will see just how wild Willie is! His eyes have that daredevil look in them, and so will yours after a few minutes on the stick of this R/C offroader!

MRC's Wild Willie

By ELOY MAREZ

Seven year old Erin Hayes enjoyed running the Wild Willie, then volunteered for photo.

• By now, we all know how to spell *relief!* Just as well-known amongst the devotees of display and operational models is that *precision* is spelled **MRC/Tamiya**. The name is indeed synonymous with highly detailed plastic and metal models which are assembled from parts and pieces that not only look extremely realistic, but actually *fit*, and in the case of operating models, are engineered far beyond what is expected at first introduction. You can be assured that when the instructions in a Tamiya kit tell you to "secure Part A to Part B with a 4 mm screw," the parts will go together with no forcing or trimming necessary, and the 4 mm screw will drop into its hole without strain or slop. These kits are a pure delight to assemble and to watch grow as you assemble.

The full MRC/Tamiya line includes all manner of vehicles, from a Harley motorcycle to the Space Shuttle, in scales from 1/100th to 1/6th. Many are super-detailed display models, though there is a wide variety of electric-powered vehicles designed to be radio controlled. These include a number of 1/12th and 1/10th-scale race cars and military vehicles, to which "Wild Willy," a tongue-in-cheek version of the latest Willys M38, is the newest addition. Both are a far departure from their original forefather, the venerable World War II vehicle, a 1/4-ton G.P. (General Purpose), from whence came the nickname "Jeep". Wild Willy is a 1/10th-scale kit, utilizing two R/C channels for control, and a five or six-cell, 6.0 or 7.2-volt Ni-Cd battery to power the potent Mabuchi RS-540S electric motor. This combination provides enough drive power for realistic, smooth-surface speeds, and over all types of rough terrain limited only by the diameter of the wheels (approximately 3-7/8ths inches) and your own driving skill. In addition, Wild Willy is capable of exciting, dirt-raising "wheelies", during which it raises its front end up to about 15 degrees and roars off on its two rear wheels. The rear end is further supported by two spring steel wheelie bars which extend from the chassis . . . all under your complete control. Wild Willy's overall dimensions are 13.5 inches in length, 9.5 inches in width, and 10.5 inches in height.

Wild Willy features a three stage forward and reverse speed control, a water and dirt proof radio compartment, differential gear drive, independent single wishbone front suspension, and coil sprung, rigid rear suspension. Oversize wheels and semi-rigid sand tires are standard equipment, including a ball-joint, adjustable servo-saver equipped steering system. The entire vehicle is extremely rugged, with all stress bearing members being of thick dimensions, and having strategically placed ribs and reinforcements. Metal parts are used extensively; the gears are a combination of metal and nylon, and all four wheels are sealed ball bearing supported. All of the crash bars and upper body framework is internally reinforced with metal. The bumper is of extremely heavy construction throughout, and is mounted on heavy springs capable of absorbing the shock of head-ons which might prove destructive to lesser equipped vehicles.

Assembling Wild Willy is half the fun, and requires only careful following of the clearly written, profusely and accurately illustrated instructions. There are

Wild Willie could also be called "Square Willie" because he's only a little longer than wide.

The front end, showing the massive bumper springs, entire front end is rugged enough to withstand shock with little damage.

The rear end, showing the electric motor before protective heat shrink tubing was applied. Wire "feelers" are wheelie bars.

over 400 pieces, which at first glance seems to make it a long and tedious job, but it actually takes only three or four evenings to get the Wild Willy chassis ready to run, plus whatever time you decide to spend on painting the plastic body and Impetuous William himself. All of the hardware is metric; the required Allen wrenches are furnished, as is a very clever and handy four-way nut wrench, a smaller version of the larger, similar tool found in every model flier's toolbox. Even the grease is furnished . . . you will need only those basic tools such as screwdrivers and pliers that all modelers own, plus some light oil and Loctite or similar thread sealant.

All screw, shaft, and parts sizes are noted on the instruction booklet, and can also be found on each parts bag. To speed parts identification and prevent confusion, I found it to be a good idea to place the header card from each bag as it is opened, together with the bag's contents, in individual containers, thus keeping all parts and identification information readily available. There is also a parts page of full-size drawings, with dimensions, which can be used as an additional ID aid if a mixup does occur.

Each plastic sprue is assigned a letter, and each part on the sprue is assigned a number; reference to each part during the assembly process is always by that letter and number. Each plastic part is thus readily identifiable from the clear sketches of each sprue included in the booklet. Painting information for the plastic pieces is also furnished on the plastic parts page, with further color key information being found on the hardware bubble pack.

The tires have a "scoop" tread, and thus must be installed to rotate in a certain direction. This detail is foolproofed by little arrows in the sidewalls, indicating the proper rotation during forward movement.

The fit inside the radio box is extremely close, and has to be done in the proper sequence. The steering servo is installed first, held to the bottom of the box with a length of the two-sided tape that is furnished. Its alignment to the steering assembly is critical, but not difficult. Next, the speed control servo and the speed control assembly are double-taped to the top of the steering servo. The receiver and battery pack go into the rear of the box. The switch is also mounted within the radio box and is actuated through a soft rubber seal. After a couple of minutes to study what had to be done, I had no difficulty installing the components from my old tried-and-true MRC 772 radio into the box. Using one of the newer and smaller road pack radios so popular with electric car hobbyists these days would have eased the chore somewhat, though the requirements and sequence would not change. A self-centering throttle control on the transmitter is required for proper operation of the resistor type speed control. The antenna comes out of the box and is threaded into a plastic tube which plugs into a mating socket in the chassis. The antenna then extends up through a hole in the plastic body.

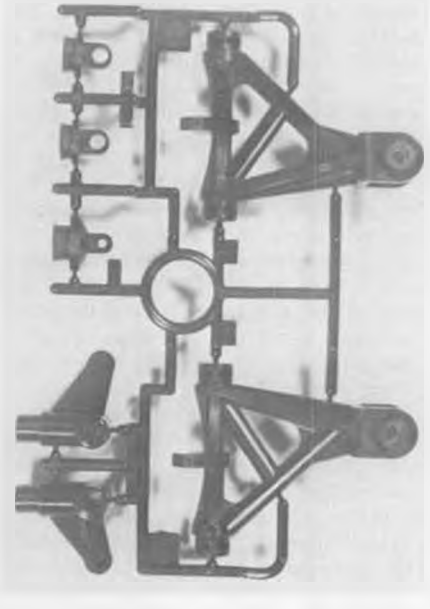
The drive battery is located on a shelf immediately behind the radio box, over the motor/transmission area. There is space for either a five or six-cell 1200 mah pack, though some loss of performance is to be expected with the lower-voltage, five-cell type. All of our testing and running was done with the larger battery.

Obviously, painting the Wild Willy body can be done in any manner desired, though precise instructions are furnished only for the quasi-military

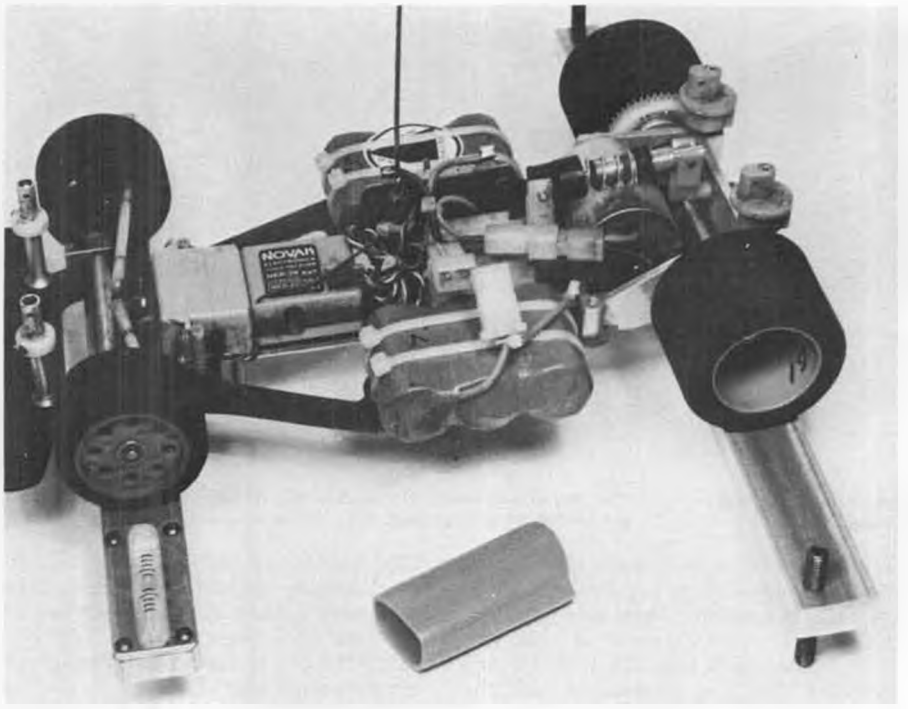
Continued on page 66

Two four-way wrenches: one from my flight box, and one from the Willie kit. NICE!

The best way to organize parts during assembly is to use containers with header card from kit.



Each plastic sprue is identified by a letter, and each part by a number. Easy ID!



Delta's all aluminum tweak board for 1/12 cars allows setting tweak to a tolerance of .002.

Super light wheels from Delta fit Phaser and Super Phaser, and most other 1/12 cars.

Precision cut hobbed pinion gears from Delta. Run smoothly, run forever!

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR

• As promised last month, this column will again deal with the Leftover Special, more accurately known as Associated's 1/8-scale RC150 Club Racer. Before we get into the nitty-gritty concerning this particular car which John Snyder and I are working with, here are a few more random thoughts about the many club racers and their race cars.

This part of the story goes back several years to when I was just starting to race 1/8. I had an early model of MRP's pan car, the one with a Kydex/aluminum laminate pan, 1/4-inch rear axle, drum brake, gray wheels . . . hey, we are talking Dark Ages stuff, OK? Still, at the time it was *fine*, and I had a great time racing it for a couple of seasons, the car then being passed on to my wife, then to my daughter.

In fact, Snyder raced the same basic car all of the '82 season, which ought to tell you something about the durability of a properly cared for 1/8 car. While the car is not currently competitive with top-of-the-line race cars, it still runs well enough (and is reliable enough) to provide one with the sought-after Good Time At the Races.

All of the exciting racing is not done at the head of the field, you know. I personally have had some great times racing for 4th, 5th, and 6th place positions in a main event; all it takes for Good Times racing is a couple of others to race against regardless of main event or position in that main. Anyway, back when I started our local club, 1/8 racing was quite a different scene from what it is today. Large carbs (usually 60 and 60 Pumper Perry carbs) were regarded as needed to get the power to be competitive and, almost unfortunately, there were at least four or five racers capable of driving such an over-powered chassis with some consistency, the most notable being one Bob Welch.

With Bob and a couple of others doing the winning, it was obvious that whatever they used was the way to go. As it turned out, Bob is one of those rare racers with what I call the quick-eye/quick-hand ability, the setup he was racing with was almost exactly opposite to what was best for everybody else! I can still remember Bob slamming his pan car into the 180 at the end of our straight, braking not only at the very last instant, but also using the brake and some tweak to actually throw the car sideways around the corner; as soon as it was pointed straight to the next corner it was instant full throttle and he would be on his way. The technique looked ragged, and it was pretty quick . . . but more importantly, it *looked* even quicker.

New heavy duty servo saver from Kimbrough. Off roaders take note ... and 1/8 road cars!

Few could resist the temptation to copy not only his car setup, but his driving technique as well. What went unnoticed, and may not be at all obvious to you, was how very difficult it was to drive Bob's line. Remember that this was back when Futaba S7 servos were the only way to go, primarily because they were the only servos available that were proven to be reliable in 1/8 cars. But they are also quite slow, even when used with a 5-cell battery pack. Among other things this meant that a racer like Bob was always having to drive way ahead of the car, as it was lagging behind Bob's inputs. With the above example, that meant hitting brakes before the actual braking point, an act most of us can follow fairly easily, but with the car still pitched sideways and rounding the corner, Bob would nail throttle early, *before* the car was straightened out. By the time the servos responded, almost as if by magic the car was in fact headed to the next bend and flat bookin'. He would do this for all the corners, lap after lap, only rarely making a mistake. It was a great show to watch and Bill Jianas is still the only racer other than Bob to show me such skill at seemingly knowing what the car was going to do before it would actually get around to doing it.

And so there I was, wanting to do well in 1/8 racing, and yet knowing full well that I could not drive like Bob. For-

Continued on page 73

Joe Averitt, of Miami Beach, Florida, sent in this photograph of his recently completed Eindecker E-III which he converted to control line from a Nick Ziroli R/C kit. Joe says it's a "fun flying plane". Specs: span, 55 in.; power, ST .60. Easy conversion.

Control Line

By MIKE HAZEL

PHOTOS BY THE AUTHOR

• I feel like I am writing in some sort of vacuum, as I have had no response to my first column yet, but so it is with the necessary lead time for a magazine. I would again ask to hear for you, and I would like to receive any and all of your club newsletters, as I am a newsletter junkie. This month's column comes from the contest report department. While I do not wish to fill these pages with a lot of contest results, the following meet is a biggie, and merits the coverage.

NORTHWEST CONTROL LINE REGIONALS 1983

Control line enthusiasts from the west coast made the annual pilgrimage to the NW's big one in Eugene, Oregon. This is the thirteenth year for this traditional affair, which is held over the Memorial Day weekend. Besides being a mecca for many competitors, there are several spectating modelers who come for the weekend just to watch.

The site is at the Eugene municipal airport, on the local sponsoring club's flying field. The Eugene Propspinners are the prime movers of the meet, but are dependent on other NW clubs and individuals to help put on this affair.

The two-day schedule this year included just about every CL event. It seems that every year or two, something is added; this year, FAI team race was tacked on to the racing roster.

Although it is a two-day competition, other activities make it seem enjoyably longer. Things actually got underway on Friday, when the field received its final manicure, and the participants started rolling onto the site and establishing the "tent city." By late afternoon there were already about ten "households" made up of campers, tents, and travel trailers. Many spent the evening doing some test flying, and some fun flying.

Saturday morning saw very nice, clear, and warm weather. In reality, it was unseasonably *hot* for the area, with the high temperatures reaching into the 90s.

The first of the racing action was kicked off with the Goodyear event. Oddly enough, this event is now held for the out-of-area competitors, as it is now a dead event in the NW region. All of the eleven entrants were from either California, Utah, or Canada.

The first place winner was Jeff Hollfelder, who teams with Tim Gillott. The

The folks in Tacoma, Washington really know how to fly combat! Party time!

"Ridiculous Rich" Porter appears to be biting off more than he can chew of his double-size Voodoo. Webra .60 power.

time turned for the 140-lap final was 5:58.4. The plane design was a Shoestring, and was powered by a Rossi MK II, reworked by Gillott. A homemade graphite prop was used, and the fuel was Sheldon's 70 percent. An interesting point about the plane itself is that it was built back in 1969, and has flown in *eight* nationals! It showed evidence of having been modified and touched up, which is very understandable for a plane having flown for hundreds of miles. It was also noted that a pressure fuel filling system was used on this plane, *a la* FAI team race.

Over in the combat circle, Slow Combat was being flown. At this contest, all of the combat classes (except for 1/2A) are flown double elimination. This means lots of match activity for the pilots and the spectators.

Jim Womack came out on top of this event. He used an original 500 square inch design powered by a G-21 Tigre .35 with an extended intake to get him through the preliminary matches. For the final match, he used a Flite Streak with the same power plant. Event director Gene Pape noted that the final match between Jim and Phil Granderson was probably the best match of the day.

The carrier deck was seeing action with all three classes being flown. First place in the profile class went to Bill Skelton. He flew a Bill Melton designed Guardian. Power was by an ST 35, which he fitted. Other details included a 9x7 prop, Sheldon's fuel, K&B R/C glow plug, and a uniform tank.

The most interesting entry was by

Charlie Johnson (left) watches John Thompson and Bill "Kill" Varner prepare planes at Redwood City combat meet.

Would anyone care to identify this plane? (Hint: check out the initials on the fuselage.)

Wayne Spears. His design, called the Triple Turkey, was modified from a Mo-Bipe, with the fuselage cut off at the front, and rebuilt with the engine in an upright position with the tank immediately behind it. Carrier planes seem like they have lots of gadgetry, and this one had about all of it. The top wing had a full-length flap, and the lower wing had ailerons. Where you would expect to see wing struts, he had a sheeted area which gave the airplane a box-like appearance. The plane also sported a pop-over rudder for low speed flight.

Meanwhile, back over in the racing circle, it was time for Rat Race. The winner was Tim Gillott, using his famous Shark design with a K&B 40S. The plane was pulled by his own 7-11/16x9 graphite prop, and Sheldon's 55 percent fuel. His time was a good 4:34.4. Tim handles the pitting chores, and was probably disappointed by the time as he had missed the plane on the final pit, and the pilot had to tow it around again. This added about six or seven seconds to what would have been an excellent time. His in-traffic airspeed was 150 to 153 mph.

The next racing event was Mouse Race, Class I (reed valve). This was the largest-drawing event with 18 entrants total among the two age-group categories. The winner in the Open class was the team of Tom Knoppie and John McCollum, using John's "McMouse" design. This plane appeared very sturdy and fast. It featured a plywood fuselage, aluminum sheet wings, and a metal engine mount. The eight-ounce plane also had a CG wheel landing gear made from an aluminum strut, and a uniform vented tank. They used a Tornado 5x4 nylon prop, and 40 percent nitro fuel. The winning time was 5:08.1. The finals race was a four-up affair, and it was sure exciting to see all the entries go up within two or three seconds after the start signal.

In the Jr-Sr division, the winner was Joana McCollum with a 5:22.7 time. She used a plane similar to her father's.

In the Class II event (unlimited), Bob Boling came out on top with his "Ignatz II" design with a 10:45 time. Bob dared to use a *stock* TD .049, which was helped with Sheldon's 50 percent fuel. This plane was not very fast, but had some good pit stops. As Vic Garner points out, it is not the fast planes that win in racing, it is the *quick* ones.

One of the other Saturday events was Profile Scale, which is fairly self-explanatory. This sort of scale flying is becoming popular in this area, as an alternative to the more difficult and time consuming precision event. There are actually three different sport scale type events flown in the NW, differences are dependent upon what club is holding what contest. This is a low-key event for fun, but most of the entries were pretty sharp looking. Randy Schultz was the winner. He flew an ME-109 from a Midwest kit powered by an O.S. .35.

Then it was back over to the Carrier circle. In Class I it was Terry Miller chalking up 259.9 points for a first place win. He used a Martin Mauler from a Sturdi-Built kit with Fox .36 power. The Class II winning score was 291.7 points posted by Greg Beers. Unfortunately,

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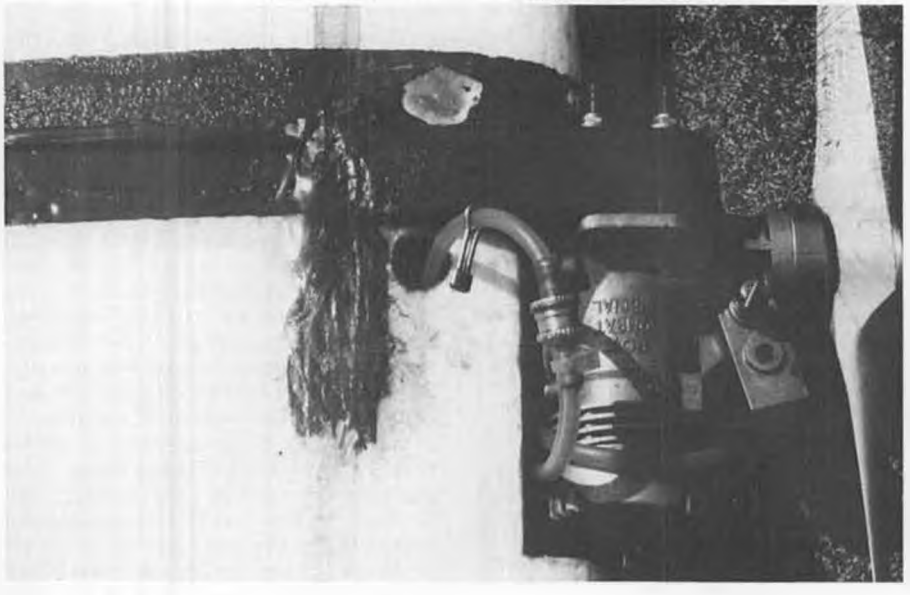


What you are looking at is a foam wing combat job with one heck of a strong repair . . . that black blob is actually carbon fiber and epoxy over a fractured spruce spar cap. Quick & dirty!

Gene Pape gets "framed" by his own garage door as he holds his Dogfighter C/L ship.

Skip Ashby starts on an official run toward the time traps. As evidenced by all the feet in the background, the meet is well attended.

And away she goes! Barely visible on the ground is the thin monofilament guide wire that keeps cars on the straight-and-narrow.

ASME RUBBER POWERED CAR RACE

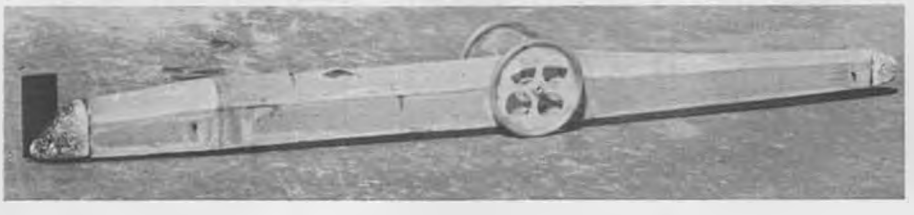
By BILL STROMAN . . . Every major university has its "Engineering Day" when students and other interested parties climb atop tall buildings and drop eggs in boxes or throw paper airplanes. California State University is no exception with its unusual rubber powered car race sponsored by the ASME.

• As near as I can find out, the American Society of Mechanical Engineers has held a rubber band powered car race every year since 1981 on Engineering Day at California State University, Long Beach. Other annual competitions on this day include a paper airplane event and a bridge building event. In the paper airplane contest, modelers compete for the best total of points in distance, duration, and accuracy. In the bridge building contest there is one class for the best model bridge based on a ratio of strength vs weight (these are tested to destruction on a testing machine), and another class for deflection vs weight which is judged by placing a 10-pound weight on top of the bridge and measuring the resultant deflection.

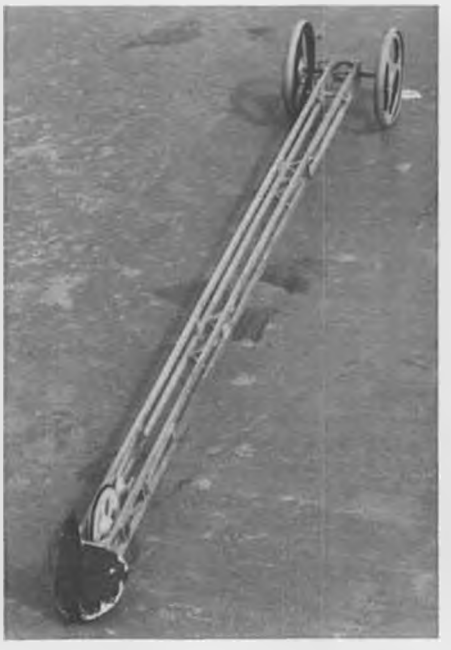
As you can tell by the photos, most of my time was spent at the rubber powered car race. The race was run by Chairman Randy Duprey, Greg Patrick, and ASME President, Christine Olson. Now this is a serious event: they measure out the 25-meter run on a sidewalk, fill all the cracks with grout, set up laser run-timing traps, and place a monofilament guide line down the middle.

My son, Ray, and I entered the race. Our cars were checked by the officials to see if they were within the standards established by the rules. We were then given the official rubber bands to test our cars. This is really a different type of rubber than we in model airplanes are used to. Firstly, it is a yellow-white color (no graphite, therefore the ultra violet rays from the sun really knock the heck out of it in a short time); secondly, it is twice as thick as the rubber we usually use. It was given to us in the form of a loop 12 inches long, and it had a lap joint of about 1-1/2 inches. The thick cross section gave us high torque, but the joint made for a stress concentration, that is, most bands failed next to this joint. Now I'm not complaining, as all cars were powered with the same type of rubber, we all had the same problems; I just wanted you to know what some of the problems were.

In rubber band powered cars there are two classes, one for high school

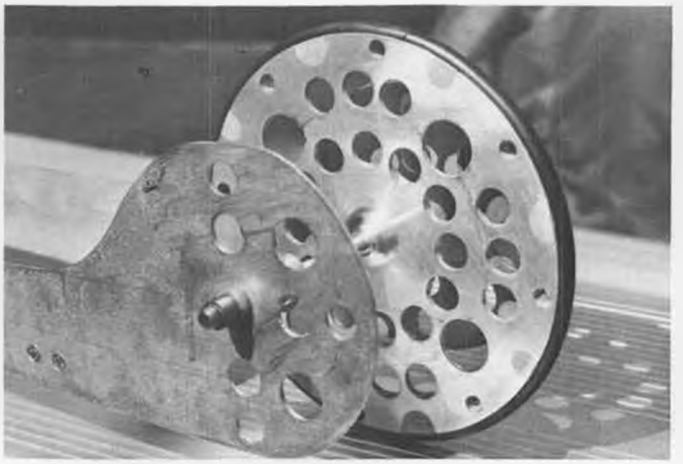


Jeff Wilson's car screams through the traps at a pavement scorching speed of 16.756 mph in the top photo, then pauses for a victory photo below. Laser beam timers visible in top photo.



Dave Norton built this car. It features wood frame, surgical rubber tires. A dragster!

Ford Aerospace's Bill Gaines took third in Open class with this stick-like car. Clear plastic wheels are hard to see. Note HPV shirt.



Pat Walsh must have spent hours on this rear drive wheel. Wheel's diameter is about seven inches in diameter.

As Bill Gaines linearly stretched his rubber band for power, a long car was necessary. Note wire loop at rear of vehicle for the guide wire.

Pat Walsh and his car. Nice workmanship was evident on this all-aluminum entry.

students, and the other (Open class) for everyone else. I overheard one of the crowd ask, "Isn't that guy in the cowboy hat kind of *old* for this event?" Now really, my hat is *not* a cowboy hat, it's more like a "Raiders of the Lost Ark" hat.

The way the different entrants used the rubber band was interesting. Most of them fastened the band to one end of the car, and the other end to a string. The string end was then wound around the axle until the band was stretched to max power. There were *words* heard now and then as someone would exceed the limit of his band's elasticity . . . it kind of reminded me of Taft on a hot day.

One car owner cut the band into two pieces, put a band on each side of his power wheel, and obtained power by twisting the band.

Ray and I used a three-to-one geared differential rigged up to a pair of four-inch diameter spoke wheels. We used rubber lube on our motors and a four-to-one winder. Many of the other entrants had never heard of rubber lube, and were very interested in where to obtain some. When I told them about rubber powered planes, some of them wanted to see a contest, so I gave them as much information as I could. Who knows, perhaps we can get a few more people into modelling this way.

The cars were really something to see as they went down the track. Some didn't make it all the way, some were fast but jumped off the guide line. Our cars had a problem in that they would burn rubber at the start if wound too much. This was great for the crowd, but cost us precious turns at the end. As the traps are set at the last meter, it tended to lower our time. What speeds were these cars going you ask? Well, the best time this year was 16.756 mph, not as good as last year when the speeds were 21 mph, but good just the same.

After about an hour of testing, we were given new rubber bands, and each of us got three official runs. The prizes in

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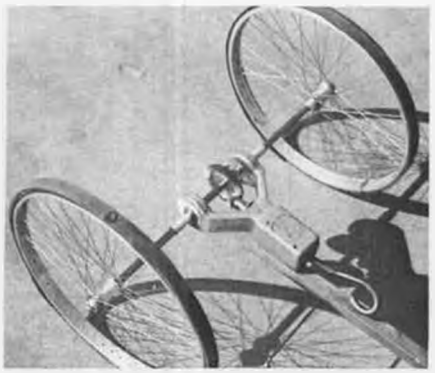
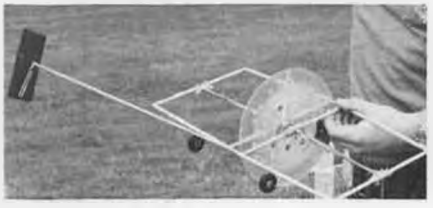
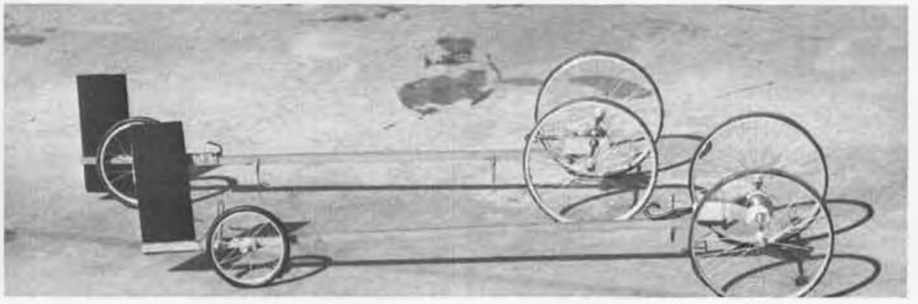


Bill Stroman's gear box and wheels. Rubber tires were old model airplane motors.



Ralph Pyka used bands on each side of the drive wheel. Looks like a canard.



Bill and Ray Stroman's racers. Both had four-inch wire wheels and 3:1 gearing. Major difference between the two was the gear box design: one was cast, the other milled from bar stock.

BOSTONIAN BEAVER

By WALT MOONEY . . . Although this little Bostonian is not a true scale model, it can be built as such with stretched wings if you prefer, but it will no longer be a Bostonian, so you can take your pick or build both . . . they're cheap!

• Here is a relatively simple little model that will fly well and has some of the flavor of the deHavilland Beaver. As a Bostonian, its wingspan is limited to 16 inches. It was originally built with that class in mind, and had neither wing struts nor landing gear fairing sheets. When it was completed, it looked like a racing version of the Beaver, so a second wing was built. The second wing was built with a span which would be scale for a fuselage of this length. Now the model looked more like a Beaver, so struts and wire fairing sheets were added to fill out the impression.

Take your choice, and build either one.

If you choose the long wing version, you'll have to draw up a 24-inch wing. This may be a little challenging if you have never done it before, but it's not hard. Simply get a long enough piece of paper, and make three parallel lines 12 inches apart. Copy the tips from the plan at each outer line. The two root ribs will remain in the same position relative to the centerline. Draw the spars, and the leading and trailing edges from tip to tip. Draw in rib locations equally spaced between the root and tips. You'll need 16 ribs instead of 10.

The wings, vertical tail, horizontal tail, and fuselage side frames are made directly on top of the plans. You'll need two fuselage side frames. I suggest building them on a flat building surface directly on top of each other so they will turn out as nearly identical as you can make them. When the side frames are completely assembled and the cement is dry, they can be removed from the plans. Both sides will most likely be cemented together by excess cement at the joints. Use a thin, double-edged razor blade (half a blade is enough), and carefully slit the two frames apart. A single-edged blade has a thick rear edge that will pry the sides far enough apart to break them during the separation operation; a single-edged blade is thinner, and won't cause this kind of problem.

Once the fuselage side frames are separated, you can begin the fuselage "box" assembly by cementing the side frames together at the very rear end. It is imperative that the two frames be exactly matched at the rear end for perfect alignment. Next, add the cross braces as you work forward from station to station. Note that there is a sharp angle in the longerons at the wing trailing edge in the top view. Carefully crack the longerons at this point before adding this cross brace pair. There is a similar break at the landing gear/instrument panel station that must be dealt with in the same fashion.

Try to get the fuselage as true and square as possible. The cross-braces at each station should form perfect rectangles, not skewed parallelograms. Viewed from the side, both side frames should be lined up with one another. Viewed from the top, the longerons breaks and frame cross-braces should be in the same imaginary planes, centered on and perpendicular to the centerline of the fuselage. It is difficult to true up a fuselage box frame *after* it is completely assembled, so you must check your progress at the addition of each set of cross-braces to make sure the structure you are assembling matches the plans.

When you are satisfied with the fuselage frame assembly, add the formers at the forward station, and add the former at the instrument panel location. Cover the front of the fuselage with 1/32nd sheet balsa.

The nose cowl and the removable thrust button should be constructed next. The cowl formers are all *circular*. Sizes are shown in the side and top views. The thrust button is made of several layers of hard balsa, and a plastic thrust bearing is installed at its center. Note that the cowling former in which the thrust button fits has a square hole in it to accommodate the button. The thrust button should be a snug fit in the nose cowl former. The cowl formers are wrapped with 1/32nd sheet balsa to complete the cowl.

Cut the wing ribs out of 1/16th sheet balsa. It is probably best to cut one rib pattern out of harder material, and then use this pattern to guide your blade while cutting out all these ribs as identically as possible. Pin the leading edge to the plan, and using the ribs as a guide, pin the trailing edge down over the plan at exactly the right distance behind the leading edge. Now, cement all the ribs in place. Cement the spars in place in the rib notches.

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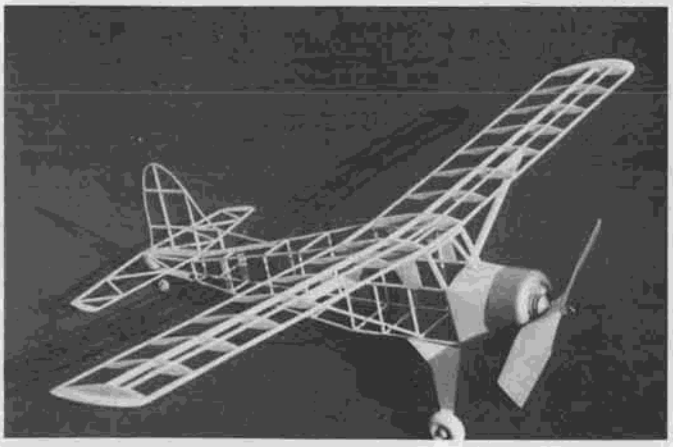
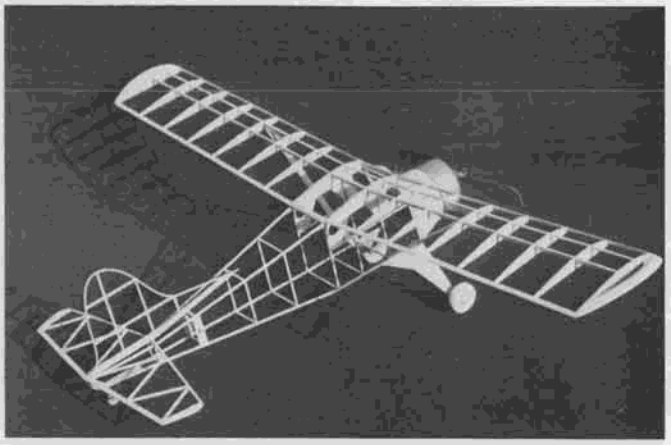


All framed up and ready for covering, the D.H. Beaver is a modification of the Bostonian Beaver. See text for mods.



Three-quarter rear view of skeleton framework. In this state it is almost too pretty to cover!

USE HARD 1/16 X 1/8 BALSA FOR THE L.E.

1/16 SQUARE FOR THE FRONT SPAR

ALL RIBS ARE CUT FROM 1/16TH SHEET BALSA

THE WING TIPS FROM SOFT BALSA HOLLOWED FOR LIGHTNESS

ARE CARVED BLOCKS

1/16 X 1/8 FOR THE REAR SPAR

WING PLAN

DIHEDRAL INDICATION

1/16 X 1/8 FOR THE TRAILING EDGE

ENGINE COWL FORMERS ARE CIRCULAR, CUT FROM 1/8TH SHEET BALSA

ALL COWL SHEETING IS 1/32ND SHEET BALSA

1/16TH DIA. REAR MOTOR PEG

1/16 SHEET BOTTOM FILLER

FUSELAGE TOP VIEW

RIB PATTERN

THE VERTICAL TAIL OUTLINE IS LAMINATED FROM THREE PIECES OF .020 X 1/16TH MODEL RAILROAD BASSWOOD STRIP

ALL FUSELAGE PIECES ARE 1/16 THICK

FRAME AND TAIL STRUCTURE

WING STRUT 3/32 X CROSS

1/4 BALSA SECTION

STREAMLINED

BALSA TAIL WHEEL STRAIGHT PIN FOR WIRE

6 INCH DIA. PLASTIC PROPELLER

BALSA WHEELS

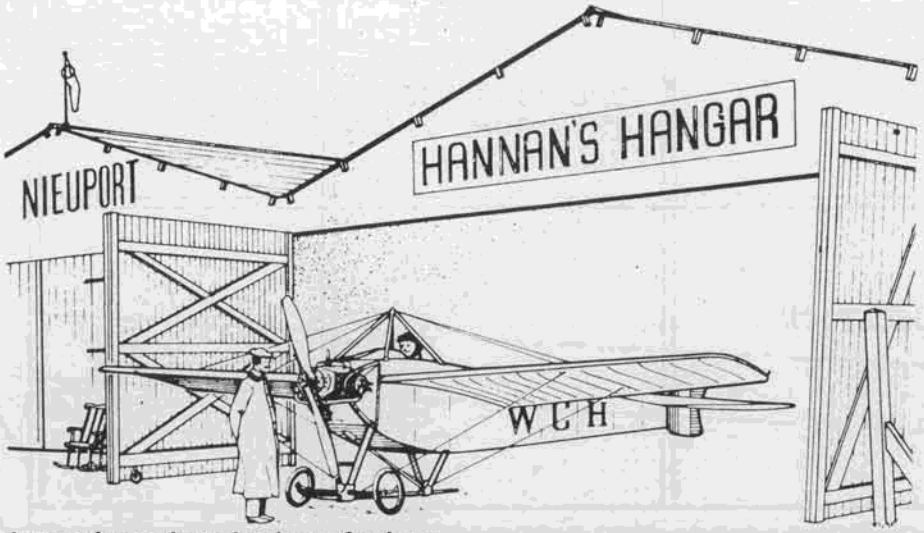
LANDING GEAR WIRE PATTERN - BEND FROM .025 MUSIC WIRE

HORIZONTAL TAIL PLAN

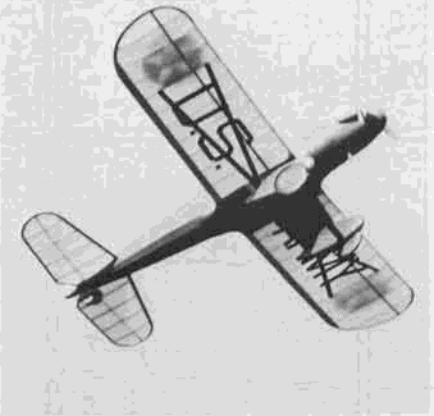
BOSTONIAN BEAVER

A 14 GRAM BOSTONIAN SEMI-SCALE

Walt Mooney 03-24-83



Learn from the mistakes of others . . . you can't live long enough to make them all yourself.



One of John Walker's self-designed models is this Curtiss Swift powered by a Telco CO_2 engine. Translucent appearance gives stick and tissue models lots of charm. Walker photo.

• Our anonymous lead-in line this month was supplied by Gerald E. Myers, of Redway, California.

THE SPRUCE GOOSE IS LOOSE

The above headline across a two-page spread in the *Los Angeles Times* proclaimed the official opening to the public of the giant Howard Hughes flying boat. Hidden from view since 1947, the mammoth machine was finally spared from the ludicrous fate of being sawed into pieces for museum display, and instead, installed in a special free-standing dome located alongside the Queen Mary ocean liner in Long Beach, California. According to local television coverage, enthusiastic visitors were waiting in line from two to three hours to see the fabled flying machine, and those interviewed seemed to feel their $6 admission fees were well spent.

In addition to the "Goose" (a name Hughes detested, incidentally), on view are a full-size reproduction of the H-1 racer (wonder who constructed it?) and various other items of aviation memorabilia. A gift shop markets all manner of souvenirs which may well become future collector's pieces, and help to defray the costs of housing the imposing display.

COMPETITION PHILOSOPHY

What's your motive for building models? Personal satisfaction? Nostalgia? Contest wins? Frank Zaic, in a recent letter, had this to say on the subject: ". . . we never flew a model in more than one contest. We made new ones for every contest, even if it meant night work, or testing on contest days. Which meant that we were more anxious to check-out a new idea than to assure a contest win. All this also makes me realize that model building and flying is a good way to overcome the fear of losing. To lose in a model contest is no disgrace. Just making a model fly is a victory in itself." Amen to that!

CHARTER A CONCORDE, ANYONE?

Dave Gibson sent in news of British Airway's Concorde division which has been gaining additional earnings in the charter ride business. For "only" $1,028 one can fly to Egypt from London, see the Pyramids, and return home on the same day. Tut, tut.

ESKIMO P-38s

Pearl Reynolds favored us with a United Press International news release detailing plans for recovering six Lockheed P-38s from cold-storage. And we do mean cold! They are buried in over 30 feet of snow in Greenland, along with two Boeing B-17s. Even though they have been there for over 40 years, it is expected that they will still be in excellent condition.

The aircraft force-landed there during 1942, having been mislead by spurious radio signals, possibly originating from a German submarine. Their crews were rescued, and one pilot is interested in helping with the recovery operation. In charge of the mission will be Republic Airlines captain Russel D. Rajani, employing an organization appropriately named "Pursuits Unlimited".

AND SPEAKING OF AIRLINE PILOTS

Carl Hatrak gave us a *TWA Skyliner* publication which contained this gem, from a South Carolina fifth-grade student: "When I grow up, I want to be a pilot because it's a fun job and easy to do. That's why there are so many pilots flying around these days. Pilots don't need much school; they just have to learn to read numbers so they can read their instruments . . . Pilots should be brave so they won't get scared if it's foggy and they can't see, or if a wing or motor falls off . . . The salary pilots make is another thing I like. They make more money than they know what to do with . . . I hope I don't get air sick, because . . . I couldn't be a pilot, and then I would have to go to work."

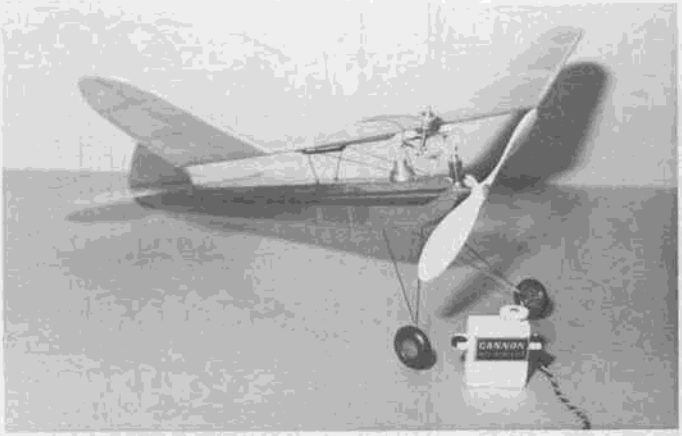
HOW COMPLICATED IS IT?

Some of our models contain lots of parts, but consider how simple they are compared to their full-size counterparts. According to *TWA Skyliner*, a DC-9 transport consists of 160,000 pieces, not counting the engines! Additionally, there are 528,000 fasteners, such as 440,000 rivets, 63,000 locking bolts, plus 25,000 screws and shear bolts. And if you think your R/C model has a lot of wires in it, contrast it with the DC-9's 65 *miles* worth!

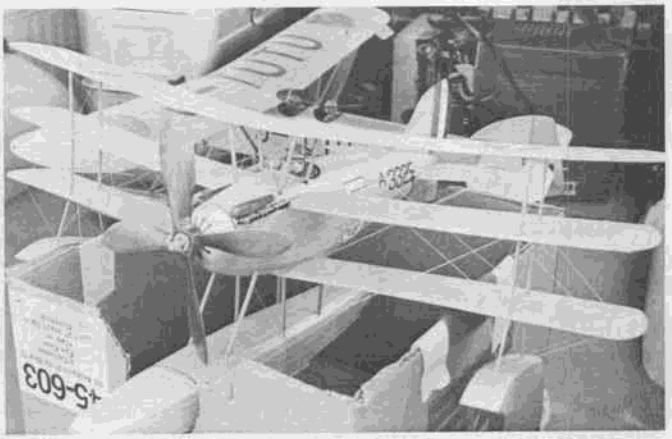
THE COLONEL SEZ

World-renowned builder, Bob Thacker, is currently involved with tail-first model designs, and after considerable first-hand investigation of the breed, offered this opinion: "For a canard, the nose has to be either made

Fying Aces club members (l to r) Sal Alu (holding the Eaglerock bipe), Leonard Wieczorek (famous 3-view draftsman for many magazines), Ed Heyn (admiring the Curtiss bipe), and "Mr. Golden Age Repro", Joe Fitzgibbon. Photo by Dick Benjamin via Dave Scott.



Dan Walton's "sort of" Peanut scale Lanzo Record Breaker for indoor flight. Uses Brown Jr. CO_2 engine, weighs only .47 oz.



Another Bill Noonan masterpiece is this rubber powered Curtiss Triplane. Model is quite stable in flight. Cardboard cradle.

of iron, or arranged to knock off."

HALF A CENTURY HOBBY

During a recent Mile Square Park flying session, Johnny Luxon was seen wearing a little badge on his hat reading "50 years a modeler". "Most impressive," we remarked. "Yeah," said John. "But even more impressive is the fact that this badge was made five years ago!"

THE REDCOATS ARE HERE

During the recent San Diego Scale Staffel Annual contest, entries were registered from various places in California and even Arizona, but easily farthest from home was David Deadman, all the way from England. His CO_2 powered Piper Cub, Monocoupe, and Polish PO-2 ambulance plane not only survived the trip nicely, but one of them managed to place first in the "gas" category. The Southern California sun was an unanticipated hazard for David, but he was soon equipped with a suitable hat. Its decor? American stars and stripes!

The prestigious Jack Lueken Memorial Trophy for the most outstanding performance by a Junior was won this year by young Frank Allen IV, who narrowly edged out his sister for the honor.

SIMPLIFY, SIMPLIFY

Dr. Phillip Dzus offers these words of wisdom to beginning builders of flying scale models: (1) don't select needlessly complex subjects; (2) avoid subjects with weird dihedral configurations, such as Corsairs and Stukas; and (3) pass up designs with compound-curved cabin windows, such as the Polish Wilga. In short, to avoid undue anxiety, stick with slab-sided, open cockpit fuselages, straight chord wings, and bypass subjects with wheel pants. Unless, of course, you are a masochist.

FOCUS ON A GLOW ENGINE

Berkey Photo Incorporated has been running a series of full-page, full-color advertisements in photography magazines with depict their Sigma zoom lenses in relation to items associated with various pastimes. For instance, one advert shows a deep-sea fishing lure alongside a lens; another features stereo headphones, as employed by joggers, etc. But the one that captured our attention appeared in *Modern Photography* for May, 1983, and displayed a 28-85 zoom lens held aloft by a hand which is also holding a Cox .020 engine complete with propeller!

40-40 VISION

Michigan's Jim Jones tells us of a new indoor club fun event. Called P.P. 40 (**P**lastic **P**rop and **40** square inches maximum) the models are fairly simple to construct, yet yield flight durations of about three minutes under a 24-foot ceiling. Intended for beginners, the designs employ five and a half inch diameter, commercially molded props which have been sanded very thin to reduce weight. Covering material is limited to Japanese tissue, and ROG starts are mandatory. The longest three flights from five tries determines the winner.

SPECIAL PEOPLE

One of the magazines to which we subscribe is *Writer's Digest*. A recent form letter from Editor Bill Brohaugh included this: "Writers are like no other people. We are creative, perceptive, resourceful, and maybe, a little eccentric." Sounds to us like an equally accurate description of *Model Builder's* readers!

SUBMARINE AEROPLANES

Ray Boldt, of Eviston, Illinois sent us some updates on the continuing saga of the many aircraft resting on the bottom of Lake Michigan. Variously estimated as numbering from as few as 50 to as many as 300, they are evidently strewn among some 3,000 sunken ships . . . which gives one some inkling of what a big lake it is. According to James T. Bryan, who leads the USS Yorktown Association, some of the World War Two types are in mint condition, because they did not crash, but were simply pushed off ships to make room for others!

If U.S. Navy permission can be obtained, some of the planes may be raised for display on the carrier *Yorktown*.

INDOOR IS NOT FOR EVERYONE

Or so says Florida's Dr. John Martin. Well, maybe not in this country, but in Japan there are over 1,000 indoor flyers,

Continued on page 64

Model hang glider from a Japanese kit. Articulated pilot figure snaps together. Photo from John R. Walker.

Stinson Sentinel by Milan Kacha, of Czechoslovakia, is powered by a VL electric motor. Photo via Ed Toner.

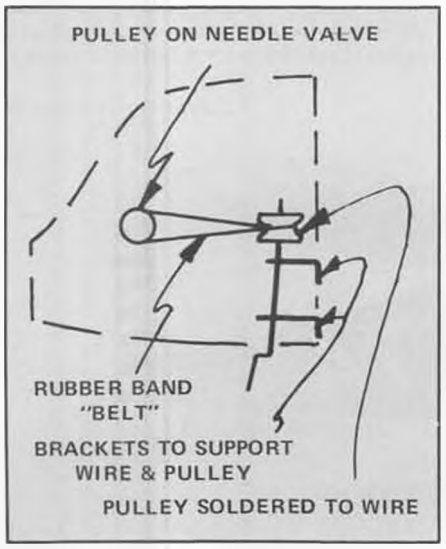
Free Flight Scale

By FERNANDO RAMOS

• Last month I ended my column by discussing a method of making cowls for engines. This month I'd like to discuss engine accessibility . . . a nice thing to have for starting, adjusting needle valves, etc. Let me pass on a few hints that could make these tasks a bit easier. As we are dealing, presumably, with scale models, we don't want things sticking out, or hanging around. Instead, the realism of the model is of primary importance.

Whenever I build F/F powered scale models, ninety percent of them are powered by diesels, the other ten percent by the venerable Cox .020 Pee Wee. Infrequently, the engine's glow plug is not readily handy for starting. My approach to this problem is handled in two ways, one just about as easy as the other. (See Figure 1.) Once the engine is permanently mounted onto the fuselage, I'll take some single strand, insulated copper wire about 20-gauge in size. I'll strip off about one inch of insulation from one end, and then wrap it tightly around the "pin" of the glow plug. Incidently, I use Scotch-Brite on the plug first to remove any oxidation. Obviously, the whole one inch of wire isn't wrapped on the "pin", but the extra length is simply used to get extra leverage so that it can be tightly wrapped.

A second piece of wire is similarly handled, but this one is tightly wrapped on the base of the glow plug. The other ends of the wires are routed down the firewall, and soldered onto a couple of brass shims. These shims are permanently mounted onto the firewall so that they protrude just enough below the cowl to attach a couple of small alligator clips from the battery. With some designs it may be possible to insert the brass shims higher up on the firewall so that they are not visible at all. In this case, they would have to be bent forward a bit so that the alligator clips can be attached.



With this setup, one can adjust the needle valve from beneath the model.

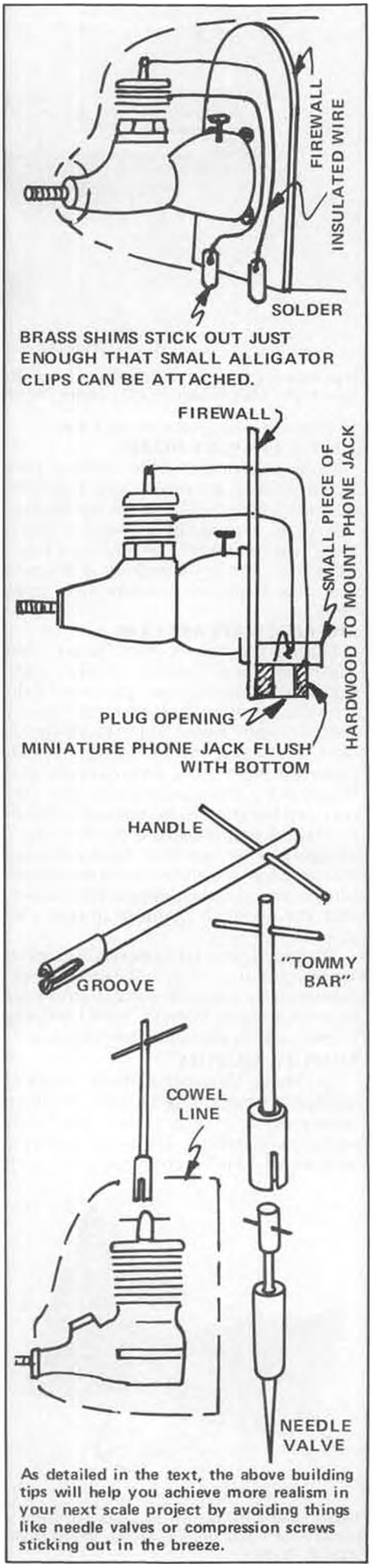
The other approach is to use a miniature phone jack and plug which are readily available at your local Radio Shack. Instead of running the wires from the plug to the brass shims, run them to the phone jack. This jack can be located anywhere, inconspicuously out of the way. Just plug in the battery leads and you're ready to go.

There is an option here that you may want to consider. It seems to me that Cox puts out a glow plug clip that attaches nicely to the plug. Wires are then soldered to this clip with the other end attaching to the battery. You may want to use one of these clips leaving it permanently attached to the engine with the other end going to either the shims or the miniature phone jack.

Naturally, with a diesel none of the above is necessary. However, access to the compression lever *is*, and this could be a problem with a cowled-in engine. The only drawback to using a diesel, in my opinion, is the need to have a small hole in the cowl just above the compression lever in order to be able to adjust it. Certainly, this is not much of a drawback! The question is, what do you insert into the hole to vary the compression? I believe the British call it a "tommy bar." It's a tool with a T-shaped handle with a slot on one end that can be used to turn the compression lever.

I suppose if we lived in England, we could readily purchase them, but alas, I've never seen any around these parts . . . so I make my own! (See Figure 2.) I have several different tommy bars because the compression levers that I own vary in size. Also, some are T-shaped, others have only half an arm, or a half-T shape. (It's according to engine displacement.) Tommy bars are very easy to make using brass tubing. As most diesels are made with metric screws, etc., I take brass tubing which fits best over the compression screw. Then, I take a short

Continued on page 90



As detailed in the text, the above building tips will help you achieve more realism in your next scale project by avoiding things like needle valves or compression screws sticking out in the breeze.

The Rose Parrakeet is one of the easier biplane Peanuts to construct as there are no flying wires to hassle with, and the tail is sheet wood.

ROSE PARRAKEET

By SEARS McCORRISON . . . If you've never built a bipe before, try the Rose Parrakeet; it's a pleasant, painless portal for prospective Peanut producers!

• The Rose Parrakeet is an excellent subject for Peanut scale modeling. Instead of flying and landing wires, the wing rigging consists of a single strut from the top of the rear N strut to the lower wing fuselage joint in front of the cockpit. The model can thus show scale wing bracing without the use of thread or monofilament.

Construction is standard stick and tissue. The fuselage is built of 1/16-inch square balsa, with 1/16 balsa sheet for the stabilizer and lower wing mounts. Fuselage formers are 1/32 balsa sheet except for 1T, 1B, and 2T, which are 1/16 balsa sheet. The top and bottom stringers are 1/16 square, one each. Before starting the fuselage, check the longeron material to make sure that each one has the same hardness and bends the same amount when flexed. Build the sides on the plan using pins to hold the balsa in place. (I use card holder pins for all my building. These are somewhat larger than common pins, and they have a round top which makes them easy to grip.)

Cement the rear fuselage sides together and allow them to dry. Cut the crosspieces for Station 3 and carefully cement them in place, lining up the fuselage to make sure that it is square. Allow the fuselage to dry completely before proceeding. PLace the rest of the crosspieces in the frame at this time, station by station, checking the align-; ment on the plan as each station's cross-braces are placed in the fuselage. Note that Station 2T has two cross-braces.

The formers may be notched for the stringers before or after placing on the fuselage. I find it easier to place them on unnotched and cut the notches on the fuselage with a file 1/16-inch thick. Former 3B will have to be notched on the fuselage. Place only one Former 2T on the fuselage at this time.

Bend the landing gear from .032 wire, using the plan as a guide. Place cement on the bottom and one side of the other Former 2T. Place the LG on the fuselage at Former 2T and out the other 2T over it, making a sandwich. Hold for a short while to make sure the cement has covered the joint, then take apart again and allow the cement to dry about five to ten minutes. Recement the second Former 2T and press back into place with the LG wire. Hold or clamp until it is dry.

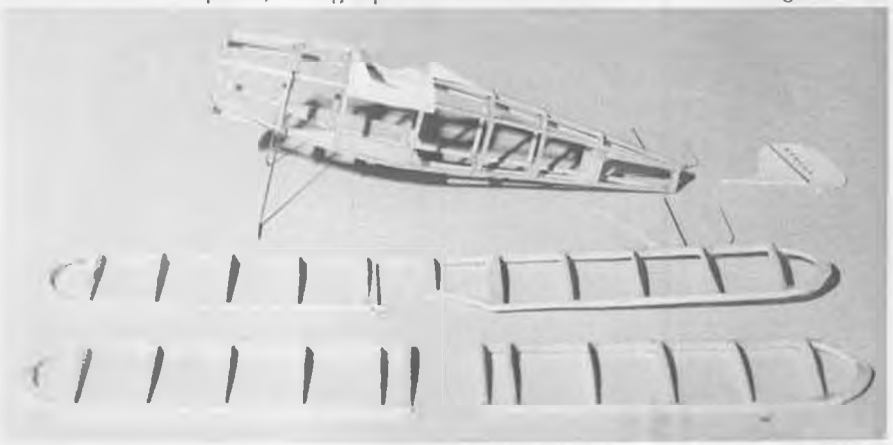
There is no notch in Former 4T. The stringer is butted against it where shown. When all formers and stringers are in place, cut the cockpit and headrest from bond paper and cement in place. In this size model, bond paper has enough stiffness to hold its shape without stringers.

Cut the nose block from 1/4-inch sheet, carve and sand to shape. Place the nose block on the front of the fuselage and mark the location of the inside of the frame. Do the same with a piece of 1/8 sheet. Cut out the 1/8 sheet piece and cement to the nose block on the marked spot, checking the location by placing it on the fuselage. Remove and set aside to dry.

Cover, water spray, and dope the fuselage. Cut two pieces of 1/16 sheet to the shape shown on the side view with the heavy line marked cowling, place on the fuselage sides between Stations 1 and 2, and trim top and bottom to blend into fuselage. Place dummy cylinders on cowling.

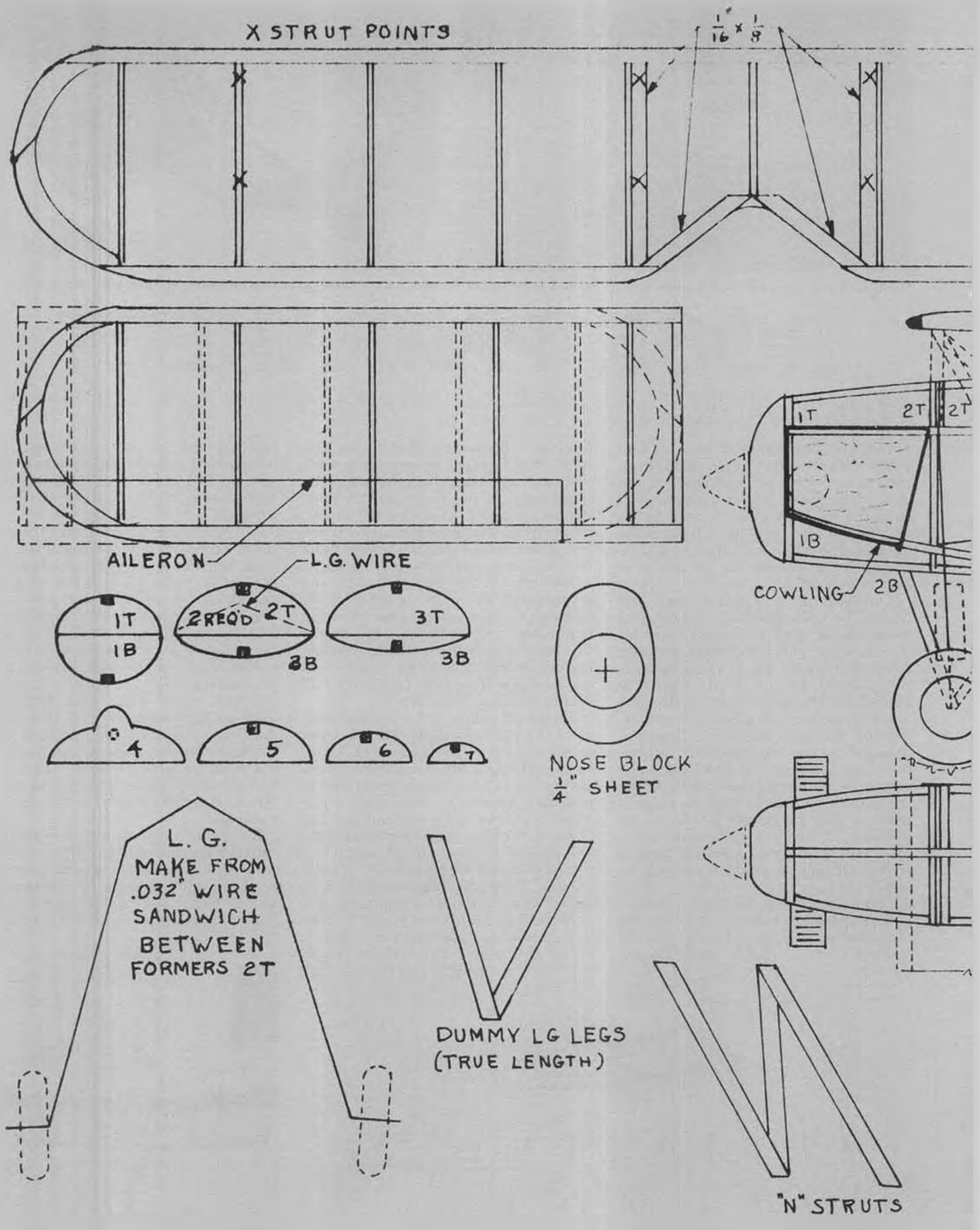
Build the wings on the plan, making sure to have one right and one left lower wing. Round the leading edge and tips. Sand the trailing edge to a triangular shape. Crack the upper wing at the center rib and apply cement at the crack.

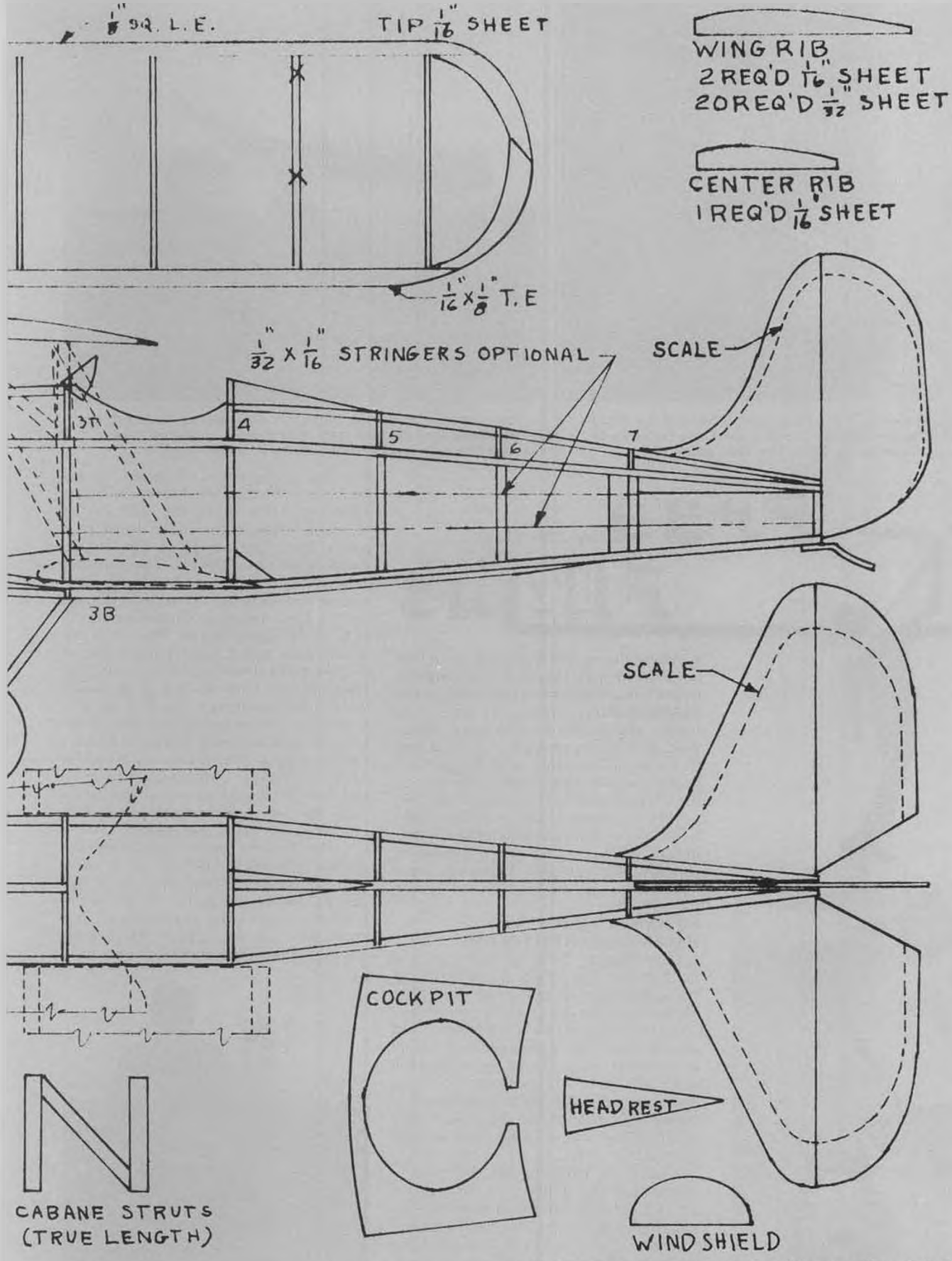
Continued on page 92



Simple construction technique is obvious in this photo of the framed-up Rose Parrakeet. We recommend it as a first-time bipe for the Peanut builder with limited experience.

Ready for takeoff! After covering the wings and fuselage with tissue & dope, naturally.


X STRUT POINTS
1/16 x 1/8
AILERON
L.G. WIRE
1T
1B
2 REQ'D 2T
3B
3T
3B
4
5
6
7
NOSE BLOCK
1/4" SHEET
1T
2T
2T
1B
COWLING
2B
L. G.
MAKE FROM
.032" WIRE
SANDWICH
BETWEEN
FORMERS 2T
DUMMY LG LEGS
(TRUE LENGTH)
"N" STRUTS



ROSE PARRAKEET PEANUT SCALE

S.B.M. 5-13-75

Al Grell prepares his Cox T.D. .15 powered Panhandle for a flight at a recent Nor'Westers contest. The Panhandle is a derivative of the '60s Texan design by Ed Miller. Dee Grell photo.

Concentration to the last instant. Al Grell gets set to launch the Panhandle into the blue skies of Oregon . . . not a common meteorological phenomenon last April. Dee Grell photo.

Free Flight

by Bob Stalik

• When the weather is nice, as it has been for the past few days, it is tempting to get out and fly instead of finishing the **Model Builder** column. As you, dear reader, should not have to worry about such issues, why don't *you* get out and fly? The flying time will be getting shorter as the next months go by . . . there's no time like the present. Go to it!

This month's feature three view, however, is for you who pine for the indoor scene. So, if you are a habitual procrastinator (as I am), then take a good look at the indoor hand launch glider this month.

SEPTEMBER THREE VIEW: HAGEN'S ALBANY FLYER HLG

Dave Hagan came to some of the Willamette Modelers Club's indoor contests beginning about five years ago. Those were the days that Tom Hutchinson and I were battling each other and setting new HLG glider records nearly every meet. Hutch and I experimented with all sorts of variations on the Sweepette 16. We both ended with a tie for the record at 74.8 seconds. All the while, Dave was fiddling with a new approach to IHLG.

Finally, in 1982, he got the Albany Flyer trimmed and flew it to a site record of 75.2 seconds. Shortly thereafter, he smashed this record. He now holds the new one at 80.1 seconds. This score in a 42-foot ceiling is exceptional. I believe that the Albany Flyer is capable of even better scores, but for the present, it is the state-of-the-art for Category II indoor sites . . . at least here in the northwest.

Dave comments on the model: "The fuselage is medium-hard C grain. B grain will absorb crashes better without splitting, but I think the stiffness of C grain, when you whittle down to a small cross section, gives you better control of the launch. The wing is relatively small with a 3-1/2-inch root chord and wing area of only 53 square inches. By comparison, the Sweepette 18 is 57 to 60 square inches. The wings are made from 3/16 C grain balsa of about 4-1/2-pound density. I have found that wings shaped from thick C grain sheets with undercamber sanded in are superior to wings made from thin sheet balsa formed over ribs. The latter doesn't seem to give the necessary rigidity. There is a danger of the wing flexing on the launch causing the trajectory to go wild. Thin wings don't seem to hold their trim adjustments as well either.

"I find that the best way to sand in the undercamber is to finish the wing completely with a flat bottom, cut it into pieces, bevel the joints, glue in the dihedral, and glue the wing to the fuselage . . . *then* sand in the undercamber. The wing is much easier to hold

Away! With puffy white thermal clouds like these all over the sky, it's hard to miss a max . . . and Al didn't. Dee's photo again!

A happy free flighter returns with a DT'd Panhandle after a 180 second flight. Model will be 3-view next month.

during the sanding operation with the fuselage attached.

"Low ceiling gliders are flown right-right as opposed to high ceiling models flown right-left. Most low ceiling glider fliers try to adjust the maximum altitude by adjusting the glider's weight and the amount of undercamber they use. In other words, if they're hitting the ceiling all the time, they sand in more undercamber. This reduces weight too. Then they try to throw full force at a steep angle every time.

"I try to pick a spot overhead and launch at the same spot every time, but from a shallow angle. This method takes more control, but it allows me to 'grease' the model right next to the ceiling at a higher velocity facilitating a better transition."

IHLG CONSTRUCTION HINTS

"Avoid misalignment in assembly. Use some wing incidence. The wing has about one degree of positive incidence. This is done by taking a sanding block to the top of the fuselage where the wing is attached and sanding it until you remove 1/16 of an inch at the trailing edge.

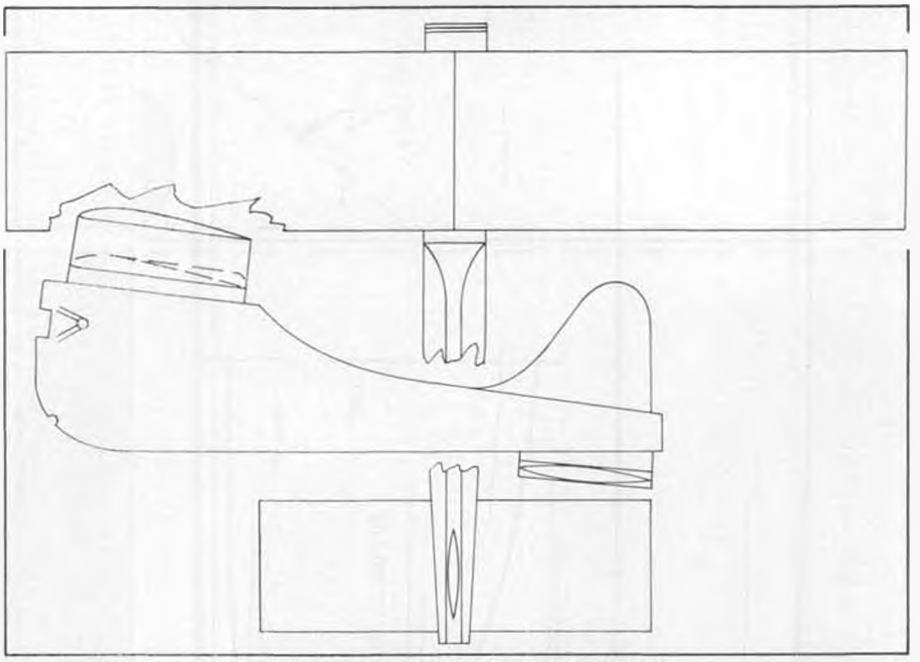
"Extreme rudder adjustment for turns should be avoided. Some turn can be built in by skewing the wing to the right (for right turn) when attaching it to the fuselage. Wing tip weight (clay) can also be used to aid turn. Avoid stab tilt. Use washin on the inner (right) wing panel. Turn adjustments for glide tend to roll the model at launch velocity but washin on that side will hold the wing up.

"Indoor hand launch gliders can be a lot of fun and they really aren't that difficult. The design should be suitable for the site. Choose materials carefully and build and fly well. Take time to practice and make official flights only when you are ready."

From my point of view, this is the best conventional indoor hand launch glider for Category II sites that I have seen. It's worth building and flying . . . even if the weather is nice outside today.

SEPTEMBER MYSTERY MODEL

We have no big, semi-famous competition model for you this month. Instead, here is a free flight ship that is built almost entirely from *foam*. This was a very experimental model in 1958 when the article about it was published. Flown with any convenient 1/2A engine, this ship was allegedly built in less than one hour. Now, the clincher . . . if you can name it, and be first in line with the correct name . . . you can win yourself a one year subscription to **Model Builder.** Send your entry to Bill Northrop care of **Model Builder** magazine.



SEPTEMBER MYSTERY MODEL

DARNED GOOD AIRFOIL: RITZ 7-45-5.5G

In 1959, Gerry Ritz won the World Champs in Nordic with his well-known Continental design. This was the airfoil used on that ship. He relates that this section was designed as a single function airfoil . . . low sinking speed in pure glide, with good penetration for consistency. He points out the necessary parameters for pure glide sections as follows: (1) the entry point should be kept low and of fairly small radius. This induces a positive split between upper and lower air with the longest possible travel (attached airflow) for the top surface, and sufficient natural turbulation for smooth performance. (2) The entry angle of the under surface should not be above the maximum angle at which the wing can fly before requiring artificial turbulation . . . in this case about seven to eight degrees. (3) The airfoil should be kept as thin as construction permits to reduce volume displacement to the minimum. (4) The undersurface from the entry angle to the rear must be designed to give a progressive depression of the air in as uniform a flow as possible.

Now, you can go out and do all of this in your next airfoil design, but I don't think that it's necessary. All you need to do is to copy Gerry's section and use it on your next glider. Once good, always good.

AIRFOILS AND THE COPY MACHINE

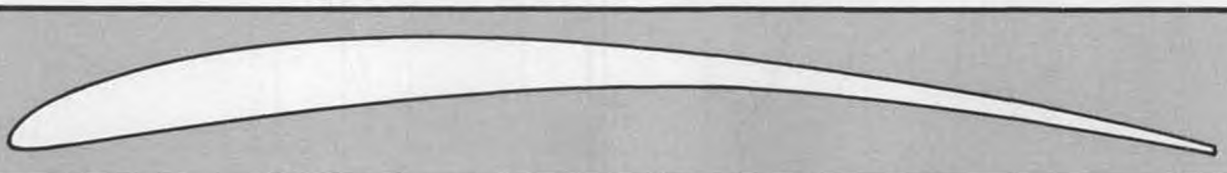
For those of you who think that drafting airfoils is an enjoyable experience, please skip this section of the column. But for the rest of you who hate drafting airfoils (the vast majority, I would guess), read on.

Most of the D.G.A. series is produced in **Model Builder** using a chord of 6.25 inches. This is a great size for 1/2A models, A-2 gliders and the like, but if you want to use a tapered wing platform, elliptical wings, or a smaller root chord, you will have to use the coordinates and redraw the section to the correct sizes.

Viola'! Enter the reducing copy machine. I use one regularly. Just slip the **Model Builder** page onto the copier and reduce away. Then you can assemble all of the reduced copies onto one page and reduce some more. The result: nearly as many different sizes as you need. Cost is about five cents per page.

For those who find the DGA too small, I understand that Xerox now has an enlarging machine. I haven't found one locally, so I draw up the airfoil I plan to

DARNED GOOD AIRFOIL — RITZ 7-45-5.5 G



STATION	0	1	2.5	5	10	20	30	40	50	60	70	80	90	100
UPPER	.5	2.3	3.4	4.8	6.8	8.9	9.5	9.4	8.9	7.9	6.7	5.1	3.1	.8
LOWER	.5	0	.3	.7	1.4	2.8	4	4.8	5.3	5.4	4.7	3.5	1.9	.0

LOW CEILING GLIDER

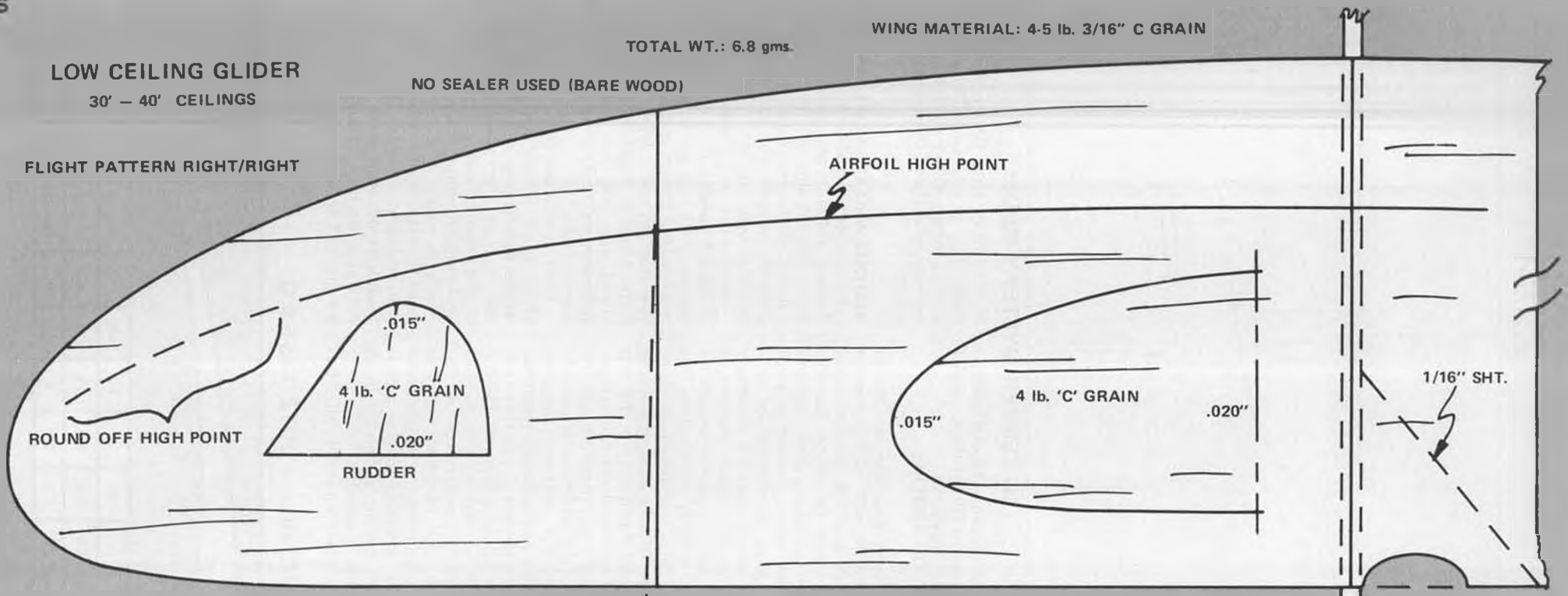
30' – 40' CEILINGS

FLIGHT PATTERN RIGHT/RIGHT

TOTAL WT.: 6.8 gms.

WING MATERIAL: 4-5 lb. 3/16" C GRAIN

NO SEALER USED (BARE WOOD)



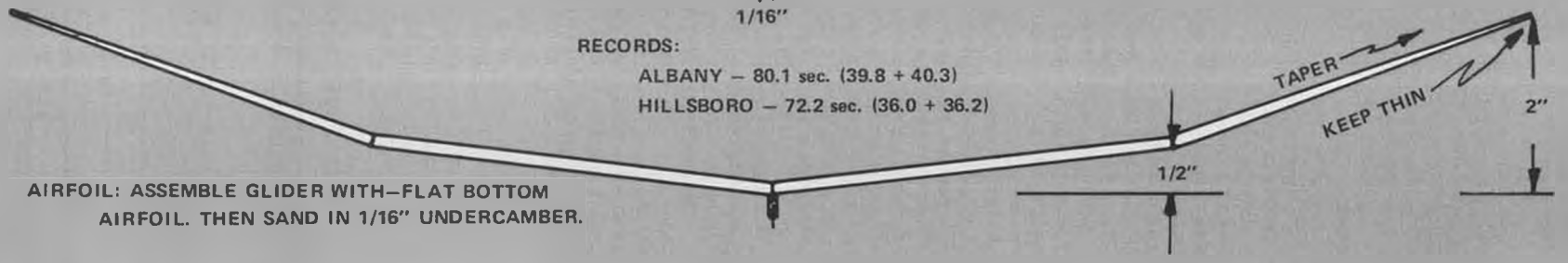
TOE OUT TIPS (WASHOUT) 1/16"

FULL SIZE TEMPLATES

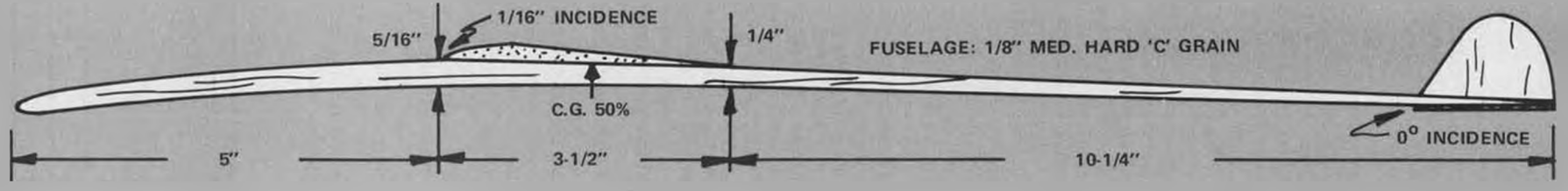
RECORDS:

ALBANY – 80.1 sec. (39.8 + 40.3)

HILLSBORO – 72.2 sec. (36.0 + 36.2)



AIRFOIL: ASSEMBLE GLIDER WITH–FLAT BOTTOM AIRFOIL. THEN SAND IN 1/16" UNDERCAMBER.



use in the largest root chord size I need, and then I reduce away from there to get the right sizes for the tapered or elliptical surfaces.

OTHER AIRFOIL SOURCES

John Malkin has produced a second edition of his *Airfoil Sections* book. It contains about 400 examples that are useful for nearly every free flight application as well as other modeling forms. In addition, John has a summary of uses and some other informative and worthwhile hints and tips. It's a good one, and you can get it through NFFS Supplies for $7.50 if you are an NFFS member or $8.50 if you are not. Write to NFFS Supplies, Manny Andrade, 1602 Encanto Place, Walnut Creek, CA 94598.

Model Builder Darned Good Airfoils: Your editor has compiled all of the DGAs that have appeared in **Model Builder** between January 1974 and September 1982 into one, three-hole punched, 8-1/2 x 11 volume. One hundred and five airfoils especially designed for free flight are included along with a few words on how to draft them up and use them. The cost of this publication is $2.00 plus 50 cents postage in the US. Overseas postage is $1.00. It's available from Bob Stalick, 5066 N.W. Picadilly Circle, Albany, OR 97321.

AIRFOILS, CIRCA 1935

In an old *Model Airplane News* magazine from 1935, I found an article on airfoils, entitled "How to Choose Your Wing Section." The text, by Franklin Shea, postulated some amazing recommendations.

I quote, "By going through a process similar to that followed by aircraft designers, a scientific gas model builder can arrive at a more logical choice of airfoils for his design. While the difference in performance which would result from the use of any of the better sections is small, it is nevertheless noticeable; and the practice will be useful for future engineers." So far so good! The article goes on to list a selection of airfoils into stable and unstable groups.

Shea continues, "In the unstable group are sections whose centers of pressure move forward with increasing angle of attack, and backward with decreasing angles. The stable group includes sections whose C.P. travel is just the opposite. It is not possible to compare stable and unstable sections directly, as the stable curves automatically lose some maximum lift. Thickness at 15 percent and 60 percent chord is included (in the tables) to eliminate sections too thin for efficient spar depth. This is important with larger spans and aspect ratios. Factors that color the choice of sections include: parasol designs can use the unstable, high lift sections to good advantage."

For your information, Mr. Shea included such unstable and questionable airfoils in the article as the Clark Y and the NACA 4412. In the stable and recommended list, Mr. Shea listed such stalwarts as the RAF 34 and the M-9 (all with upswept trailing edges). Times have changed since 1935, Mr. Shea.

And now it's time for going out to fly. Until next month, Thermals to all. •

Clarence Bull puts the death grip on his little Buzzard Bombshell which is powered by an English diesel. Scene is the Nor'Westers contest, Hillsboro, OR. Mr. B must be camera shy!

Electronics . . . *Continued from page 26*

53 MHz, for which we have adopted the Ham parlance of "Six-Meter Band." Operation on this band still requires the holding of a valid FCC Amateur Radio License of Technician Class, or higher. And the registrar at any AMA contest which you plan to attend will be completely within her (most are ladies, bless them for their support!) rights to ask you to show yours if you are flying on this band.

There is further news on our available Six-Meter frequencies! Though "available" is not the correct word in the truest sense, as legally we can fly anywhere within the entire band. The more correct word is probably "recommended", as these are the spots which have been agreed upon between our AMA and the Ham's ARRL (Amateur Radio Relay League) as a sort of gentleman's agreement so we can both enjoy our respective hobbies with the least possible interference from one another. Though for all practical purposes, we must thank the ham fraternity for their cooperation in this manner, as we need their cooperation more than they need ours. They definitely have the edge, as most of them are operating with much greater power than we are, and all we would ever be is an annoying low buzz in their speakers . . . I've yet to hear of an R/C transmitter crashing a ham tower or "shack", as hams refer to their operating rooms. Tnx, OM's es YI's, es 73!

The news is twofold: the present 53 plus MHz frequencies are being increased in numbers, and a completely new segment of the band is being made available to us. Specifically, we can now operate R/C systems in the 200 KHz between 50.800 and 51.000 MHz; the band will be divided into 10 R/C channels, which have been designated as Nos. 00 to 09, with 20 KHz spacing. Note that this is the same spacing as applicable to our new 72 MHz channels, and as such will be subject to the same operational problems until the necessary narrow band equipment is available to us. Therefore, for the initial phase-in period, that being eight years long, we will use only the even numbered channels. This will give us 40 KHz spacing, in which our present equipment, properly tuned, will operate successfully.

There is another point to remember in the use of any Six-Meter frequency for R/C operation. That is that legally, only the holder of the aforementioned Technician Class or higher license can fly his model, he is not permitted to hand the transmitter to a non-Ham flying buddy, or to allow a fellow club or family member to fly under his license. Even buddy-box operation on Six-Meter is not legal unless both parties are Ham licensees.

Some of this, especially the latter ruling, is completely inconsistent with other widely accepted Ham practices, all perfectly legal, namely, the use of "phone patches" which allow a non-Ham anywhere to speak through his telephone and subsequently through a Ham transmitter, through a similar facility at the other end, often thousands of miles away, to another non-Ham. In such a case, they are often using powers as high as 2000 watts. Further, a voice operated device is used so that the telephone user has only to speak to key and activate the transmitter, actually giving the non-Ham control, with the exception of course that the Ham can turn him off at any time. But this certainly seems to me to be far more dangerous, if that is the correct word, than me letting a newcomer fly my

airplane on a buddy-box on 53.5 while his trainer is still on the building bench. Maybe it is time for a reinterpretation of the rule!

MORE ABOUT MORE FREQUENCIES!

Now that we've had the new frequencies for almost six months, a lot of things have happened, not all of them good. For example, there have been reports of a club which has banned operation on five of the 11 new channels at its field due to reports of interference with the old frequencies. Subsequent tests by other fliers in the same city have disproved the problem. We're also beginning to hear some criticism of some of the radio manufacturers, that "maybe their systems aren't as good as we've been led to believe". Well, not in defense, but to present the other side of the picture, the older systems were built to less stringent requirements, and can not be considered as good in a broad sense compared to a system built to meet the new ones. But, *they were built according then existing legal requirements*, and criticisms based on the new tighter specs are not exactly fair.

Interference is not new, we are simply running into more of it now that we have more frequencies. Basically, we are experiencing one of the following:

ADJACENT CHANNEL INTERFERENCE

Adjacent channel interference is a case where the receiver is simply not selective enough to reject the signal from another R/C transmitter on the very next frequency. Too often, this is a case of receiver mistuning brought about by the installation of a different frequency crystal. Many receivers will not tolerate too far a frequency change without adjustment. They can become seriously out of tune. We find few receivers properly tuned to their operating frequency subject to this type of interference.

Another type of similar interference can be caused by non-R/C transmitters operating on a frequency very close (50 KC or less) to the R/C frequency; in which case the R/C receiver is unable to reject it due to proximity and signal strength. Little can be done about this. Once such a problem is identified, the wary will steer clear of that frequency and spread the word.

IMAGE INTERFERENCE

Image interference is encountered by a receiver in close proximity to a transmitter operating on a frequency (or close to that frequency) related to the receiver frequency by twice its Intermediate Frequency. We've already had some problems with 72.080 and 72.960 . . . 72.080 plus .910 (twice .455) is 72.990. Now the same relationship exists with new Channel 12, 72.030, and 72.960. One cure to this type of interference is the use of double conversion in the IF's. One such example has already appeared (and to my knowledge, the only one) in the Kraft KPR-8FD, both narrow-band and double-conversion, with a first IF of 10.7 MHz. I have been doing some extensive flying of this receiver, and though my testing is not all-conclusive, as it has all been on 53.5 which has little chance of image interference rejection, a receiver still has to do other things, and it is doing them extremely well. I will report on it further later.

INTERMODULATION INTERFERENCE

Intermodulation interference occurs when two transmitters on different frequencies are operated in close proximity to each other, producing a third frequency which will be received by any nearby receiver tuned to that frequency. We already know that:
72.080 & 72.160 may affect 72.240
72.080 & 72.240 may affect 72.400
72.160 & 72.240 may affect 72.320
72.240 & 72.160 may affect 72.080
72.240 & 72.320 may affect 72.400
72.320 & 72.240 may affect 72.160
72.400 & 72.240 may affect 72.080
72.400 & 72.320 may affect 72.240

With the introduction of the new frequencies, we run into a few other bad combinations which *could* affect any other 72 MHz receivers. They are:
72.080 & Channel 38 may affect 72.550
72.160 & Channel 42 may affect 72.630
72.240 & Channel 46 may affect 72.710
72.320 & Channel 50 may affect 72.790
72.400 & Channel 54 may affect 72.870

Notice that I use words like "may" and "could" up above. This type of interference is dependent also on physical placement of all the various units involved. The two offending transmitters have to be close to each other, and as close or closer to your airplane than you are. Simply providing more separation between fliers will eliminate a lot of this interference.

The whole subject of interference is complex; it is hard for the layman, who is really more interested in perfecting his Masters Pattern than he is in the intricacies of radio wave propagation, to understand. The matter has received excellent treatment in much detail in the May and June 1983 issues of *Model Aviation*, specifically, George Meyers' "Radio Technique" column. Those who are interested in knowing more about the subject are steered there. In addition, AMA has appointed frequency coordinators in each of its districts, to identify and deal with frequency related problems. They would like to hear of any unusable R/C frequencies in your area, sources of interference if known, and if a known R/C system, identified by make and model, was able to operate successfully amidst the new frequencies after proper retuning.

These gentlemen, by district, are:

I	George Wilson, 318 Fisher St., Walpole, MA 02181
II	George M. Myers, 70 Froehlich Farm Rd., Hicksville, NY 11801
III	James Bearden, 5552 Foxrun St., Cincinnati, OH 45239
IV	Paul Yacaobucci, 6408 Winthrop Dr., Fayetteville, NC 28301
V	Burnis Fields, 1096 Ontario St., Jacksonville, FL 32205
VI	James A. Check, 564 Grantchester St., Lexington, KY 40505

VII Pete Walters, 117 E. Main, Upper Level, Northville, MI 48167
VIII Tom Blakeney, 2300 May Lane, Grand Prairie, TX 75050
IX Sid Gates, 2380 S. Holly Pl., Denver, CO 0220
X Harold P. Jackson, 8288 Sunset Ave., Fair Oaks, CA 95628
XI Robert Balch, 16439 SE Haig Dr., Portland, OR 97236

After all that somewhat disturbing and probably confusing news, I guess it might sound facetious for me to say "Happy flying", but it is still being done, by thousands, every weekend. Look at it as simply one more item on that pre-flight checklist. You do have one, don't you?

LONG SERVO LEADS

Save your Confederate money boys, the South's going to rise again! At least it will in Trey Wood's sailplane, who writes from Mobile, Alabama that:

I am installing servos out in the wings of a sailplane to drive the ailerons. The distance from each servo to the receiver is three feet. The radio is a Futaba. Please tell me if I will need chokes, and if so, what do I ask for, where do I get them, and how are they installed. Thanks for any help you can give me.

Trey, it is hard to say positively whether or not the extra long servo leads will cause you a problem, but you can determine this for yourself with some simple tests. First, with your airplane assembled, and with only the rudder and elevator servos plugged in, establish an antenna-down or antenna-less maximum range. The model should be in the middle of an open field, three or four feet off the ground, on a non-metallic support. First find that distance at which you still have solid control, but which one or two more steps starts to cause "servo jitters." Then, have your pit crewperson turn the model about 45 degrees at a time to see if there is any change in the range with a variation in model to transmitter attitude.

Once you have established this standard, then plug in the ailerons, preferably one at a time, and repeat the test. You can expect some loss in range, and can probably live with up to a 10 percent loss, but anything over that can be expected to be a problem in the air.

If you do experience loss that is unacceptable, there are a number of more recently developed things that I would try before resorting to chokes. My friend Don Lowe, who works in RPVs and in his spare time does other fun things like competing in the Tournament of Champions, cures the problem with bypass capacitors on the output of the receiver . . . right at the receiver. He explains this in detail in the June '82 *RCM*.

Another approach is the use of an isolation amplifier between the receiver and the servos. Two such items are available commercially. One, from Ace R/C (Box 511D, Higginsville, MO 64037), is called a "Noise Trap", part no. 26K17 for $3.95, less connectors, in kit form. The other one is from EMS (Electronic Model Systems, 6175 Palo Alto Dr., Anaheim, CA 92807). It is available in four versions, with the connectors of your choice. The one you would need is a GS-1Y, single channel, two servos, at $12.95.

There is yet another approach to the problem. Available from RAM (Radio Controlled Models) is the "Plane RF De-Glitcher". This involves the use of some small ferrite beads which are simply slipped over the servo leads. Ten beads are included, enough for five servos, plus RAM's explicit instructions in the art of glitch elimination . . . cost only $8.95.

But Trey, just in case that little pea-picking heart of yours is still set on chokes, we'll tell you about them too. We'll go back to Ace R/C for six of its 10 UHY chokes, No. LL106, at 50 cents each (non-Confederate!). You should install one in each servo lead, as close to the receiver as possible. I would stagger them, so as not to create a great big lump all in one place, and I would protect them with shrink tubing. Be sure and make good solder connections as the longevity of the model is riding on them.

I have heard of extreme cases, though most often involving ignition engines, where nothing else worked but chokes and shielded leads. In this case, obtain some small shielded wire, remove the outer shield and slip it over the servo leads, which has to be done before the chokes and/or plug is installed on one end. This outer shield is then connected to the negative (black) lead.

Actually, you caught me just about a month early, as I am just now devoting most of my spare time to sanding my first servos-in-the-wing model. It'll have my dual receiver setup (see April **MB**) and individual servos 22 inches out in the wings. Naturally, I will test for possible signal loss due to the long leads and if I discover anything worth passing on, I will do so.

May we ask the same of you-all?

BATTERY CHARGE MONITOR

We heard from the great city of Phoenix, in the form of a letter from Dick Henderson, who writes:

As so many who tread on the very edge of the electronic community in trying to enjoy both R/C flying and

electric power flight, it seems the questions on both subjects are never ending. Especially pertaining to correct methods of fast charging electric power flight packs.

I am enclosing a monitoring circuit which I built from Mitch Poling's article in the May issue of **MB**, *page 46. . . . It does work! I have sub-C (1200 mah) power packs from four, six, seven, and eight cells. Mitch's monitoring circuit which uses a 0-50 micro-amp meter has limitations and has to be observed closely to see when the charge should be terminated (when meter hand slows down and stops). I modified Mitch's circuit to include three separate circuits and switches to expand its usefulness . . . these work too.*

I would like to know if there is a method which uses "light emitting diodes" in conjunction with Zener diodes to indicate a completed charge instead of the micro-amp scale. To me it seems simple and positive . . . when the LED goes on or off the charge is completed.

If such a method is possible, it would be convenient if Radio Shack parts could be used as much as possible. They are available to most of us who do not haunt the regular electronic supply houses . . . I realize that some items may not be available at Radio Shack.

I hope I have not confused the issue too much, but I hope you understand what I am trying for. Mitch's meter works, but I think an "LED" system would be more definite, plus simpler.

Dick also included a diagram using the battery monitor from the June column as a peak voltage indicator, asking if it would work. Well Mr. H., I don't see why not, and substituting a variable resistor for R1 would allow some fine trimming of the triggering point. However, I've included a circuit which I like even better, which should be more stable, and which can trigger with voltage changes as little as .02. It's a bit more complicated, but that's what we have to pay for precision sometimes. Most of the parts are Radio Shack, in fact, it could easily be assembled on one of its experimenters PC boards such as No. 276-159.

Actually, this is something I intended for something else. A couple of years ago, a tri-color LED appeared, which glowed red or green depending on polarity, or orange, if powered with AC. I liked that color change, and tried to make a transmitter voltage monitor which would glow green as long as the battery voltage was normal, and go red when it dropped to the critical level. Well, I got it working, but . . . the current drain was about equal to that of the transmitter, and I wasn't able to get it down to a usable value! Fortunately, I didn't throw my notes away, and it is presented here with a couple of minor mods to make the LED change from green for normal charging, to red at a preset point.

The calibration would best be done with a variable power supply and digital voltmeter, but if one is not available, it can be set fairly closely by connecting it to a fully charged battery and setting the pot to just where it causes the LED to go red. The use of a 10-turn trimpot will permit finer adjustment than will the 270 degree pots. Try it, the first time you see that LED change color you'll agree that the extra parts and work were worth the effort.

LOW SPEED TACHOMETER CALIBRATOR

I don't care what you do, you can't please them all! Just as the July issue appeared, in which Fritz Mueller shared his excellent tachometer calibrator with us, I had a call from one of my local friends who admitted that yes, Fritz's device was clever and useful. However, my friend wanted to calibrate his tach down on the lower end of the scale. Guess he is not as interested in how fast his engines go as he is in how *slow* they go!

Anyway, this one was a little easier, and I'm presenting it here for those of you who like to show off your slow idle, and want to be able to say exactly what the idle speed is. As most of you know, our most readily available tachometer calibrator is the common AC fluorescent light bulb, which is actually not producing a steady light, but is constantly flickering, though at a rate too high for the human eye to follow. An optical tachometer aimed at such a light will indicate 3600 rpm, and everyone I've ever seen has an adjustment which is used to bring the needle exactly to that value. The problem lies in that all subsequent multiplication is not exactly linear, and the calibration may not hold at higher, or lower, values of rpm.

To get a lower calibration standard, we need only to insert a diode, a 1N4003 or equivalent, in one of the conductors to the light bulb. Polarity is not important in this case, what it will do is allow only every other cycle of the 60 cycle per second house current to reach the bulb, giving us half, or 1800 rpm for a calibrating mark. You can do all of this at 110 volts, but remember that you are dealing with enough voltage to *instantly* and *completely* end your modeling career. As this is only a now-and-then thing for most of us, I can't really recommend the expense of a transformer operated low-voltage supply, but if a transformer with an output of six or 12 volts is available, by all means use it, with the properly rated bulb and a lower rated diode. •

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

according to Paul Lagan, writing in the fine Australian magazine *Airborne*.

ALSO FROM JAPAN

John R. Walker of Charlottesville, Virginia, provided the photograph of the hang-glider model which was made from a Japanese kit. Five different designs are manufactured, and the glide is pretty nice, according to John. He also mentions a magazine from the same country which is sort of a cross between *Popular Science* and a comic book, and

which features a different paper glider each month.

And finally, Ichiro Yamada sent us a copy of *Peanut Technology*, a 12-page publication sub-titled, *Shonai Peanut Powers*, which may in some inscrutable way sound familiar.

Although we are unable to read the text, a few English titles and captions do appear, and the drawings and cartoons are in the universal language understood by model builders the world over. A separate full-size Peanut plan for a Cessna 150L accompanied this issue, and its construction would seem to follow more-or-less traditional methods. Almost entirely hand lettered, *Peanut Technology* evidently is quite limited in circulation at present, but we predict a bright future for it, as enthusiasm is reflected from every page.

According to Alain Parmentier, of France, a Japanese TV crew was on hand to film the Peanut Scale meet conducted at the Orly aerodrome near Paris, so interest must be quite strong . . . And Ichiro Yamada has provided some indication of the lengths the Japanese Peanut modelers have gone to in the weight reduction department, by noting the following entries in a recent contest: FRED parasol: 2.8 grams; Farman Moustique: 2.9 grams; 1913 Ponnier racer: 3.4 grams. Best time of the meet was one minute, 22 seconds by the FRED.

SILLY SIGN-OFF

To close on a final, oriental note, George Harris assures us that building a model of a Chinese helicopter is quite a problem, because about an hour later you want to build another one! •

Electric . . . . . . *Continued from page 31*

because it is new, and the six-cell pack is about a year and a half old. The motor run time is to the rpm drop off at 10,000 rpm, which is a sharp dropoff. The earlier run times were to the same, 10,000 rpm.

I dusted off an old home brew charger which uses a heavy duty adjustable resistor, and proceeded to find some settings that would give me a 15-minute charge time. The closest I got to 15 minutes is shown in Table 2 where I started with 6.0 amperes, which dropped to 2.1 amperes at the end of 17 minutes with 69 am in the pack. Seventeen minutes is better than 21 minutes, but I would guess that an initial charge rate of seven amperes would be needed to give a full charge in 15 minutes if left alone.

As the column due date is upon me, I haven't had time to try it . . . perhaps next time. I also ran a constant current curve with the same charger, and at an average 4.5 amperes throughout, it ran an incredible 78 am into the pack. The pack didn't even heat up! I goofed and didn't run a motor run on this one, it would have been interesting to see how long it would run. In fact, if I have time before the next column, I'm going to run a series of tests on how many am come out of a pack compared to what is put in. That should be interesting! I'll bet it is pretty good, somewhere between 80 to 90%. Anyhow, with a constant current of 4.5 amperes, it took 17 minutes to get a full charge. At the end of the charge, the pack voltage was so high that I couldn't get more than 4.0 amperes into the pack even directly connected to the 12 volt charge battery (no resistor at all).

The bottom line on the seven-cell pack is that there was not the dramatically sharp rise in the voltage at the end of the charge as was seen for the six-cell pack. The voltage rose steadily through most of the charge, then took a "hop" of about a half-volt, then stayed steady at a peak value. This was true of both the constant current and the non-constant current charge. The point here is that when the voltage stops rising, the charge is done, but the seven-cell pack is not as dramatic as the six-cell pack. This is to be expected, as the voltage of the seven-cell pack is nearly equal to the charging battery at the end of the charge. Well, enough! I just haven't seen "hard data" anywhere, so I figured it was time to back up words with facts, so there it is! You might try it with your packs, it certainly helped me understand more about mine.

★ ★ ★

Woody Woodward sent in some information about his Powerhouse (kitted by Cal Aero Models). This is a very attractive model, and it looks like it is easier to build than most old timers. It has a span of 50 inches, an area of 380 square inches, and weighs 37 ounces with an Astro 05 using eight 550 mah GE cells. The radio is a Cannon mini block with three servos; the third servo is for an on/off switch.

Woody found it flew well with a Top Flite wood 7-4 or 8-3-1/2, but not with a Top Flite nylon 6-4. Later, he put in an Astro 075 using the same battery pack and the 8-3-1/2 Top Flite prop, which gave even better flights, at an all-up weight of 42 ounces. These flights were all in early 1982. Woody says that if he had known then what he knows now, he would have been flying with sub-C cells, as duration was erratic. It is easier to fully charge six sub-C cells than eight 550 cells, as you may already have guessed by the charge curves.

Thanks, Woody, for the info.

I just finished an 05 float plane, it has 380 square inches of wing area, and weighs 42 ounces, very close to Woody's plane, and it flies very well on six sub-C Sanyos and the Leisure LT 50 pattern wind with a Top Flite 7-4 nylon prop. It does a very good ROW as well, so I think the Powerhouse would do quite well on six sub-Cs.

Nelson Whitman, at my request, was kind enough to send me some photos of his seaplanes for my book on electric flight. Most of the photos went into the book, but here is one remaining photo which shows Nelson's beautiful fiberglass work. This is his Shag III hull (a shag is a type of cormorant). It is designed for the cobalt Astro 15 with 12 sub-C cells.

His earlier design, the Shag II, flies on 16 550 mah cells with the regular Astro 15, and does an excellent ROW. Nelson uses the RAM electronic throttle for power control. Flying weight is 68.5 ounces with a wing area of 581 square inches. This sounds just right to me; my float plane using the Astro 15 cobalt motor and 12 sub-C cells weighs 72 ounces, with 600 square inches, and it flies very well with a super ROW. Thanks, Nelson, for the photos.

My Astro 15 seaplane is called the Aqua Aport, and it is really a fun plane to fly . . . when it isn't in a tree! That's one thing about flying from the shore, don't let the plane get behind you! There is always a seaplane-eating tree ready to gobble it up, as the audience at a recent float plane meet knows. Fortunately, the damage to my Aqua Sport was minimal.

I use a Top Flite 8-4 nylon prop with the cobalt 15, this has been a good prop. The ROW is short, usually less than 50 feet.

I charge with the Astro Flight AC/DC charger, and use the Accutach (a combination volt meter and tachometer) to monitor the charge voltage from two 12-volt batteries in series.

My favorite time to fly is early in the morning, about six or seven o'clock. I fly at a local lake about five minutes from where I live. The plane is so quiet that even the fishermen don't object! In fact, they catch fish while I am doing my thing, so everyone is happy. Believe me, if you can fly and still keep the fishermen happy, you are doing it right! Every once in awhile, I see in the magazines that "propeller noise" is the real culprit, not the engines. Don't you believe it! The 8-4 is turning over 13,000 in the air, and you can hardly hear it. Propeller noise! Oh well, it's human nature to blame whatever you can.

Anyhow, the 05 seaplane I mentioned earlier is a "little brother" to the Aqua Sport, and it too flies quite well. However, at first I couldn't get it to ROW. This was puzzling, as it had plenty of power. Then I measured the angle of the floats compared to the stabilizer, and it was all very clear! The floats were slightly "up" compared to the stabilizer. I cranked in 2-1/2 degrees of down in the floats, and now the ROW is easy. For best results, floats need to be at zero or negative (down) compared to the stabilizer, a fact that many float plane pilots don't seem to know. Several planes at the contest would not take off for that reason, until the problem was fixed. If you try floats, keep that in mind, and you will be rewarded with good ROW.

Speaking of take-offs, I helped a beginner with his first flight on the Leisure Electronics Playboy, with an Astro 05 cobalt motor and seven sub-C cells. What an incredible plane! It climbs like a homesick angel, and glides forever. I've already said that I'm impressed with it, and I am even more so now. It makes an ideal beginners plane, it is super docile in flight, and it would be perfect for Old Timer for ROW. Try it, you'll like it.

Last, but not least, Hans Weiss has kindly supplied me with several issues of the European newsletter, the "Ampere Flyer." This is a monthly newsletter, and it is packed with information. In the February issue there is information on Yuasa NiCds (which look as good as Sanyos), info on the ASL 3 charer, info on several speed controls, the 1983 contest calendar, a catalog of electric articles, and on, and on. In the March issue there is a review of the Keller motors, complete with technical data, how to calculate the efficiency of a motor, an updated contest calendar and articles list, and a review of the Astro contest. There is nothing like it in this country, and it is an excellent way to keep current!

The subscription for a year is $20 (a credit card order is OK and makes international payment much easier). Write to Peter Blommaart, Rue Wauters 28, B 6200 Gosselies, Belgium.

Keep up with the future, fly electric! •

Wild Willie . . . . *Continued from page 43*

color scheme we see on all of the MRC ads and on the colorful box itself. Somehow, I rather doubt if the U.S. Army would permit anyone other than Wild Willy himself, or possibly Private Benjamin, to decorate one of its Jeeps with "Gumout" and "Bilstein" stickies! Said stickies come in a large variety, and are of the peel-and-stick type, as opposed to the older style water releasable decals. Any custom paint scheme could be easily applied with the many-colored MRC/Tamiya plastic paints, or any of the other brands of plastic paints readily available . . . let your imagination be your guide.

I made two mistakes during the assembly. I neglected to install the shrink tube covering over the motor, which is there to keep out dirt; and I kept looking for a metal spacer when in reality it was a length of plastic tubing. How could I make these dumb mistakes? Well, mine was one of the early arrival kits in this country, and included only Japanese instructions. I have since seen and checked the English version, which if I had been following, would have prevented both of my minor errors. This definitely proves that those people who have difficulty following written instructions in any language can still assemble a Wild Willy or any other MRC/Tamiya vehicle following only the sketches, with only minor discrepancies occurring. In my case, it took only the removal of a few screws to free one end of the motor, after which I slipped the tubing on and

applied a little heat from my heat gun to bring it down to size.

Driving a Wild Willy is a real kick! And more of a challenge than driving your normal R/C car that can only go fast and turn. Its extremely short wheelbase and differential allow it to turn in only twice its own length, and the high center of gravity with all of that drive power makes it outrageously maneuverable: two-wheel turns and spinouts are readily possible. One can learn to do them consistently after only a little driving practice. The speed control is excellent and positive, a definite *must* as one starts wanting to put Willy through his paces in other than "straight and level". Wild Willy is definitely an attention getter, not only from those already involved in some phase of the R/C hobby, but probably more so from the yet uninitiated public. We have never been at one of the local parks or school yards without a crowd soon gathering, and pleas of "Let me try it!" being heard. Surely, we'll all be seeing more of Wild Willy, and Wild Willy competitions everywhere.

I haven't had this particular problem with Wild Willy . . . it hasn't been left standing still for very long since it was finished . . . but with other, older R/C cars, I've found it best to place them on some kind of support, off of their tires when they are to sit for long periods of time to prevent them from getting flat spots. It is probably a good idea to do this with Willy if you plan to let him rest more than a few days.

Wild Willy is manufactured by the Tamiya Plastic Model Co. of Japan, and legally imported into the U.S. only by Model Rectifier Corp., in Edison, New Jersey. It carries a suggested list price of $129.95, less batteries or radio control system. As mentioned, any two-channel system will take care of the control chores, while the recommended battery is an MRC/Tamiya C-14, six-cell Ni-Cd, which comes with a 110-volt, wall plug-in, overnight charger. A 15-minute quick charger which plugs into your car's cigarette lighter, No. RB0010, is also available. Try your local Hobby Shop first, or contact MRC for the name of the nearest dealer. Those of you on the West Coast should write or call MRC at 14417 Tiara St., No. 102, Van Nuys, CA 91401; (213) 989-7673. See you at the track! •

Bostonian . . . . *Continued from page 49*

When this assembly is dry, cut a narrow notch *almost* all the way through the leading and trailing edges at the dihedral break locations. The dihedral break is located just at the outside of the two centermost ribs. Next, cut the spars *clear through* at the outside of the centermost ribs. Lift the spars above those ribs (they should bend enough to do this without breaking), and lift each wing tip to the correct height for the wing dihedral while leaving the center panel of the wing pinned to the plan. This will cause the spars to overlap a slight amount at the center section. Carefully cut off just the overlapping spar material, and then cement the resulting spar joints back together. Rub some cement into the notches in the leading and trailing edges of the wing which should be closed up pretty well by now because of the dihedral breaks.

Now rough-cut the wing tips from soft balsa blocks. Lightly cement them to the tip ribs, and carve them to the exact shape required. Then, separate them from the ribs, and hollow them out for lightness. Make them as thin as you desire, and then cement them back in place permanently.

Make the outline of the vertical tail by laminating thin, basswood strips to the shape shown. The outline on the model in the photos was made around a curved line of pins at approximately 1/4-inch intervals along the inside of the tail outline on the plan. When the outline is dry, remove most of the pins, and assemble the rest of the vertical tail directly over the plan.

Assemble the horizontal tail directly over the plan. This structure is very simple and easy to construct, so no special instructions are needed here.

When all the balsa assemblies are dry, use fine sandpaper to shape the leading and trailing edges to the correct cross-section. Then, sand the *entire* structure to remove any rough spots, and to generally smooth up the structure prior

to covering.

Bend the main landing gear wire to the pattern shown on the plan. Cement it in place in the fuselage.

Cover the model with lightweight tissue. The color scheme can be anything that you desire. Because the Beaver has been used as a bush plane in the Arctic, an Arctic scheme was used on the longwinged bird in the photos. The tail surfaces and the wing outer panels were covered with red tissue, and the rest of the model was covered with silver tissue. All tissue panels should have the grain of the covering material aligned with the longest dimension of the part.

The tissue can be adhered to the balsa sticks with thinned, white glue. Thin the glue with at least equal parts of water (50/50). Use this glue only on the outline of the structure. When covering the model, make sure the tissue overlaps the edges enough to cover all of the balsa so that the edges of the surfaces are not left unfinished as far a coloration is concerned.

After the covering adhesive is thoroughly dry, the tissue should be water shrunk. This is best done by very lightly fogging a spray of water above the surface. The tissue should get damp, but not really wet. The tissue will shrink as it dries, yielding a smooth, wrinkle free surface. Next, give the tissue two coats of thinned, clear dope.

Before assembling the surfaces to the fuselage, it's a good idea to add any decorations that you may want on the model. It's easier to add the lines indicating control surfaces while the flying surfaces are unattached. Similarly, decal numbers are easier to apply to the fuselage sides at this point also.

Cut the landing gear fairings from 1/32nd sheet balsa, and cement them in place on the wire. Make the tail wheel out of sheet balsa, and bend the wire from a straight pin and install it on the fuselage. Put balsa wheels on the main gear, and retain them with a drop of cement on the axle. Be careful not to get any cement on the wheel.

Cement the tail surfaces to the fuselage. Lightly cement the wing in place on the fuselage. Make the wing struts and fit them in place. Their location on the wing is indicated by a small "X" on the third rib from the center.

A seven-inch diameter plastic propeller is cut down to six inches for the Bostonian. Bend up the nose hook and insert it through the thrust button. Add a couple of small washers between it and the propeller, and then bend in a winding hook. Install the windshield and the windows. A 1-3/16-inch piece of 1/16th diameter aluminum tubing is used for the rear motor peg.

A loop of 3/16ths flat rubber about 12 inches long is about right for first test flights. Make sure the airplane balances at the center of gravity (CG) indication. Ballast the model if necessary using modeling clay. Try a few hand glides to make sure the model flies reasonably. If it stalls, separate the trailing edge of the wing from the fuselage, and add shims as required to get a proper glide. Use the same procedure on the leading edge if the model dives in the glide. Now, give the model about 50 hand winds, and try a short, powered flight. Use thrust adjustments to control the powered part of the flight, and gradually work up to more and more turns in the rubber motor.

The plastic propeller and thrust bearing for this model can be obtained from Peck-Polymers, Box 2498-MB, La Mesa, CA 92041.

The balsa wheels are available from "Old Timers," Mike Mulligan, 6031 Cortez Dr., Huntington Beach, CA 92647.

Have fun with whichever Beaver you choose to build. •

Rubber pwd. cars . . *Cont'd from pg. 48*

Open class were a Hewlett-Packard computer for first place, fifty dollars for second, and twenty-five dollars for third. The High School class prizes were seventy-five dollars for first, fifty dollars for second, and twenty-five dollars for third. Now with prizes like *these* the entries really got serious! However, most entrants weren't so serious that they couldn't help each other. Comradeship was very much evident during the contest.

The thing that impressed me was each person's approach to the design of his car. Some frames were made of wood, some were made of metal. The wheels were made of plywood, plastic, metal, while the tires ranged from wood to rubber, including surgical rubber tubing. One man solved the problem of how many turns his wheels would need by starting his car unwound at the finish line, rolling it backwards to the start line, turning the wheels a few *more* turns, then letting it do down the track for a run.

The whole meet was run very well, and the people who ran it get my thanks for a good time. Speaking of times, here are the results of the day.

OPEN CLASS

PLACE	NAME	SPEED (MPH)
1	Jeff Wilson	16.756
2	Mark Ashby	14.765
3	Bill Gains	14.479
4	Bill Stroman	14.248

HIGH SCHOOL CLASS

PLACE	NAME	SPEED (MPH)
1	Ray Stroman	15.064
2	Kevin Miyake	10.965

As you may have noticed, my son beat my time by quite a bit . . . guess it will be some time before I hear the end of *this*. It looks like I'm going to have to put together a faster car by next March, as Ray will be in Open class by then, and we will be in the same event.

Send me a self-addressed, stamped envelope if you are interested in seeing this race in person next year. Better yet, why not enter your own rubber powered car? I'll try to get the information back to you if possible. Bill Stroman, 12218 Dune St., Norwalk, CA 90650. •

Pylon . . . . . . *Continued from page 39*

used as an after run oil when you have finished flying for the day. You can make a good oil by mixing one part Marval Mystery Oil and one part 20W non-detergent motor oil.

Next, you will need a break-in prop that will allow you to run the engine at its maximum racing speed, but at a "four-cycle" rich setting to keep it cool and well lubricated. To do this on a .40-size engine, you will need to use a prop one inch smaller in diameter than will be used for racing, i.e. 9-6, 9-6.5, 9-7

RC500

1:8 SCALE RACING. IT'S A GAS!

Team Associated's gas-powered, 1:8 scale radio-controlled cars are the ultimate in model car competition.

With an unbeatable combination of power, speed and performance, gas R/C car racing has grown to be a truly international sport.

Associated cars have played a major role in the history of 1:8 scale competition. Our legendary RC1, a simple, flat pan-chassied car won both the Road and Oval US National Championships immediately following its introduction in 1971. After several years of testing and development we next introduced the amazing RC100, which won it all in R/C car racing's first World Championships.

Always a dominant force in the world of R/C racing, Team Associated's RC300 continued our winning tradition, setting records all the way in Florida's classic 24 hour Enduro.

Our secret to success is simple. We do our talking on the track, offering model car racing enthusiasts competition tested and proven cars and components.

We build race cars to stand up to world class competition, and win.

INDEPENDENT SUSPENSION. A NEW ERA.

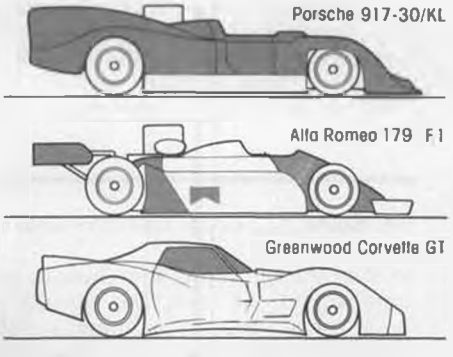
Our new RC500 is the most unique and revolutionary race car we have ever built, because it is designed around a chassis using 4 wheel independent suspension.

In the development, testing and prototype stages for over 2 years, the RC500 is the final result of Team Associated's joint British/American effort.

The RC500 is a true racing car, with authentic race car suspension geometry and fully adjustable springs, shocks and sway bars.

You set the ride height. You select the stabilizer bars to suit your track. You even fine-tune the coil-over shocks.

Every option is there for you to dial-in your RC500 the same way racing mechanics set-up a modern, full-scale Formula car... perfectly balanced for optimum performance.



The refined rear suspension geometry of the RC500 rides on adjustable competition coil-over shocks and features simple sway bar tuning.

And to make sure you get your RC500 set-up right we've included a comprehensive assembly and suspension tuning manual. Together with our simple, step-by-step assembly photos even the novice can build the RC500 and become an expert on subjects like understeer/oversteer, roll rates, spring rates, caster and camber. Special sections also cover advanced engine tuning, radio installation and driving techniques.

Exclusive cross-over front shock layout provides optimum suspension travel and rebound.

THE RC500. ANOTHER WINNER.

For all the pride and satisfaction there is in building and driving the sophisticated RC500, there is still nothing quite like the thrill of victory.

Like all Associated race cars your RC500 is above all designed and engineered to win. Each component must meet our strict, competition tolerances and are manufactured of the highest quality materials.

Already prototypes of the RC500 have won several prestigious British and American national titles, proving the versatility of the basic chassis in several different body classes.

Your RC500 meets all specifications for competition in the Americas (R.O.A.R.), Europe (EFRA) and Asia (JMRCA) using internationally recognized standards for fuel capacity and dimensions.

Take up the ultimate challenge with your driving skills and RC500. Join the thousands of RC car racing enthusiasts of ROAR (Radio Operated Auto Racers) and get into the high-powered excitement of gas car competition.

TEAM ASSOCIATED
Associated Electrics
1928 East Edinger Ave., Santa Ana
CA 92705 (714) 547-4986

depending on plane, weight, and course length.

As a stock 8-6 prop would be too small at the hub, and therefore dangerous, you should use a 10-6 cut down to 8-6. This should be cut down accurately with a simple fixture, as pictured, then carefully balanced. If you intend to race, and you don't have a balancer, *get one!* Better yet, *get a good one!*

Now that your engine is checked, oiled, reassembled, and your new break-in prop is made and balanced, we will procede to the break-in. This is a process that mates or burnishes the parts together. It also stabilizes the dimensions of the parts. It cannot be said too many times that this is a critical step, and it can mean the difference between a junk engine and a good racing engine.

Your engine should be mounted securely to a test stand or your plane. Start your engine and set the needle valve to a rich, "four-cycle" run. The way to check this is to put your fingers around the cylinder head. If it's too hot to hold onto, richen up your needle setting. Run at this setting for about two to three minutes, then shut it off, and allow it to cool down.

Restart the engine and repeat the above two to three more times. Increase engine speed by carefully leaning the mixture in steps until you get your engine up to a *fast* "four-cycle." This process could take up to an hour. The way to check that you have done your work properly is to run the engine with the prop you are going to fly with. Run the engine up with a 9-6 to 9-6.5 and see if it will hold maximum rpm without signs of leaning. If not, repeat above steps until it does.

To do the last step accurately, you will need a tachometer. All break-in should be done with five percent to 15 percent nitro fuel. Above all, *don't rush this process.* It can also be used to break-in any size engine with certain adjustments.

It is my fond hope that more of you will become interested in Formula One-40 and Quicke 500 racing. If Bill lets me write more article (*permission granted! wcn*), next time I would like to go into sheeting foam wings, as most all racing planes use them.

Try some racing . . . I'm sure you will love it. •

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

Most of the questions were how to get more speed. Ah, yes. The pursuit of more speed. Well, I'm going a little faster this year with my 7.5 tunnel, and there are a couple of things I've done to the boat and engine.

As I race in the stock 7.5 tunnel class, the only legal change I could make to the engine was replacing the standard timed piston and sleeve with the high port piston and sleeve. Because both standard and high port units are listed on the parts list, this is legal to do and still run as stock. The high port unit is a standard part item. To take advantage of the higher rpm possibilities, I found it necessary to raise my engine higher on the transom. Although many others are using X-450 and X-452 props, I've found the X-447 works best with the above mentioned setup. It seems to me that people have been over-propping the K&B 7.5. I'm always experimenting with engine height and engine angle. Both of these variables change depending on water and wind conditions.

A few letters wanted to know about the Prather 7.5 Tunel. As I don't have one, I went to talk with someone who has a fast one. That individual is Ed Fisher. Ed and I have had some close 7.5 tunnel races during the last year and his Prather 7.5 runs very strongly. Ed said his boat is stock. He has made no sponson modifications. However, he does employ an external turnfin mounted to the side rather than a fin mounted to the inside of the tunnel wall. Like many others running the Prather 7.5 Tunnel, Ed has added weight to the right side of the hull. He suggests ten to twelve ounces mounted inside the sponson over the center of gravity. He is using an Octura X-450 with a slight amount of the trailing edge removed.

As we begin our second year of racing 7.5 tunnels, an interesting trend is developing in my area. Many of the guys who build their own designs or build from the plans of others are making smaller boats for the 7.5 outboard. We have boats only 28 to 30 inches running very well using the 7.5 outboard. I'm presently working on a "chopped" version of my Dumas Hotshot 45 that will be shorter, thinner, and possibly two pounds lighter than the boat I'm presently running. I'll certainly share my findings once I get the boat completed and have raced it a few times.

1983 HOBBYTOWN REGATTA BIGGEST YET

This year marked the sixth running of the Hobbytown Regatta hosted by the Brazzle family, owners of Hobbytown in Tacoma, Washington. Originally, the event was for 3.6 tunnel boats. In recent years, Sport 40, 7.5 Tunnel, and 3.5 Deep Vee have been added. The 3.5 tunnel class remains the favorite with twenty-seven entered in that class. Twenty Sport 40 boats made up a strong field for this event.

A bothersome wind created problems for some of the 3.5 tunnels. The other classes weren't as affected by the windy, choppy water conditions.

Ed Fisher, of Seattle, demonstrated why he is a national champion and record holder by sweeping Sport 40 and 3.5 Deep Vee and placing second in 3.5 Tunnel and 7.5 Tunnel. For his racing efforts, Ed received over four hundred dollars in merchandise and equipment. Bill Hornell drove his record holding Prather 3.5 Tunnel to victory in the 3.5 tunnel class. Bill received a new radio system for his win. Driving an original design 30-inch tunnel, Rick Grim took top honors in the 7.5 tunnel category.

Following the day's racing activities,

all contestants and their families were invited to a free banquet hosted by Hobbytown. Jim Brazzle, son of store owners Bill and Ruth, served as master of ceremonies as he presided over the presentation of awards. Jim managed to keep everyone laughing as prizes were distributed to everyone who entered.

The top finishers in the four events are as follows:

3.5 TUNNEL
1. Bill Hornell, Prather 3.5 Tunnel
2. Ed Fisher, Geraghty Tunnel
3. Jim Brazzle, Prather 3.5 Tunnel
4. John Boyatt, Prather 3.5 Tunnel
5. John Havens, Geraghty Tunnel

7.5 TUNNEL
1. Rick Grim, Original Tunnel
2. Ed Fisher, Prather 7.5 Tunnel
3. Jerry Dunlap, Hotshot 45
4. John Havens, Geraghty Tunnel
5. Don Hays, Prather 7.5 Tunnel

SPORT 40
1. Ed Fisher, Modified R/C Glass
2. Steve Compton, R/C Glass
3. Norm Nordby, R/C Glass
4. Mike Coutonen, R/C Glass
5. Ron Erickson, Original Hydro

3.5 DEEP VEE
1. Ed Fisher, Prather 3.5 Deep Vee
2. Ken Themier, Dumas Vee
3. Rod Geraghty, Prather 3.5 Deep Vee
4. Mike Wight, Zinski Vee
5. Leo Dreith, Zinski Vee

C/L . . . . . . *Continued from page 46*

airplane data was not available.

FAI Combat got underway on Saturday afternoon, and as previously mentioned was flown double elimination. Top men here in the battle was Howard Rush. He used a foam plane that he referred to as the "same old airplane", which I guess is supposed to mean everybody should know what it is. He used both Rossi and Nelson power, though fortunately not at the same time. Combustion was by 10 percent nitro fuel, and thrust was from a Taipan 7x4 prop, cut to 6-1/2 inches in diameter.

One of the more interesting FAI ships was Ken Burdick's. He has designed a plane which uses easily and quickly changed components. The design starts with a combination center rib, tail boom, and engine mount unit. The tail piece is removable, as are both of the wing panels. The leading edge of the wing panels was unusual in that it was a round, one-inch diameter tube which extends through the center rib the length of two rib bays on both sides. The inner tube is built in the same manner, but with hardwood and fiberglass cloth reinforcing. Ken calls all of this "tube technology". He is still sorting out the design, as he feels the model flexes a bit much in tight maneuvering. Ken also designed a transport box to haul around enough pieces to put together six of these planes, plus flying gear. When a plane comes apart, you sure can make storage compact!

Back at the racing circle, it was time for AMA Slow Rat Race. The winning time of 6:32.9 was turned by Vic Garner flying his own "Med-Fly" plane. This is a very clean design. He used an O.S. .36 for power, swinging his own 'glass prop. The uniform tank with mechanical fastfill was of his own manufacture. Fuel used was Sheldon's 50 percent. He mentioned that he has plans for sale.

Late in the afternoon some storm activity that had been brewing in the distance came to pay a visit to the flying site. The combat flying had to be curtailed twice because the flyers were getting static electricity shocks. Just a very light rain fell, and then things were running again.

FAI Team racing finally got underway. There were five entries in this event who were new to the Regionals. The best of a series of 100-lap races was used to determine the winner. There was no feature length race run. The Kusik team came out on top with a 3:52.7 time. The design used was the "USA-FAI", by Jed Kusik. A Nelson .15 with a .152 venturi was the power. The prop was a McCollum 6-1/8x7-1/2. So much for the Saturday competition.

Sunday morning saw the weather cool off a bit, but it was quite windy. The main action this day was speed, stunt, and more combat. There was also scale, balloon bust, and sport racing to complete the activity.

The speed circle activity got under way at 8 a.m., due to the large turnout. Here is an event which is supposed to be dead, yet so many entries were signed up that there were a few entrants who never had a chance to post an official. There were 21 entrants with a total of 46 event entries. Strict time limits were adhered to, to assure as many flights as possible. The flight lineup reminded me of the old days.

There were no outstanding times turned in, probably due to the fact that it was simply too hard to get on the circle for testing. Also, some of the smaller planes had some difficulty in the wind.

Here are the results: In 1/2A, Fred and Joyce Margarido (the M&M team), took first with 94.20 mph. They used an open-exhaust TD .049 in their own design plane with a crankcase pressure tank. They used their own fuel, and carved their own prop.

In Class A, the M&M team was on top with 157.24 mph. They had problems early in the day with their engine not getting "on the pipe" due to the cool weather. Later in the day, they made the winning run with a lean setting to stay on pipe. The plane used was an original design with a Newton 'glass fuselage. The power was a Rossi .15, fed by a suction uniflow tank.

An *A* for effort had to go to Jim Rhoades for his attempts to get his Rossi .15 powered ship with centrifugal fuel switch (CFS) to cooperate. He never was able to get an official clocking.

Chris Sackett took Class B with 159.34 mph. He used a Pink Lady design built from one of the kits that he manufactures. The power was a piped Super

Tigre X-29 with a suction tank.

In Class D, the M&M team came back with a 175.71 speed for first. The airplane information was unavailable.

In Jet speed, John Newton dusted off an Ironsides Too for a 179.57 clocking. The plane was designed by Jerry Thomas and is built of aluminum and magnesium. The Dyna-Jet engine was modified by extending the intake and the combustion chamber, and it was run on a 50/50 mix of nitro-methane and propylene ox:de.

Jerry Thomas had his new asymmetrical wing Jet design with him, but did not run it. It is an all metal ship, and features a large inboard wing, and several adjustment capabilities. The tank can be adjusted to change the balance and fuel feed. It will be interesting to see how it works.

Paul Gibeault was on top in the FAI class with a 151.14 mph time. The plane was a Super Kingfisher, which is a West German design. The engine was a Rossi Mk II, with 10.5 mm crankshaft, and fitted with a Gillott ABC cylinder which had 188 degrees of exhaust duration. The fuel system was crankcase pressure with CFS.

Paul also followed up with a win in Formula 40, using a Shark rat racer. The engine used was a K&B 6.5 rear intake with a Cox long reach plug, and swinging a Kelly 8x8 fiberglass prop.

There was also plenty of combat action on this day. In the morning the 1/2A event was flown, which was really interesting with the wind blowing. John Salvin came out on top of the pyramid here, flying a Bear Model Products 1/2A Viper, powered by a Kustom Kraftsmanship TD .049. The engine used a high compression Cox head, Sheldon's 40 percent nitro fuel, and spun a Tornado 5x3 nylon prop.

Fast combat was plenty of fun to watch also. Although the planes did not have the kite type problems in the wind as the small planes, the moving air causes the planes to turn and respond much more than in still air. Perhaps this was why there were so many mid-air collisions this year. There were several hot and heavy matches which ended in pieces. Top streamer eater was John Thompson, who used his own "Axe" design. The plane had a 42-inch wing span, and is of balsa, but with a foam leading edge. The power was a Fox combat special spinning a Top Flite 8-1/2x6-1/2 cut down to eight inches. The final match in Fast was between John and Bill "Kill" Varner, who are both members of the globally-feared Beaver State Combat Team.

On the other side of the field, the Precision Aerobatics folks were doing their thing. There were three classes flown, which were slightly modified from the PAMPA groupings.

In the beginner class, the winner was Terry Miller, flying a Top Flite Tutor to a score of 285 points. Power was a good ol' McCoy Redhead .35.

Randy Schultz took the Intermediate group with a score of 326 using a plane called "Instead Of". He used a reworked O.S. .40 FSR and a Zinger 11x5 prop. Other details were a Fox RC plug, and 10 percent nitro fuel for the Robbert 5-3/4-ounce uniflow tank.

Don McClave took the Expert class with a 419 score using a Fancher "Imitation" design modified with a full fuselage. The power was a stock O.S. .40 FSR swinging a Zinger 11x5 cut down to 11 inches.

The scores in this event were no doubt adversely affected by the wind. There were many slack lines and ballooned landings to be seen.

The racing was wrapped up on Sunday. The NW region has its own two classes of sport racing. In regular Sport Race, a kit plane must be used and be powered by a Fox stunt .35 on suction feed. No shutoffs or devices common to racing planes are allowed. The second class is called Super Sport Race, and is somewhat similar to AMA Slow Rat Race. The difference is that a plain bearing, single bypass engine must be used, and no inboard fuel tanks are allowed. This sort of racing has been really popular in the area.

In the Sport Race event, Richie Salter was the winner in the Jr./Sr. class, using a Sterling Ringmaster, 9x7 prop, and Sheldon's fuel. Young Richie is a top junior competitor in the Seattle area. His time was 9:57 for the 140-lap race.

The Open division winner was Jim Womack with a 9:04 time. He used a Ringmaster, Tornado 9x7 prop, K&B

glow plug, and his own 15 percent nitro fuel.

In Super Sport, Vic Garner turned a 7:42 time for first place. He used a Nashville Slow Rat, a K&B .35 which he reworked, and his own 'glass prop. The fuel was Sheldon's, and the tank was a uniflow design.

The Precision Scale event was scheduled to fly mid-day, but the entrants elected not to risk their ships in the wind. So the scoring was based upon static judging only. The winner was Bob Newman, who entered his Waco UM-5. Second place went to Dave Mullens with his Ryan St-A. And third place was awarded to Rory Tennison for his J-3 Cub entry.

The last event to be flown on Sunday was Balloon Bust. Here is an event that looks so easy, and yet is so hard.

In the Jr./Sr. class, Richie Salter had the most hits, and the Open class was won by Uncle Glen Salter. Both used Ringmasters.

That is the report on the competition, but this meet contains so much more activity than just the competing. There are the "sideshow" activities. R.F. "Steve" Stevenson brought down a small portion of his engine collection. This amounted to about 300 engines, of all types. Then there was Frank Macy's display of old-time control line planes, consisting of Fireballs and Firebabys. Frank is the force behind the firm, A-J Funpak, which sells some of the old Jim Walker gliders, and has made available the Fireball plans.

Each evening there are the get-togethers of various groups, which many times seem to be the highlight of a contest. Many of the competitors get to see each other but once a year, and at this contest.

That about wraps up this report. Try to make it next year if you can. By the way, if anyone has any doubts as to the status of CL, there were 75 entrants, with a total of 207 event entries. I am sure that this would be considered heavy participation at almost any contest.

Keep your lines tight, and your loops round! Mike Hazel, 1040 Windemere Drive NW, Salem, OR 97304. •

R/C Autos . . . . *Continued from page 44*

tunately for me, at this time Gene Husting was doing some really good how-to articles for *RCM* and several that applied to my experience in 1/8 stressed mild, easy-to-drive 1/8 cars. Small-bore carbs, light clutches, just adequate steering to make the tightest corner on the track, light brake, a bit of push (understeer) in the setup — I used all of these setup tips on that first car and it was great.

Mild wasn't the word for it; the car was more likely to be described as uninspiring! Still, in my very first heat race in 1/8 racing, I almost won against some pretty good racers. The start was almost funny, I was last off the line. At the first corner at least half the field

stuffed going in, and a couple of others spun coming out. Hey, no sweat, I just drove around those guys, and was in second place at the start of the second lap. About lap three, the leader got nailed by somebody trying to make up time, not wanting to be lapped so early, and I was leading. End of Cinderella story, my tank had sprung a leak, and the car ran out of fuel a couple laps from the end of the heat. But before it ran dry, the situation got almost hilarious.

Constantly knocking on my back door were two, and sometimes three racers. They all had cars which were *much* quicker on the straights. One of them would get right up to my car only to overshoot a corner or simply spin out exiting. Once, one of these racers really did get right on my bumper, we came out of a corner with my car leading his by just a couple of feet, we both nailed it, and his car literally ran straight into mine. It wasn't on purpose, he had just not yet realized how much faster his car was while accelerating than mine. By the time he figured it out, we were both on our lids.

The important thing to note here is that mild chassis/motor setups really can get you around in good shape. I'll forgive you for not believing that at this point in time, but only if you will promise to keep your eye open at the next 1/8 race, taking note of what *really* works for others of similar abilities and racing comparable equipment.

My apologies for not getting right into the RC150, instead going afield with all of this stuff about setup and attitude toward 1/8 racing, but I have found it to be extremely important to success . . . and not just initial success either.

After reading what Gene had to say about car setup, and then putting the advice into practice, I was quite surprised to see that Gene himself was following that advice, even as a very experienced racer competing at the Nationals and almost always qualifying for the main.

First time I saw him race was here in Seattle for that year's Nationals, but at the time I didn't race, and so couldn't appreciate what was going on.

The next year we were at the Nationals at Rattey's (this was 1978, I believe), and by this time I did know what to look for. Sure enough, Gene was racing a very mild setup. Okay, the motor was pretty good, but it still was far from awesome. Actually, the best thing you could say about his motor was that it had the right kind of power for the traction available and his style of driving, which is far more important than just having a "killer motor" anyway. Watching practice and qualifying, his car was not one that got your attention . . . Unless you were watching closely and paying attention with a stopwatch.

As it happened, I did have a stopwatch in hand and Gene was running really well . . . not super-fast, mind you, but easily quick enough to make the main in Expert. (This was before ROAR went to the ABC main system, Expert, Amateur, and Novice racers all tried to qualify for only one main per driver class.)

As I write this, the thought strikes me that it would be very interesting to check past records to see just how many times Gene made the cut in Expert, or with the ABC main system, qualified for the A main. Interesting because, in my opinion, and I can only hope Gene agrees, he is not one of those racers that is just a natural at racing cars like Welch, Jianas, Burch, Kyes, Carbonell, and a few others are. So instead of dazzling the opposition with brillance at the wheel, Gene instead concentrates on exactly what I am telling you to do with your club racer, and you can flip back a few pages or paragraphs to re-read that information.

A seemingly unusual result to this conservative approach to car setup is that once you do discover how well it works, learn the lines at your track, figure out how to get through traffic and all of that stuff, the next logical step *is not* to load the car up with "killer power," screw in on the brake, or to do anything else that makes the car the least bit radical. I still run a .200 bore insert in my carb. Everytime I try to run more brake, I turn slower lap times. Without a little push in the chassis, I usually run fine by myself, but I can almost count on looping it when dicing for position with another car.

And you watch any smart remarks about my (lack of?) abilities or those of the racers I compete against, because I will put the group I race with up against yours *any day*. Furthermore, I'll bet you that I can qualify for the A main in any club race in the country, B or C mains at the Nationals, Winternationals, McCoy race, etc.

Gee, that made the ego all better. . .

As the pages on the desk are piling up faster than planned, I suppose we'll just have to go over the RC150 next month, which is just as well; I'll have some more pictures of the car by then.

For now, let's go back to the previous mention of using a stopwatch. This little device is not only cheap, thanks to the

electronics wizards and mass-production, it is also a very valuable tool for the racer. Cars can *look* fast, they can *sound* fast but the stopwatch won't lie to you as your eyes and ears will.

Again, we go back to when I started racing. At the time, I was still flying a lot of CL and in several competition events had been fooled by my ears; I learned to rely only on the watch for measuring speed.

It didn't take but a couple races to see that I was getting pulled real bad on the long straight. But I used a stopwatch to see just how bad it was, and it wasn't bad at all! Try it sometime. Time what appears to be the fastest car from the entrance to the corner preceding the longest straight to the exit of the corner after the straight. Do this several times to either get an average reading or a best time. Then do the same timing on another car or two, preferrably cars that are being driven on the right line, and that are working well. They just seem to be a little down on speed.

When I did this at our track there was, admittedly, a difference in elapsed time from corner to corner with the high horsepower car being quickest. But the difference was so slight that you simply wouldn't believe me if I told you . . . An under handed way of forcing you to make the test yourself.

The kicker was that the "max-motor" car(s) were inconsistent, both through the test area and through the infield which is mostly corners and real short straights. So, when timing the cars for a complete lap at a time, the consistent, easy-to-drive cars almost always came through for the win. A racer like "The Grape" (Bob Welch) would frequently mess things up with his natural ability to drive a radical car quickly, but that still doesn't change the fact that more normal people with lesser abilities can more easily go as fast as they possibly can with a mild setup.

Going just as fast as you can is the bottom line, isn't it? If you get beat, there is always next time, and you have the added experience of one more race. That experience will help.

As I write this, I am trying to wind down from a day of racing. My head is still ringing slightly from exhaust noise and dulled by nitro fumes. My mind finally realizes that today I did just what I am trying to tell you to do. No, I didn't win. I came in second in the A main. Gary Kyes had me covered by two laps in 50, and he didn't push his abilities to the maximum. I have no doubt that he could have won by a wider margin, but he was just out for some laid-back club racing. But, like I told the fellow who came by my pits after the race asking what had happened with a tone that obviously meant "Why didn't you win?" . . . I went as fast as I could go on this particular day.

And that really is the bottom line. •

BIG Birds . . . . *Continued from page 17*

(they remind me of the Balsa USA plans my Collegian was built from) and include a sheet of drawings showing how to go about getting that bathtub/guppy-shaped fuselage framed up with a minimum of fuss.

Like my C-3, Vogel's was also intended for .60 to 1.2 two-cycle or four-cycle engines only. The airframe was NOT designed to handle the weight and vibes of the bigger gas engines. I'd strongly recommend one of the new big four-strokers, or converting your two-cycle 60/90 to diesel or ignition operation . . . so that a larger, more efficient (for this design) prop can be used. You'll also like the very realistic sound (as compared to the small prop on a typical two-cycle glow engine), the great fuel economy, and the fact that any chance of overheating due to the large prop has been all but eliminated. A two-cycle glow engine isn't happy turning large props and can be easily ruined because of heat.

Vogel didn't give any gross weight figures, but the bird should come in at 13 to 14 pounds. At that weight, swinging between 15 and 17-inch props, you're gonna have to throttle back in order to achieve anything close to scale-looking speed. Don't forget to experiment with a few different size props in the air where it counts (try not to pay too much attention to static rpm figures . . . they don't mean much); when the "right" prop unloads, that BIG Bird of yours is gonna feel like she's been reborn . . . and so will you.

INFLIGHT PIX

For most of us, taking pictures has become an important part of our hobby. We try to record everything about a full-size bird we intend to scale down, get pix of other guys' good looking airplanes, and, of course, document our own efforts on film . . . all the while secretly hoping that somewhere along the line we'll come up with that special "cover" shot all the magazine editors are gonna fight each other for.

What got me off on this photography kick were some letters, notes scrawled on tissues (tissue? Why, I don't even *know* you!), and phone calls from some unhappy people. I wasn't aware that so many BIG Bird lovers were less content with static photos, and were trying so hard for those "dynamic" inflight shots instead . . . with very disappointing results. After reading and listening to the sad tales of woe, I realized that the same three basic problem areas kept cropping up: the aircraft comes out too small on the print; the negative and print are usually underexposed; and/or the plane is blurred or out of focus.

Before jumping into the problem-solving arena with my two cents worth, a reminder that coming up with consistently good inflight pix, like learning

how to fly R/C, ain't gonna happen overnight. It's yet another learning process that takes time and diligent practice. You've got to know that camera well in order to feel comfortable with it . . . and the only way to do that is to use it *frequently*. Also, as the 35mm SLR (single lens reflex) is pretty much the norm these days, all comments, opinions (Who? Me?) and recommendations offered here will be aimed at, and for, this type of camera.

Okay, now let's take a look at those three main stumbling blocks.

1) *The aircraft comes out too small.* Simply put, you've got to fill more of that negative with airplane . . . which can be a problem if you don't have a zoom/telephoto lens; most contests/fly-ins have strict safety rules and *do not* allow photographers too close to the flightline. At an informal club flying session, however, even the standard 50mm lens can be used quite effectively . . . if you plan ahead and keep safety in mind. By premeasuring and presetting the distance, *f*-stop and shutter speed, you'll stand a good chance of getting a lot of sharply-focused airplane in that rangefinder. Remember you must pan with that moving BIG Bird and use a reasonably fast shutter as the action will be close to you. A note of caution here: *don't* get that close to the end of the runway unless you're sure of the pilot. A good example was last year's pic of Ted White's big Jungmeister on its maiden flight; Ted knew I'd be taking the photos from up close, and I knew how well he could fly . . . so I was relaxed and got a good shot of his bipe right after liftoff that needed no blowing up. Also, in order to use both a fast shutter speed (to eliminate any blurring) and a high numbered *f*-stop (for max depth of field to keep things in focus), you should load with a high speed film rated at 400 ASA (color or B&W); a lower ASA rated film will leave you begging for one or the other of these optimum vital camera settings.

2) *The negative is underexposed.* If you shoot with an automatic camera, its automatic exposure system is gonna use the average reading from the bright sky and set its shutter speed or *f*-stop accordingly. Without exception the shutter will be too fast, or the *f*-stop will be too high, and the bottom line will be consistent underexposure. The folks with manual-only cameras don't fare any better cuz they also set their exposure by aiming up at the sky, and so end up with those same settings that guarantee underexposure.

Here's what works for me: I use *manual only* for all inflight shots, and I preset my shutter and lens by getting a typical exposure reading from one of the resting BIG Birds . . . and unless the lighting changes, i.e. the sun goes behind a big cloud, or sudden overcast, I leave those settings alone. Sure much of the background and surrounding area will most probably come out overexposed, but who cares, the flying machine comes out looking good. Hey, be careful about those overcast days: there's more light bouncing around than you think there is, and it'll fool you most every time.

3) *The plane is blurred or out of focus.* The problem here is that you need both maximum depth of field (the higher the *f*-stop number, the smaller you make the lens opening, and consequently, more area in front of and behind the point of focus will be in focus) and the fastest shutter speed to insure that your picture won't be blurred or out of focus. Because any movement is magnified by a telephoto lens, the possibility of blurring increases as the lens rating increases. In other words, if you're using an 80-210mm zoom, you'll have more of a problem with movement being amplified at the 210mm setting than you would with the lens set at 80mm.

Even on a bright, sunny day, using 400 ASA B&W film, like Tri-X, it can be difficult to optimize both of the camera settings because of the amount and type of filters being used. I usually have a rotating polarizer and yellow filter on my 80-210 zoom when shooting BIG Birds with black and white film. The polarizer eliminates unwanted glare, hot spots and reflections, while the yellow increases contrast so that the airplane's colors stand out, as does the aircraft itself. But it's a fact of life that when you dance, you gotta pay that fiddler . . . and in this case it costs me the equivalent of three *f*-stops. Each filter is rated for the amount of light it *won't* allow through to the film and this number is stamped on its ring; it tells you the "cost" of using that accessory. I have to increase (or open up) my *f*-stop twice for the polarizer and once for the yellow filter. Of course, a built-in light meter, whether it's in the auto or manual mode, will tell you just how much light is coming through the lens, but the point is that I end up three *f*-stops more "open" (*f*8 instead of *f*22), *and* I end up with less depth of field. Now I'm faced with having to give up some of that fast shutter speed in order to go back to a higher *f*-stop, to increase my depth of field.

There are two ways to solve this problem. The first alternative, to eliminate any and all filters, isn't a viable choice to me because I don't want to chance glare and reflections, and *do* want that bird to stand out. The second option is more practical: as I do my own developing and printing, I set the camera's exposure index for 1600 instead of Tri-Xs normally rated 400 ASA. This is known as "pushing" and does require much more developing time, even though the same developer (D-76 diluted 1:1) is used.

As I double the ASA rating twice in order to get to that 1600 (400 to 800, and then 800 to 1600), I've found that adding 75 percent of the normal developing time for each doubling of the ASA will yield a good negative. For example: if my normal time would be 10 minutes, then doubling it twice to 1600 requires an additional developing time of 15 minutes, or a total of 25 minutes. If I had shot the roll of Tri-X at 800 (doubling only once), then I'd develop for only 17-1/2 minutes. Now these are suitable times for me; because your enlarger may be different, or because you use different paper and or chemicals, more or less time might be best for you. These times should give you a good starting point if you've never pushed before and want to give it a try.

Shooting color should make your life less complicated because of Kodak's new Kodacolor VR 1000 print film. It's *VERY* fast and seems to give good color balance without the expected grain. Also, you wouldn't normally load the

lens down with the light-robbing filters that B&W films require, so virtually all of that 1000 ASA rating can be used to really optimize *f*-stop and shutter speed.

Before calling it quits, a few comments and recommendations about telephoto lenses are in order. Even if you're an old hand at using these long lenses, it's always best to plan for, and use, a tripod or similar type of support . . . especially when the lens is much over the 200mm size. And most zoom/tele's have a built-in sun shade or hood . . . *USE 'EM!* Also, go for the lowest telephoto setting that'll give you what you want; you'll have a much better chance of coming away with sharp, clear pictures. And last, but by no means least, run some rolls of film through that camera of yours on a regular basis. Neither the camera nor the lens are gonna be easy to use unless you become familiar with them . . . and who knows, that very next roll may have those inflight shots the editors will fight for!

I just realized that I've made no reference to motor drives or power winders, and it's not because I don't have one or don't use it. I have found, however, that I'm better off *not* using my winder for inflight pictures. Without the winder, I concentrate more on each frame and end up with many good negatives; using the winder seems to make me a bit careless, cuz I figure that by shooting like a machine gun I'm bound to get something good on a roll. Perhaps this is a weakness that I should do something about, but I do better when I'm "under the gun" and have to make each shot count.

'83 IMAA FLY-IN FESTIVAL

If you were planning on flying at the festival, but neglected to preregister, you may have very well blown your chance to get any airtime at Ida Grove this year. But that doesn't mean you can't go as a spectator and thoroughly enjoy the magic of this "R/C Disney-world." One reason IMAA Fly-Ins have become so very popular and well-attended is because they are so low-key. Also, there's no pressure due to competition, families have a chance to really enjoy the outing and each other (the old man *isn't up* tight about having to fly against Dave Brown for first place), and these fly-ins have become a place for sharing . . . which *everybody does*. (There's no fear you'll be giving away the "secret" that'll cost you a top slot.)

For all the info about the Festival, send an SASE and I'll shoot the beautiful brochure back to you the very same day.

THIS IS SAFETY?

I've seen a few guys who really thought they had the edge, safety-wise, but who were actually courting disaster. Both these gents pointed out to me that they had fire extinguishers and were using manual pumps . . . as they puffed away on their damned cigarettes. Kinda hard for me to account for that sort of reasoning. . . . 'Nuff said!

TIP OF THE MONTH

I can vouch for the fact that . . . "Insanity Is Hereditary; You Can Get It From Your Children!"

Al Alman, 605 168th St., East, Box 95, Spanaway, WA 98387. Don't forget that we're sharing, gang, so keep those cards and letters *and tissues* coming . . . along with the photos.

FLYING SAFETY IS NO ACCIDENT •

Missile Boat . . . *Continued from page 15*

than nuisance value.

Propelled by an internal solid-fuel rocket engine, plus an external solid-fuel booster rocket under the belly, the Styx has a range of up to 23 miles. The Styx is radar guided during the cruise phase of the flight. The radar in the Styx nose cone sends its scan to sophisticated computers aboard the Osa. These analyze the information and decide upon the action to be taken. The computers then direct the Styx to within target acquisition range using the missile's own radar information. When the Styx missile is in range, the infrared homing system takes control for the final guidance phase of the flight. This directs the missile to the heat of the target ship.

The Styx cruise missile flies at about 150 feet above the water. This is so low that it makes the missile virtually impossible to detect with normal shipborne radar, until it is within visual sighting; then it is too late.

Osa/Styx effectiveness has the leading navies of the world worrying about the safety of their huge carriers and other expensive and important ships. Indeed, the Soviet cruise missile/Fast Attack Craft combination has caused a revolution in the future of naval warfare.

An R/C Osa/Styx construction feature will appear in next month's **Model Builder**. This model can even launch a missile! Don't miss it! Happy Boating! •

Sedan . . . . . *Continued from page 11*

they're military planes.

Two preparatory items will help in construction. First, make a sanding block out of 3/4 x 2 x 12-inch straight pine stock faced with 120 and 220 grit aluminum oxide paper (use *rubber* cement so that you can replace paper as it wears). Next, make up a tool as shown on the plans, which I think you will find extremely useful for tasks like slotting trailing edges and cutting off cross-pieces and diagonals. Break a carbon-steel (Gillette Super Blue) double edge blade as shown. Hot Stuff it into the slit end of a 3/16 dowel. Use it by sighting down the blade held vertically over the part you want to cut and pushing down to cut and trim small parts "X-actly." For example, to cut fuselage crosspieces and diagonals, shape one end to fit with the sanding block. Now, place the stick over the plans or across the framework with the preshaped end in place, line up the tool's blade with the joint line, push

down, and *voilá!* — the perfect joint.

TAIL SURFACES

Let's begin here. Start by supporting the 1/8 square medium-hard LE and 1/8 x 3/16 TE pieces over 1/16 scraps on the plastic covered plans (I reuse Monokote backing sheets as it helps save petrochemicals). Pin down the spars and add the 1/16 x 1/4 and 1/8 x 1/4 ribs and braces as shown. The rudder tip is laminated from four layers of 1/32 x 1/4 balsa using Titebond, over a form.

Add all the gussets and braces as shown. Spot glue the spars and the aerodynamic balance areas of the tips together. Please note that the rudder-fin assembly can only be glued on *after* the stab-elevator is covered and installed on the fuselage. The rudder spar is an important strength member, so don't just cut it off to clear the stab spar and then butt-glue the fin to the top of the stab.

Lift the surfaces off the plans, and with a ballpoint pen, draw centerlines on the LE, TE, and tips. Using the sanding block, shape the surfaces to conform to the plan cross-sections, leaving a little "fat" (1/32 or 3/64) on the extreme TE to avoid breaking it during handling and covering. Cut the surfaces apart and sand the bevels on the rudder and elevator spars to allow free movement of the hinged surfaces with a minimum gap. Drill 3/32 holes for the Robart Mini-Hinge Points, and cut recesses for the hinge joint, *but do not glue yet.* This nicely simulates scale hinging.

Set these surfaces aside.

LOWER WING

Don't complain, guys, there's only a half-wing to build here, and besides, the funky configuration is half the appeal of this bird. I never have figured out how to lay out tapered wing ribs, especially for a *double*, double-taper wing like this one, so the lower wing is largely finished up with the sanding block, like the tail surfaces.

Cut the center and tip ribs, and the rib at the TE "break," out of 1/16 medium-hard sheet per the plans. Carefully cut the spar slots. Cut rectangular blanks to the length of the other ribs over the plans, with a little extra on the front edge to allow shaping the LE bevel. Mark and cut the spar slots using a divider to transfer the tapered spar depth at each rib station. Cut the LE pieces, and epoxy the TE pieces at the break joint together (don't glue the dihedral joints yet) over the plan. Notch the TE. It helps to roughly preshape the TE pieces before going further. Cut the sheet tip pieces, noting grain direction. Note that the center section LE piece forms its own dihedral brace: it is deeper than necessary to begin with, and runs without breaks across the dihedral joint area. Be sure to sand in the bevel on its forward face very carefully, to insure a good, strong joint. Fit and glue all the ribs *except* the dihedral ribs, not gluing ribs to the spar where the dihedral brace will pass through. Glue in the tip pieces.

After sanding the joint faces at the dihedral break to a good fit, pack up the tips the indicated amount and glue the panels together using epoxy sparingly. Add the rest of the ribs, again *not* gluing where the dihedral brace goes. The brace is most easily made using this method: the ribs are slotted for the brace, a blank of plywood (cut to length) is slid into the rib slots, and the spar is used as a template to mark the top edge of the finished brace. The top edge is cut with a jigsaw, the blank is slid in again, the bottom edge is marked as before, and the blank pulled out so the final cut can be made. Glue into place using spare amounts of epoxy.

Lift the wing off the plans.

Add the 1/16 x 1/4 strips outboard of the dihedral rib bottoms. These form a base for the covering to adhere to. Add the block bracing for the mounting bolt hole but *do not drill* yet. Tack-glue and rough-shape the fairing block.

Now put a thin strip of vinyl electrician's tape across the tops of the preshaped ribs only. Sand the LE and TE roughly to shape, and then shape the wing ribs using your sanding block laid spanwise but pushed chordwise to shape the rib blanks to blend with the taped-over ribs. Sand the whole structure smooth, except the bottom fairing block, and set aside.

UPPER WING

Use your favorite method to "prekit" from 1/16 medium-hard balsa, 20 regular ribs, three center section ribs, 20 nose ribs, and two dihedral ribs from 1/8 sheet. Round off the rear, upper portion of the nose ribs to produce a better covering job.

Pin down the spars, the preshaped and notched TE, and the LE over 1/64 shims. Add the ribs, gluing LE and TE with Super 'T' Hot Stuff, and the rib-to-spar joints with Titebond, using for the latter purpose a pointed, 1/4-inch round brush. *Don't glue* where the dihedral brace will go, and don't add the 1/8 ribs until the dihedral joint is complete.

Glue in the 1/16 x 3/16 hard interplane strut braces and scrap strut mounts, drilled out to 1/16 where indicated. Add the tips, noting the cross-section and upsweep on the plan. Lift the outboard panels, and sand the joints to match the dihedral angle. Prop up the tips the indicated amount, and glue LE, TE, and spar dihedral joints using a Sig trick: drill several small holes, 1/32 or 1/16 diameter by 3/32 deep, into the spar, the LE, and the TE *inside* their final cross-section. Work epoxy into the holes and over the mating faces, bring together and pin, effectively "nailing" the parts together. Add the gussets and block reinforcements shown, and the center-section sheet fill (note grain direction). Cut and fit the TE fairing block roughly to shape but *do not glue* until the fuselage is available for final fitting.

FUSELAGE

Build the side frames (one left, one right) out of hard, stringy 1/8 square balsa as well as the other sizes of balsa and spruce where indicated. Take special care to get the lower wing saddles right as they control its incidence. Note that the side view of the fuselage is a true *projection* of the top view, so the tail post will end up over the centerline and over the spot shown on the plans. Glue the 1/16 hard diagonal on the outboard edges of each frame so they will contact, and can be glued to, aft fairing strips. Use Titebond here sparingly, but preglue each joint and you will gain significant strength. *Do not* add the 1/32 sheet sides yet. Cut out the bulkhead parts and cabin crosspieces, but don't glue the ply pieces to B-B yet. Glue cabin bulkheads and sides together upside-down over the plans, taking care to get a square, true structure. Crack the longerons

behind C-C and bring the side frames together at the tail directly over the fuselage centerline, and glue. Add the gussets behind C-C, and the top and bottom crosspieces and diagonals. Fill in the lower wing mount area with cross-grain 1/16 sheet. Lift the structure off the plan and epoxy the ply pieces to B-B with epoxy, but *do not drill* for the wing bolts, and don't cut away the frames in the window areas yet.

Now add the 1/32 sheet sides, cut from hard, stringy, A-grain stock, but *don't glue* forward of B-B yet. You complete this area by weighing one side at a time down on the building board and bending up the front frame 3/16ths of an inch. Small kerfs half-through the front frame pieces, made with a razor saw, will ease the bend. Make sure sheet and frame contact evenly, and use Super 'T' to glue them together. Add the front cross-members and all the indicated gussets and reinforcements. Cut out the window areas.

Now build up the rear turtledeck framework and stringers, the side fairing stringers, and the 1/16 sheet at the pushrod exit point (left side only . . . this ship uses one pushrod for both control functions). The forward fuselage top changes from oval to triangular cross-section, but 1/64 plywood, dampened, bridges this nicely and is a lot lighter than blocks. First add the partial bulkhead A-A, the "dash panel," and the 1/8 scrap brace between them. Add the gluing pieces along the top longerons. Cut a piece of 1/64 ply roughly to fit. Put a bead of Titebond along the top of the brace and the dash panel, mate up and clamp or hold until the glue sets up. Now trim and glue the side seams and forward edge down, using lots of rubber bands or rubber strip to clamp.

Cut and glue the 1/4-inch sheet forward side pieces and top and bottom blocks. Add the 1/4 x 3/8 spruce lower wing "hold-up" brace and spruce gear leg crossbrace. Bend the LG wires and drill B-B as shown. Bind the legs to the fuse with epoxy and copper wire, and bind and solder the lower legs together. Add the bottom fuse sheet, grain fore and aft, and sand the fuse front to contour. Sand the side (2°) and down-thrust (3°) shown into the nose. If you are using an engine longer than a Babe Bee, the firewall will have to be moved back to keep the prop plane in scale position. A new firewall can be made by marking around the sanded-back nose onto a piece of ply held against it.

Add the servo rails and reinforcements, spaced to suit your servos (plans set for Ace mini servos). If you plan to use a throttle, think out and do the installation now. I originally used a "clunk" tank made from a one-ounce Hot Stuff bottle, and ran the fuel line to one fill tube on the Babe Bee backplate (the other was plugged). (Fifteen minutes is a long time to try to stay in front of a 1/2A plane.) Coat the inner nose area with heat-thinned epoxy, glue 3-48 blind nuts for the engine bolts to the firewall, and epoxy them to the fuselage nose.

Now add the 1/16 ply piece to the top of B-B, using epoxy. When this has set, place the top wing on the fuse, align it carefully to avoid lateral or longitudinal twist, and spot glue in place. Drill the wing dowel holes straight through B-B into the wing spar, and drill the TE and 1/8 ply wing mount with a 3/32 or No. 64 drill. Remove the wing and tap the mount holes 4-40 or install 4-40 blind nuts. Add, and final-sand, the top fairing block to the wing, and drill and recess as shown for the bolts. Add the wing dowels.

Shaping the forward cabin roof block is an exercise in sculpture . . . just remove all the wood that doesn't look like the finished piece. Study the photos before beginning to have the shape firmly in mind. Begin by fitting the block exactly to width, and mark and sand the side profile. Use 180 grit paper glued to scrap 1/8 x 3/8 spruce, and 220 grit glued to six inches of 1/4-inch dowel, to finish the shaping. It helps to mark around the wing LE and to mark the shape of the block at the fuse side. Sand the bevel across the top of the windshield, being usre not to sand into the wing LE shape that projects cross the cabin top. Finish up with the wing installed, and with tape over finish-sanded wing areas like the LE and inboard rib tops. Rabbet the block to take the windshield material using a fresh single-edge razor blade. Recess for, and add, the spruce windshield

posts with epoxy.

I used strips of 1/16 x 1/32 to form ledges in the window and windshield openings to glue the acetate to, but don't add these until most of the covering/finishing is done. Now fit and carefully align the lower wing and fairing block, and drill, tap, and recess the wing bolt hole and mount as shown. All the wing bolt holes and recesses should get a good shot of Hot Stuff for reinforcement and fuelproofing.

COVERING AND FINISHING

I used a rather heavy combination of Silkspun Coverite and three coats of sprayed Pactra Formula U in red and white to approach the cream and maroon scheme of the original. Solarfilm, Monokote, or even Super or Permagloss Coverite would no doubt be lighter and produce a better finish than I managed. Make sure you remove the covering from areas that get glued on the stab, fin and fuselage. The trim was painfully cut from Trim Monokote, using tracing and carbon paper to transfer the shapes and lots of new, No. 11 blades, cutting on a sheet of glass.

The dummy Whirlwind cylinders were made from lengths of cardboard coat-hanger tube wrapped with two stepped layers of 1/32 sheet balsa and carpet thread to simulate fins. Rocker boxes and heads are 1/8 scrap, pushrod tubes are 1/16 aluminum tube, the exhaust collector ring is four wraps of 1/16 x 1/4, Titebonded around a form, and the crankcase is from one-inch block, razor-sawn to shape. An easier, but more expensive approach is to buy the Williams Brothers cylinder kits . . . and if the Williamses are listening, I bet you guys could sell a zillion one-inch scale, full-engine kits to the schoolyard set. The dummy was cut away with a drum sander and Dremel tool to fit around the engine, and a "crankcase" nose and rear transition piece was made of 5/8 sheet with slots and holes for the engine parts. Wood screws in small hardwood blocks epoxied to the firewall hold it on.

Don't forget that the wheels, the interplane struts, the LG fairings, and the dummy exhaust add a lot to appearance. I leave the dummy engine off for flying. You could leave it on and add flying wires too, but at this scale, and for this kind of fun-fly project, it didn't make sense to me.

RADIO INSTALLATION AND FLYING

The pushrod installation looks impossible, but it works well. A 3/64 wire inside the inner Gold-N-Rod with Z-bends on both ends works the rudder, and the inner plastic tube is connected through 3/64 wire fittings that wrap snugly twice around the tube (but not so tightly as to bind the inner wire and thus increase servo loads) also terminated in Z-bends. The outer tube is only a guide, but rough it up and epoxy it in place at both ends.

I have used both Ace Mini and Cox/Sanwa (micro servos) sets with success. The latter is a bit heavier, but the plane with either system is so light that it has thermalled for 10 minutes with either system aboard. Set the control throws to give about 1/4 inch up and down elevator and 3/8 inch of rudder each way for test flights. The plane is easily capable of snaps, spins, loops, barrel rolls, split-S's and similar maneuvers . . . although, of course, negative Gs quickly starve the Babe Bee. Make sure your installation is properly secured, that servos travel the right way with their arms on tight, and no wires are being strained, and generally follow all the good practices you read about every month on these pages.

Balance the plane at or forward of the indicated point for initial flights, and remove all warps and misalignments before flying (about 1/8 inch of washout is OK in the upper wings). I test-glided the plane over a grassy baseball outfield, with the radio on. Once the glide is trimmed to this CG, all other adjustments to counteract diving, stalling, or turning under power should be made with washers under the engine lugs to adjust the thrustline. The plane glided nicely at this CG with the trims on both flying surfaces set at zero . . . a desirable condition, as changes in speed have less affect on flight attitude. While this is not really a plane for beginning pilots, it has a free-flight heritage and, if trimmed right and left to itself with enough altitude, will recover from most unusual attitudes into straight-and-level flight.

Try your first flight on a day with no more than five to seven mph of wind. After the first trimming flight, mine flew great, and has over 75 flights on it to date. I have increased the control throws gradually, and the plane is capable of some very wild, decidedly non-scale aerobatics. It's a great plane to have around for those late summer evenings when you want to fool around but don't want to pack up the toolbox for a trip to that distant flying field.

Good luck, and FLY SAFELY! •

Choppers . . . . *Continued from page 19*

without pressure.

As far as rotor head set-up goes, I run my blades locked down as most of you regular readers know by now. The blade holders do not match (or accept) the plastic reinforced blade roots very well, mainly because the blade holder's top and bottom grips are not parallel with each other. I used K&S shim brass epoxied to the plastic blade roots to give a nice friction fit. Then it is a simple matter to set the lead/lag, tighten down the main blade bolt, and Hot Stuff the joint between the blade holder and blade.

Complete rotor head balance is done on the High Point Balancer for dead smooth flight the first time out. (See June and July 1983, *Model Builder*.)

FLYING

Given that you've taken the time to set the drive system up smoothly, to balance the rotors properly, and to double check the collective pitch angles, the Competitor will fly beautifully. This helicopter has the smoothest, quickest response of any ship I've flown to date. It is so tight that it almost becomes a part of you. At least you *think* it does!

It will hover dead-smoothly, yet do all sorts of aerobatics. A good example of this was the first flight with my ship. I lifted off carefully, made a few tracking changes, then proceeded to "wring it out." It felt so good I pulled a few loops from a safe altitude, then shot some approaches, and hovered a bit before shutting down.

SET-UP

The old as well as new instructions deal pretty well with set-up, although

I had initially set the ship up for dual rate throws on cyclic. I was surprised to find out that the entire first flight had

been on high rate. Yet the helicopter was not jumpy or touchy while hovering. It all goes back to the fine design of the rotor head. I conclude that dual rate is not necessary for the average guy who wants to fly the Competitor smoothly yet still do a few basic aerobatics such as loops and rolls.

Several other points are worth mentioning. The power to weight ratio of this helicopter must be the best around. An O.S. Max .50 FSR-H handles the Competitor cleanly with no problems. It is great for sport flying. Of course, the O.S Max .50 has been a superb engine since its inception, putting out close to the power of other .60s. I put the O.S. Max .60 FSR-H in mine because I had one on hand, and because I always like to be able to run an engine on the rich side. This gives superior cooling and lets the engine loaf along. If I had not put the O.S. in, I would have gone with the H.B. 61 PDP in its place. The new style carb on the HB makes it an excellent helicopter engine. From a metallurgical standpoint, I believe the HB will run cooler than the O.S. also.

The Competitor stays set up very well. You can loop it, roll it, hammer it around, and hot-dog. After the flight, the blades will still track, and the ship will be just as smooth as when you started. You can fly it today, or fly it a month from now, and nothing will have changed on you. Again, the collective system and the rotor head make this possible.

The Competitor has excellent autorotational qualities. The clutch is well built, and the rotor blades give good inertia at the bottom of autos. I have not done any full down autos with my Competitor, only power recoveries, but I have seen them done, and I have talked to people doing them. All of their comments have been very favorable. Soon, I expect to put a small whiffle ball training gear on my Competitor to practice full downs. Then, after I get completely familiar with what the helicopter will or will not tolerate, I'll remove the training gear and look completely professional! I'll give details in a later column.

Yes, it does fly inverted. Mine will never fly that way, but the helicopter can be set up to fly inverted quite easily if you know what you're doing. As I have no direct experience with inverted flight, I'll let it go at this: call Robert Gorham for all the technical details on inverted flight.

ASSORTED HINTS AND MODS

Static coning on the Competitor is extremely important. Each blade should be within one-eighth inch of the other when measured up from the tail boom to the blade trailing edge. If your static tracking is off more than this, I offer this relatively easy fix. First, measure the distance from the boom to each blade's trailing edge. *This must be done with all linkages complete, blade pitch set the same, and the helicopter essentially ready-to-fly.* If one blade is 6-3/4 inches and the other is 7-1/4 inches, you want the static coning to be seven inches for both blades. Write this distance down for later reference.

Cut a piece of 11/32 o.d. brass tube to the same length as the trimmed rubber damper. Take the rubber damper from the head and force it onto a drill bit. Put the drill bit in the drill and then use 80 to 150 grit sandpaper *with a block* to grind down the outside diameter of the damper. (Hold the sanding block to the damper as the drill is turning at full speed.) Periodically check to see if the damper can be forced into the brass tube. Stop grinding the damper as soon as you can force it into the brass tube. Put a drop of Hot Stuff between the brass tube and damper to lock them together.

Coat the outside of the brass tube liberally with five-minute epoxy and slide it into the rotor hub with a twisting motion. Insert the main screw with bushing through the yoke and damper, then tighten. Set the trailing edge of one rotor blade the proper distance up from the tail boom that you measured earlier, seven inches in this example. Hold or set this distance until the epoxy hardens.

Now you have perfect coning for the rotor head while still incorporating the rubber insert for the necessary dampening. To save you a bit of trouble later on, you can disassemble the rotor head after 20 minutes or so, while the epoxy is still rubbery. Trim off the excess epoxy that gushed out where it really wasn't supposed to. Leave the side bushings (on

the main yoke with the main screw) in place, as there is no need for these to be free, and when loose, they can affect static tracking.

You may want to double up the aluminum pieces (No. 478) that support the collective assembly. You'll also need two extra brass bushings (No. 487). This gives a wider support base which will not wear out as quickly as the single plates and bushings (photo).

The washout control as it comes will be fairly stiff if you just screw it together and stick it on the main shaft. Take some time, and loosen it up so that it works freely with no slop. Also, the links coming down from the washout control will have to be loosened up slightly by squeezing the outside diameter with a pliers while the link is on the ball.

CRITIQUE

After assembling and flying the GMP Competitor, I find that building it with the new instructions is about three times as easy compared to the old instructions. *Make sure you have the new assembly manual before starting construction of your ship.*

The Competitor loves to fly . . . it is so smooth and nimble. I hate to say it, but sometimes it almost asks to be hot-dogged and hammered around, it flies that well. Its ability to stay set up also puts it in good favor with me. However, there are points that need improvement along with the strong points. These are as follows:

POINTS THAT I FEEL NEED IMPROVEMENT

1) Side frame holes should be drilled in the correct positions without being oversized. The overside holes really complicate the setup of the entire drive system.

2) Quality control of the main rotor hub and yoke holes for the rubber damper insert should be improved to give accurate static tracking.

3) Tail rotor drive should be made standard with the larger diameter, flattened end drive wire.

STRONG POINTS

1) The main rotor head is the best on the market. State-of-the-art.

2) The entire collective system works very nicely and can be set up anywhere you desire, *as long as a pitch gage is used.*

3) Drive system gear ratios are very good, and the spiral hypoid gears in the main and tail rotors give smooth and efficient operation to the whole helicopter.

4) The fine quality of the autorotational clutch and heavier-than-average main rotor blades make full down autos practical.

5) Excellent power to weight ratio; this helicopter will be good for all of you at high altitude.

6) I failed to mention this in the body of the article, but the heavy duty Rocket City ball links are excellent, along with hardened pushrods. Don't try to re-thread the stock pushrods unless you want to dull your die.

That completes the overview of the Competitor, hope to see you next month. Ray Hostetler, c/o **MB** magazine., P.O. Box 10335, Costa Mesa, CA 92627. •

Soaring . . . . . *Continued from page 25*

with 400 or 600 grit sandpaper to give it a very smooth surface, and then removing the dust. Next, apply the Supertape directly to the sheeting. Leave the glossy paper backing on for now. When you have covered the entire wing skin, except for the area of the spar because you are going to use epoxy glue there, use a hard rolling pin, dowel, or squeegee to really press the Supertape into the wood. If you haven't already glued on a false leading edge, now is the time to do so. (See Method 1, part *A.*) Protect the foam core with masking tape and sand the part as if it were an extension of the curve of the foam core. Get rid of the dust, and remove the masking tape. You are now ready to apply the sheeting to the core. Peel off the protective backing from the Supertape and be extremely carefully *NOT* to let the adhesive touch *anything!* It is so tacky that it will permanently attach itself to anything it touches: little scraps of balsa, dust, paper, the core itself, etc. Mix up some five-minute epoxy glue and apply it to the spar cap and the area of the sheeting that you didn't apply the Supertape to. This will give you the best bond between the skin and the spar cap. If you are in a hurry, you can skip the epoxy and just use the Supertape, but you had better be sure that your spar caps aren't recessed from the surface of the foam (or sticking up) or else the outside of the skin will either need filling or extra sanding . . . a waste of time in the long run. I skipped the epoxy on the GHS, and it worked out just fine.

When the top and bottom skins are being applied, it's best to rest the foam core in its respective foam core bed so that you won't build in any warps. After the skins are applied, firmly press them into the foam core with a soft, rubber brayer, the kind used to apply ink in linoleum block printing. Lacking this tool, a second choice would be your hands used in a pressing motion. The rubber roller allows a faster, more evenly applied pressure, and I prefer it.

The next step is to trim off the excess balsa sheeting. If the Supertape won't hold the sheeting to the false leading edge (it almost always sticks just fine), a little Hot Stuff along the same will fix it. After both skins are trimmed, glue on the leading edge. Hot Stuff Super 'T' works well for this operation. Use it sparingly, however, as it can be a bear to sand if you slop it on and fail to wipe it off when it oozes out from behind the leading edge piece.

Now comes the fun part, the shaping

of the leading edge and the contouring of the wing skin to a perfect airfoil shape. Begin by taping off the top wing skin with one, or preferably two-inch wide masking tape. This will protect the skin from your mistakes . . . and you will make a few. Take your razor plane and begin planing away at the leading edge. Always keep the angle of the blade about 30 degrees from perpendicular to the LE for easier cutting action, and always keep the blade tangent to the curve of the wing skin at the point where the LE piece and the skin join together. When you start to feel the razor blade hitting the glue in the seam, stop planing and get out the coarse sandpaper (150 grit). I always use a sanding block, *never* my bare hands, when I sand anything on the wing's surface. Continue where the plane left off until you see and feel that the leading edge piece is flush with the top wing skin. Repeat the process for the bottom side of the wing. (See sketches.) All that remains to be done with the leading edge is to round in the LE radius. If you have planned your LE dimensions correctly, the centerline of the LE flat side will be the exact nose of the LE radius. Draw the CL with a fine point felt tip pen. This line is your reference point for the sanding of the radius.

Now that the LE is finished, take a look at the wing skins, top and bottom. Use the sun, a point source of light such as an incandescent light bulb, or any kind of a shadow-producing light source to find any bumps or dips in the surface. If there are small ridges or very slight depressions in the skin's surface, these can be sanded out. If you've done everything carefully up to this point, you shouldn't have any significant irregularities to contend with.

A good size for a contouring sanding block is a minimum length of nine inches (12 inches or longer is fine), and a minimum width of two inches. A comfortable handle is desirable. Begin sanding with 150 grit paper if you have bad irregularities, or 320 if you have only minor irregularities. When you stroke the wing's surface, always do so at about a 30 to 45 degree angle to the spar. This way you will avoid sanding flat spots in the airfoil.

You will be amazed at how quickly the surface smoothes out, and how perfectly curved it will be. I swear that I get more enjoyment out of making that wing perfectly smooth than I do out of any other building step. It is like magic to me how this process works!

Let's see, which lesson was that?

The next thing I learned was in regard to aileron differential. I made the mistake of using a 120-degree bellcrank in each wing that was twice as big (pivot to control holes) as the servo output arm which activates them. This significantly decreased the amount of differential I had available to me (I like about two or three to one, up throw to down throw). Lesson learned: use bellcranks that are close to the same size as the output arm of the servo. Anyway, the end result for the GHS was a little less than a 1-1/2 to one ratio which when coupled with rudder throw suffers no adverse yaw problems. Thank God for the Silver Seven that allows me to vary the amount of rudder coupling to achieve straight-ahead rolls.

Well, that's enough about the Goat for now . . . next month we'll see just how well we did against the 50 or more contestants at the Two Meter World Cup in Modesto, California. It looks good from here!

MODEL BUILDER SAILPLANES

I thought it would be interesting to take a look at the old Model Builder plans list and see just what there was in the way of R/C sailplanes. I found quite a few that I liked, some that I thought were unique, a half-dozen or so that I would like to build some day (one of which I am currently building), a few scale subjects, a few powered sailplanes, some aerobatic slope soarers, a couple of flying wings, a couple of multi-task gliders, and lots more! Take a look for yourself, there's quite a variety!

No. 3831 ELECTRICUS **$5.75**
Electric powered two-meter competition sailplane, for 05 motors. By Larry Jolly.

No. 3832 CUTLASS II **$3.50**
Foam-built flying wing R/C glider, based on Navy carrier fighter. By Larry Renger

No. 1831 ULTRA Mk IV **$5.75**
Standard Cl. 3-ch. R/C electric sailplane for geared or direct drive. Mike Charles.

No. 7821 MONARCH **$5.00**
R/C 6 ft. span swept, flying wing glider with fuselage, fin/rudder. By Bill Young.

No. 1821 *Model Builder* **RAVEN** **$5.75**
Latest in a long line of tailless R/C sailplanes, span 110", 2-ch. By Dave Jones.

No. 12811 XINGU **$4.00**
High performance F3B type sailplane of contemporary construction. Ken Stuhr.

No. 8811 MINI BIRD **$4.00**
Two-meter version of Dave Thornburg's well known Bird of Time. Mark Smith.

No. 5811 BLANIK L-13 & L-13J **$5.00**
Sharp looking T-tail R/C powered glider for .049-.15 eng., 80" span. Pavel Bosak.

No. 5802 GOLDEN EAGLE **$4.50**
FAI competitive Std. Class R/C sailplane. Glass fuselage available. Tom Williams.

No. 4802 SUNBIRD **$3.50**
For the latest challenge, a 54" span hand launch R/C glider. By Dave Thornburg.

11791 POCKET SOARER **$3.00**
All sheet-balsa T-tail one or two-channel 50" span glider, for .020. B. Lundstrom.

No. 3792 MYSTERY **$4.00**
Compact 64" span aerobatic R/C slope soarer for 2-channel radio. Al Patterson.

No. 2792 CLIFFHANGER **$3.00**
R/C slope soarer quickly built from Ace foam wings, 54" span. By Larry Renger.

No. 7792 PERCY **$4.00**
Pulse-rudder slope glider uses pantyhose egg/pod fuselage, 68" span. Jack Headley.

No. 4792 PETREL **$5.00**
Rugged, competitive R/C sailplane with 100" or 2-meter wing options. Jim Ealy.

No. 10782 AFTERNOON DELITE **$3.00**
Compact 54" span, highly maneuverable V-tail R/C slope soarer. Randy Wrisley.

No. 5782 MERLIN **$3.00**
Single or mini-multi R/C aerobatic slope soarer. Ace foam wing. By Kevin Flynn.

No. 9771 BOOMER **$6.00**
A different, but efficient, twin-boom R/C Standard Class sailplane. Bert Striegler.

No. 9751 BABY ALBATROSS **$10.00**
Exact R/C scale model of famous Bowlus sailplane. Span 122". Col. Bob Thacker.

No. 2751 TOP SLIDER **$4.00**
R/C Slope Racing glider. Will sport fly in light winds without ballast. Ken Willard.

No. 1751 R/C TYRO TRAINER **$3.50**
Powered glider with removable .049 power pod/hatch. Span 74". By Hank Cohan.

No. 12731 QUASOAR II **$5.00**
Beautiful 12 Ft. Span, V-tail, R/C soarer. Spoilers and air brakes. By Niel Liptak.

No. 6732 DRAGGIN' FLY **$4.00**
Lightweight R/C glider for thermal soaring. Wingspan 7 feet. By Duane Hyer.

No. 4731 BRIEGLEB BG-12 **$4.00**
Easily built 100" scale sailplane for slope or thermal soaring. By Chris Christen.

No. 1732 SPECTRAL **$3.00**
Single channel R/C soarer. 57" span, weighs 8 oz. Easily built. Andy McAfee.

No. 12721 DON QUIXOTE **$3.50**
An 85" span R/C glider of classic lines. Easy to build. By Dave Thornburg.

No. 9721 COLEEN-12 **$4.00**
Graceful 8 ft. V-tail soarer has slope or thermal wing plans. By Randy Warner.

No. 6723 CALIFORNIA COASTER **$4.00**
All sheet balsa R/C soarer featuring a 9 foot Jedelsky wing. By Mat Tennison.

No. 3721 YANKEE GULL **$5.00**
Expandable R/C soaring glider with 8'4" to 12'0" wing span. By Le Gray.

No. 1723 WHITE TRASH **$4.00**
A proven, trophy winning R/C sailplane with 7 and 10 ft. span. By Rick Walters.

No. 11711 NANCY **$4.00**
Scale-like, 86" span R/C glider featuring easy construction. By Jack Elam.

If you see a sailplane that you would like to build, take a look at the full-size plans instructions on page 96 and go for it!

AIRFOIL OF THE MONTH: EPPLER 214

I think that this airfoil was supposed to be the answer to the long quest for a do-it-all airfoil. Many people think it *does* do it all . . . from thermal duration, to distance, and even speed, but I think that it tends to be a little weak in the last department after hearing about the speed runs and times of the German model, the Samun, at the US F3B Team Selection Finals last summer.

I think that the E-214 is probably a very good choice for a multi-task sailplane where the emphasis is on distance and duration, or it would be a good choice for a cross-country model.

The E-214 was designed specifically for camber-changing flaps whether it be full-span flaps on a polyhedral ship, or flaperons, or a coupled flap/aileron setup. The flaps were designed to pivot at 25 percent of the chord measured from the trailing edge.

As you can see by the outline of the section, the 214 is slightly "under-cambered" from about 50 percent of the chord on back to the TE. I would think that this would make for difficult building if one were going the built-up route (no sweat for foam cores).

The theoretical glide polars and pitching moment curves reveal a few very interesting facts (theoretically). The pitching moment almost doubles when one moves the flaps from six degrees "up" (less camber), to the neutral position. This tells me that if you design a ship using this section, don't skimp on tail volume, as you are going to need it to stabilize things when you vary the flap settings. Also, when the flaps are "up" six degrees, it is interesting to note that "theoretically" the drag bucket merely widens and doesn't in fact decrease the minimum drag value.

Evidently the E-214 works well enough for at least one US sailplane manufacturer to market an aircraft using it. I refer, of course, to the Dodgson Saratoga Windsong. If anyone out there in the non-theoretical world has some firsthand experience with this section, I'd appreciate hearing from you on how it performs compared to other popular airfoils.

COMING UP

Next month there will be a report on the Two Meter World Cup by yours truly. I will be competing with my new Goat Hill Special against some of the best two-meter designers and fliers in the world. Don't miss it. Find out what the latest scoop is in high-performance

two-meter design.

Don't forget that the mailing address for all correspondence to this column (including newsletters) should be: R/C Soaring, Bill Forrey, P.O. Box 10335, Costa Mesa, CA 92627 . . . that's the Model Builder address in case it doesn't look familiar to you.

If you would like to see a picture of *your* favorite sailplane in the pages of his magazine, then send it to me along with a description of it; I'd be glad to run it for you . . . and many readers would be glad to hear about it, too! •

Plug Sparks . . . *Continued from page 36*

a displacement of .604 cubic inches. Aluminum sand castings were used extensively throughout, with the cylinder, crankcase, head, and piston being formed from this material.

Several interesting features showed up during disassembly. The piston came with two rings and a four-way baffle system. This idea was quite similar to what was used in the Thunderbird engines.

The hardened steel crankshaft was supported on two ball bearings while the rotor shaft was also supported by a fancy ball bearing. How deluxe! The connecting rod was of dural with bronze bearings. The sand cast aluminum head was specially domed to accommodate the four-way baffled piston.

The balance of the engine employed standard parts, the timer and needle valve assemblies looking very suspiciously like Hornet parts. Also of interest was that the crankshaft was made long enough to convert to aircraft operation in the event the engine did not gain popularity with the race car enthusiasts.

Every design method was employed to gain a few extra revolutions per minute. As noted before, the piston was of the four-way baffle type. In addition to this trick, the piston rose above the steel cylinder sleeve making combustion occur above the lines. This was similar to that idea first employed by Bill Cubitt in his "Atomic" engine design. To also improve performance, the skirt of the piston passed above the exhaust port (twin in this case) giving a sub-piston induction effect. To round things off, two grooves were machined in the liner to give a schnuerle porting effect. One of the first to do this!!

30 YEARS AGO, I WAS. . .

Maybe this section should be entitled "Kowalik revisited," but Charley Thuet has this to say about Steve:

"I started building ten-cent, solid scale models back in the 1930s and naturally gravitated to rubber models. When I was in high school (1936), I met an old friend, Ralph Fidance who was trying to get a kit version of the Tom Thumb engine to run. This is when I became acquainted with Steve Kowalik. From then on, we built and flew up a storm together.

"After WW-II, I tried to return to modeling, but like most returning vets, I had become a married man with all the family responsibilities. So model plane action dropped until three years ago when I bumped into Steve Kowalik at a local reunion.

"Well, it didn't take very long (especially with prodding from the grandchildren who had heard grandpa braggin' about the models he used to build) to get into the swing of things. With R/C being available, I rebuilt all of Steve's designs to date, including a little-known, planked pylon model designed in 1940 by the group of Steve's friends." *(More on this later. We will try to get drawings of this! jp)*

"I guess the Miss Delaware or the scaled version, the Air Chief, was his most famous design. After Steve and I became reacquainted, I found out that Steve still has the forty year old parts lying around. I simply had to rebuild it, complete with Firestone ashtray type tires. Only one hub was available, so I had to settle for Ohlsson wheels.

"In my opinion, Steve is a pretty nice guy, and he did have some nice designs. This is why I am writing you, to let you know about his subsequent models. In Photo No. 8, three models are shown: Miss Arpiem, Miss Delaware II, and the Air Chief. The Miss Delaware II has a redesigned fuselage and tail unit with the original wing. I did use the 1/4-square spruce in the fuselage as in the original. This number two model is my favorite, and one of the nicest flying airplanes.

"The model is covered with antique white fabricote trimmed in metallic brown and outlined with gold striping. An O.S. 40 up front, and a Futaba three-channel radio do a fine job of bringing back the memories. Fourteen minutes in my first contest last year!"

No need to mention the Miss Arpiem as it is a good flyer, but I do recommend the Air Chief as an excellent beginner's model in R/C. With an O.S. 15 engine in it, the model simply cannot be beat as a trainer.

Photo No. 9 shows what can be done when you pester a fellow long enough.

Charley continues, "Steve finally yielded, and scaled the Miss Delaware to 1/2A Texaco size. This picture was taken at the Westover AFB during the 1982 SAM Champs. Built by Q. Zitnay, this 1/2A Miss Delaware turned out to be a wonderful flyer. This model was the last drawing Kowalik did before his illness.

"I don't know how popular Steve's models are out on the coast, but Photo No. 10 shows me well satisfied with my Air Chief. I guess what I am trying to say is that Steve should get a little more recognition. I see where in **Model Builder**, Midway Model Co. is coming out with a kit of the Miss Delaware. Things are looking up."

Thanks so much, Charley. Anyone interested in following this up can contact Charles Thuet, 30 Carlisle Rd., Newark, Delaware 19713.

WESTER N.Y. SAM CHAMPS

Jack Brown, president of SAM 48, the Niagara Frontier Chapter, writes to announce the first sanctioned old timer meet on Grand Island, New York, to be known as the Western N.Y. SAM Champs.

The free flight events will feature Rubber Cabin, Rubber Stick, Rubber Scale, and .020 Replica while the R/C side of things will have Class A-B, Class C, and Antique, with 1/2A Texaco for good measure. Trophies and merchandise to $500.00!!

In addition, a regional MECA Collectogether will be held in conjunction with this meet at the Holiday Inn, Grand Island, on Saturday night, August 6th, starting at 7 p.m.

For entry blanks and further particulars, write to Contest Director, Jack Brown, 1446 Red Jacket Rd., Grand Island, NY 14072.

MORE NOSTALGIA

Received a very nice letter from Joe Elgin, 13019 Ridge Creek Rd., Strongsville, Ohio 44136, wherein he has submitted photos and material necessary to authenticate a long-lost gas design by Dick Korda. According to Joe, here is how it all started:

"About a year ago, Irma Illegras, wife of that well-known hobby store owner and AMA official, Red Hillegras, called me to ask if I was interested in an old Dick Korda model in the basement. I called Dick real quick and explained that I felt he should have the opportunity to retreive such a 45 year old relic. Dick lost no time in getting up to Widow Hillegras' place.

"Seems like Dick had given the model to Red Hillegras' Hobby Shop on the east side of Cleveland, a favorite haunt of the Cleveland Balsa Butchers. After Red died, the model came to light. SAM 39 has become quite interested in the model for SAM competition. Ralph Turner has drawn the plans up.

"Dick's model was patterned after Carl Goldberg's most impressive wins with his "Gas Bird" or "Diamond Zipper" as Goldberg calls it. The pylon model that Goldberg (and Alva Anderson) flew revolutionized free flight gas.

"Goldberg's last flight at Akron flew away and was presumed to be lost. Dick and some friends gave chase and caught up with the model. The group brought the model to the awards presentation to go along with the trophy he had won.

"Dick jokingly made a remark that he had taken a good look at the model. As a result, numerous models using this concept were built by the Cleveland Balsa Butchers."

The model design can be seen in Photo No. 11 and is presently being circulated through the SAM board of directors who will decide whether the model will be in antique or an old timer (after Dec. 1938). An interesting footnote by Elgin reveals that the model weighed 24 ounces with two pen cells. Korda was always one to carefully select his wood for strength and weight.

ENGINE TIDBITS

We are constantly running into small items and facts that cannot be used as a section of this column, hence the above title for the data recently gleaned.

Sam Taber in a letter to this columnist, states the Gwin Aero engine was definitely named after Danner Bunch's wife, her maiden name being Gwin. This occurred when manufacture started on Hoover Street in Los Angeles.

Also, Bill Simpson reports that Mel Anderson was the first to use dual carbs on a small model engine. Bill Atwood wrote an article for a model magazine which in effect claimed he originated the front rotor carburetor. Mel has a letter signed by Ira Hassad and several other interested parties who state Mel was the first with the rotary valve and also the dual carburetors.

The above was brought on by a letter of inquiry to Simpson. Photo No. 12 as sent by Bill, shows the boat that employed the first dual carb engine. According to Mel, the boat would always flip when launched at full power. Eventually, he hooked up a Kodak type timer that would cut in the second carburetor after the boat got up speed on the tether. According to Mel, the power was such that the boat practically leaped out of the water.

Other items of interest are the spark plug from a Packard automobile and the spark coil which was hand wound using the wire from a Model A Ford. Oil lubrication was from a separate oil reservoir injected into the crankcase under pressure provided by a balloon. The engine ran on straight gas.

FREE PLUG DEPARTMENT

Our former "Fuel Lines" Editor, Otto Bernhardt of 77 Products, 17119 S. Harvard, Gardena, CA 90247, has done it again!

As can be seen by Photo No. 13, the "King" (Otto) has developed new ignition timer assemblies for the Arden .09 and .199 engines. The timers have the following features: 1) Timer housings machined from solid brass bar stock, hand finished, and cadmium plated; 2) Timer housings virtually unbreakable as they are not castings; 3) Points exposed for easy cleaning and adjusting; 4) Ignition assemblies can be assembled by the customer.

As shown in the photo, the combination prop drive washer, ignition cam, and complete timer assembly is priced at $50 plus $2 postage. Matching blued steel prop nut and washer sets are available at $5 per set. State engine size, as thread sizes are different for each engine.

PLANS ALBUMS

Under the editorship of Allen Pond, and a newly-formed Pond Associates, a series of binders for flying scale drawings entitled *Vintage Plans of Yesteryear* are to be issued periodically beginning late July 1983.

These albums, starting with *Aa* to *Az*, are the answer to the often-asked question of what does a certain plan look like. Al Pond has taken on the task of reducing a series of plans to fit an 8-1/2 x 11 page. With this album one can look and judge for himself what plan he would prefer, and then secure it from the source indicated.

Present plans call for roughly 120 plans per album comprising 50 sheets of 100 (card) weight paper. The binder will allow the deletion of old, unwanted plans and the installation of new sheets as they are produced.

The albums will be white vinyl with an attractive, black silk-screen airplane motif. Each album cover will be different, representing an aircraft from that particular portion of the alphabet, i.e. *Aa* to *Az* will feature an Albatross D5 open framework sketch.

Albums will be priced at $24.95 each. Only 200 will be produced to start. If the demand warrants additional production, more albums of that particular letter will be issued.

In addition to these albums, Al Pond is planning an Engine Album based on the series of engine drawings that have appeared in **Model Builder**. Every attempt will be made to provide the three-view drawings full-size. This will aid the modeler to an immeasurable extent when he is trying to decide if the engine he has will fit a certain old timer.

The original write up will be supplied on the backside of each engine. This is something no self-respecting engine collector should be without. Price will be the same as the *Vintage Plans of Yesteryear* flying scale albums.

Sales of the initial album will greatly determine if it is financially feasible to continue this series of plans which will eventually become an encyclopedia. Inquiries should be directed to Allen Pond, c/o Pond Associates, 1725 Rogers, Bldg. I. San Jose, CA 95112.

SAM SALLIES

SAM 36, also known as SAM *1836* as that was the year of the Alamo massacre in San Antonio, Texas, reports (via Kelso Barnet) that the 1/2A Texaco event draws at least one new member a month into their chapter.

A SAM 1836 contest was recently held with an increase of models in one month followed by two the following month. Kelso notes that the modelers they are drawing are not the "shake and bake" types, but modelers who like to put together complex structures.

In fact, to prove his point, Kelso submits Photo No. 14 of Jim Reynolds' 1/2A Texaco Brigidier scaled from the original Berkeley plans. Jim is looking forward to La Junta for the SAM Champs as this bird does fly! *(Look for Jim's 1/2A Brigidier . . . Berkeley's spelling . . . construction article in a future issue of* **Model Builder**. *wrf)*

SAM ABROAD

GERMANY

Thanks to Phil Bernhardt, one of the former contributing editors of **Model Builder**, for the German translations, we are allowed to present the following text from Erich Punke (via Gerhard Everwyn).

"In 1942, I found a construction plan for a model glider in a hardware store. I bought a plan with my allowance as when 12-year-old boy would like to have a glider called 'Falke R-5.' Unfortunately, I had absolutely no idea of how to build it. After many hours of studying, I gave up and ordered the kit. Naturally, my parents were upset with me because I had spent my money on such a useless thing.

"At that time, a kit consisted of a few pieces of plywood, some sticks, and a couple of bicycle spokes. Quick build kits were a thing of the future. With much difficulty, I had the framework almost finished when the war intervened. My dream of a Falke R-5 was finished.

"Years thereafter, I built a few simple models such as the 'Winkler Junior' and 'Baby,' best suited for beginners. After WW-II, I obtained plans for the 'Hummel,' a gas job by H. Antusch. Powered by a Webra Winner 2.5 cc diesel, this model has proven to be really fun. As a free flight, that tank was filled with a few cc of fuel and retrieving depended on how sturdy your legs were. The model shortly gained the nickname of 'Tree Searching Device' as it seemed to have an affinity for trees.

"In later years, I built model designs such as the Funk-Star, Satelit, Falcon, etc., but it was not until I ran across an article in Flug written by Gerhard Everwyn that I discovered the popularity of old timers.

"I got in touch immediately with

Everwyn and asked if he could find a Falke R-5 plan for me. In several days, I had the plan . . . after a 40-year wait!! Needless to say, the model was constructed in short order."

Photo No. 15 shows the Falke R-5 as built by Erich Funke. Subsequent photos received show the model completely finished. We will run other photos of his gas models in future issues.

NEW ZEALAND

Ivan Treen reported the old timer events at the New Zealand Nationals were supported better than ever despite the fact that when the Nats are held in the "South Island" at Christchurch, the entries drop off noticeably.

The old timer events enjoyed 53 entries (an increase over last year). A poll of the O/T members during the year prior to the Nats resulted in making a separate event in Vintage Gas for spark powered models. This event will run parallel with the diesel/glow powered event. Both events will still have the usual precision flights with a target time of two minutes.

This year's Nats saw 20 entries in the diesel/glow event while the new event drew five sparkers. Not too bad for a new event on such short notice! Treen also reports that there is a trend developing similar to the rubber events in the USA. The Anzacs have selected the Flying Aces "Moth" as their one model type contest. At a 24-inch wingspan, this sounds somewhat like the SCIF (SAM 3) "Two-Bit" contest.

The geography in New Zealand spreads the modelers out pretty thin, so this new rubber contest will have to be postal to get things rolling. However, Treen has been flying a Moth for over a year and declares it a fine flyer. To augment the point, eight have been built in his district to date!

AUSTRALIA

Received a most welcome letter from Mervin Buckmaster, editor and publisher of the Australian modeling magazine, *Airborne*, in which he has provided several halftones for publication in **Model Builder**.

We have selected the one of Merv cranking on his favorite model, the Jasco Flamingo, as featured in the Jasco catalog of 1938. Merv states he has built nearly 200 models and this was by far the best fun model he has ever had. The Flamingo is pictured in Photo No. 16.

With an HP 40 up front, he could always figure on a 10-minute glide with 100-second motor run. A lovely ship! Covering was yellow silk top side with "skyloft" on the bottom. Dope finish.

Merv said he couldn't stand so much fun as he finally sold the Flamingo. He is now working on a new old timer.

THE WRAPUP

Don't feel bad, fellows, if we didn't report your meet or club doings. For a change, we are loaded with material, most of which is on a 90-minute tape from Dave Baker of Britain's SAM 35. Just tremendous activity going there! We'll try to carry some of the more salient points of his tape in the next issue.

Also received another tape (one hour long) from Joe Ott. Maybe a lot of modern fliers think Joe Ott is an old goat and his stuff is *passé*, but don't you believe it! Joe, despite his young age of 82, is very adapatable and extremely imaginative. If you think his Golden Eagle design is kind of neat, just wait until you see his proposed radio set for beginners!

The SCAMPS newsletter just came in giving the dope on the SCAMP Texaco Annual held on the same day as the SAM 49 spring meet at Taft. If you thought the wind was bad for radio control models, just imagine where the free flight models ended up in that gale!

As Daymon Adcock, SCAMPS prexy, stated in his contest writeup, it was sad to see so many contestants and so few entries. It appears the "sandbaggers" got stung this time as the only decent flights were made early in the morning. Normally, flight times increase in Texaco in direct ratio to the length of day and rise in temperature. The smart guys took it on the chin this time.

As Daymon says, "It truly was a shame to end up with 14 fliers and 22 entries (nine of those were in Texaco!). Two events had no entries at all! This was one contest that proved you didn't have to be a "hot dog" to win. *Just enter!* •

Counter . . . . . . *Continued from page 9*

ending more construction frustrations, and adding to the total efficiency of the three versions of Speed Stix. Flat Speed Stix come color-coded in 100 and 120 sanding grades, and in 3/4, 1/2 and 1/4-inch widths.

Flat Speed Stix are available from Precision Sanding Tools for $3.75 for a six-tool set (one of each sanding grade in each width).

Another welcome addition to the workshop . . . and the field box!

★ ★ ★

If it's aerodynamics that turns you on, and if you are someone who could profit

from a little theory, fundamentals, and practice, then you should check out a book entitled *Basic Aerodynamics and History of Airfoils for Pilots, Technicians, and Administrators* by Jule Neville Dews. Its a 24-page, 8-1/2 x 11 inch, illustrated treatise of the subject that sells for only $2.50 (postage paid) in the United States. The intent of the author is not to make a profit off of the sales of these books, but to merely share his wealth of knowledge of the subject with as many people as possible, especially beginners who might have a real need to know the basics. For $2.50 you can't go wrong! See the classified ad in this issue. •

Whistler . . . . . *Continued from page 27*

duce, but if you could view it, you would see that the mid-wing version is the spitting image of the full-size aircraft. Clyde told me that after the military tested the little German electric fighter, they decided against further study of electric flight, and his father was made a civilian advisor.

When I received the photo of the Whistler from Clyde, I knew that this was the subject for my first sort-of-scale masterpiece. The area and moments were perfect, best off, I could even use a scale power source. Plans were quickly drawn and the Whistler soon became legend in Southern California. All the versions presented here have been successfully built and flown. They have all proved easy to build and have been found to be excellent sport fliers. Although the Whistler is an electric powered model, the design is easily changed to a gas powered model for .049-.09 glow motors. Just do two things: make sure the model is fuel proofed so the fuel residue won't rot the nose off, and don't let me find out you did it.

As presented in **Model Builder**, the Whistler is designed to be powered with common six-cell 05 systems. My Whistlers have been flown with both Astro and Leisure systems and have rewarded me with regular eight to ten minute flights. Believe me, this is the sport electric that you have been waiting for.

PREPARATION

Now that you have decided that you want a Whistler of your own, you're going to have to build one. When scratch building, I like to make up a kit before I start construction so that I don't have to take time out from building to fabricate something. Use the drawings as a guide, and form the ribs, the fuselage sides, the formers, and the shear webs. You don't have to be too careful on wood selection, the lighter the better, but don't sacrifice strength for weight. Now is also a good time to get the hardware together. Sig makes the landing gear you'll need as well as the small canopy if you build that version. Got everything cut? If so, then let's grab some Hot Stuff and go!

BUILDING THE WHISTLER WING

I like to build the wing first so that I can have it ready to fit to the fuselage. Look at the photos, note that the Whistler has an open structure wing with center sheeting for protection from the rubber bands. You must decide whether you will build the constant chord wing or the wing with tapered tips. If you build the tapered wing, modify the ribs using the method shown on the drawing. Also note that the three center ribs have to be trimmed to accept the center sheeting.

Build the wing tips first. Pin the bottom spar, the trailing edge and leading edge in position. Position and glue the ribs in place. Add the top spar and the shear webs. Glue the wing tip block in place. When both tips are complete, raise the tip up 1-3/4 inches and sand the root flush to form a good joint with the center panel. Now build the center panel using the same sequence. Note that the spars are not covered by the center sheet, but instead the center sheet edge glues against the spar. When the center panel is complete, check the fit of the tip panels to the center panel. If all looks good, glue the tips to the center panel and add the hard balsa dihedral ties. Now sand the leading edge to shape and finish sand the rest of the wing. Place the wing aside to await covering.

BUILDING THE TAIL SURFACES

Both the stab and rudder are simple, flat structures constructed with 3/16 x 1/4 balsa outlines and 3/32 x 3/16 ribs. Build both the stabilizer and the rudder over the drawing. When complete, gently sand the edges round. It is not necessary to sand an airfoil shape into the surfaces, just sand them to a pleasing contour.

BUILDING THE FUSELAGE

Lay the fuselage sides on the board bottom facing bottom. Make sure that you have them aligned; now pin in position and mark the locations of the two plywood formers. Now glue the 1/8 x 1/4 balsa longerons in position. Remove the fuselage sides from the table and pin them together, longerons to the outside. Sand the edges thus ensuring the sides are the same. Unpin the sides and taper sand the longerons at the rear so that the sides will fit together at the tail. Pin one side to the board longeron side up. Place all the plywood formers in position. Use a small triangle to ensure that they are perpendicular to the sides. When all is square, glue the formers in place. Now you must decide which of the three versions you will build. If you build the high wing version, add the cabane strut assembly, check the drawing for the proper method of assembly. If you build the low wing, you must now relieve the fuselage bottom to accept the wing. When the modifications are finished, align the fuselage sides over the top view of the drawing. When you have a square fuselage, apply the glue to the formers joining the assembly. While the assembly is still pinned over the drawing, join the tail end together . . . be

careful to achieve proper alignment. Remove the fuselage from the board and glue the nose block in place. Now, add the plywood floor. Each of the three versions has a different top assembly. Using 1/8 balsa, form the top assembly for your particular model. Line the noseblock with the 1/64 plywood motor tube. Make the tube using your motor as the form and then carefully fit it to the nose block. Make sure there is no up or side thrust. Place a spinner on your motor and put the motor in the nose block. Carefully sand the fuselage to shape. Put the pushrods in the fuselage from the bottom of the fuselage. Now, apply the 1/16 bottom sheeting cross-grain. Finish sand the fuselage smooth.

COVERING AND FINAL ASSEMBLY

Check the fit of the wing and tail assembly to the fuselage. If nothing needs to be changed, cover the entire model with Monokote. Make the landing gear assembly and decide how you want to mount it. If you want to use blind nuts and screws, glue the 1/8 plywood landing gear mount in place inside the 1/16 plywood floor. Drill the aluminum mount for screws. Line the landing gear up on the fuselage and mark the location of the holes. Drill the holes and add the blind nuts. When you have the tail feathers covered, hinge the elevators and rudder using Rocket City nylon hinge strip. Put the wing in position on the fuselage and secure it. Remove the Monokote from the bottom of the stabilizer where it glues to the fuselage. Line the stab up with wing and glue in place. Get yourself a Carl Goldberg

nylon steering bracket, some 1/16 wire, and a 3/4-inch tail wheel and make-up the steering unit. When complete, assemble the steering unit to the fuselage and rudder and glue the entire assembly in place. Make sure the fin is square to the stabilizer.

Using the plans as a guide, plan the installation of the radio and electric motor unit. If it looks like the center of gravity is going to be within acceptable limits, then go ahead and permanently mount the radio in position. Adjust the servo throws so that the rudder moves 1/4-inch each way and the elevators move 3/16-inch each way; please make sure the rudder and elevator move the proper direction.

Mount the motor into the nose block; if the motor is a little loose, wrap it with some masking tape to increase the motor's diameter until you have a snug fit. It does no good to have the motor spin in the tube, twisting the wire harness in half. Now, place a 1-1/2 inch Goldberg spinner and a Cox gray 6-4 propeller on your motor. Place the motor battery in position and secure the wing. Once again, does the model balance properly? Do the controls move in the proper direction? Does the motor system work properly? Are there any warps? If everything checks out OK, put both batteries on charge, and go get some sleep, your Whistler is going to fly in the morning!

FLYING THE WHISTLER

The Whistler is not too particular as to where you wish to fly it. However, if you are flying from a field that is rough or has high grass, you may wish to remove the landing gear and handlaunch the model.

If you are going to hand launch the model on the first flight, it is better if you trust the launch to a qualified helper so that you can have your full concentration on flying the Whistler. Have your helper stand into the wind, position yourself behind him. Give the model one last preflight check. If all is "go," have your helper launch your Whistler into the sky. Let the model climb out gently as you get acquainted with the controls. You will soon find that you have a smooth flying aircraft with excellent response. On this first flight, it's not a bad idea to take the model up a little bit and try a stall both power on and off.

Good luck with your Whistler, I hope you like yours as much as our test pilots have liked theirs. •

F/F Scale . . . . *Continued from page 54*

piece of tubing that telescopes over the first one, and Zap it onto the end. This is done in order to reinforce the end that slips over the compression lever. The first one I made didn't have the reinforcement, and it wouldn't hold up against some of the engine's forces while being over compressed.

If the engine has a T-shaped compression lever, then a slot across the bottom of the tube is necessary. This should be deep enough that the tommy bar stays on. If, on the other hand, the compression lever is a half-T, then I slot only one side of the tube. Naturally, the tube with the slot running across the bottom will work on the half-T, but I prefer the single slot way for added strength.

On the other end I drill either a 1/16 or 3/32 hole and Zap a piece of brass tubing through the hole for a handle. Polish it up, and you have a very useful tool which most modelers won't be able to figure out. When they ask, and you reply, "It's a tommy bar," they still won't know. Maybe you ought to make one anyway just as a conversation piece!

Another problem associated with coweled engines is the needle valve, or more precisely, *accessibility* of the needle valve. There are many different ways to get access, some very easy, others taking more time. Naturally, it's up to you to determine how much you can stand to have a long wire sticking out the side of your scale model. Let's go over some of the alternatives.

Naturally, the easiest method is to solder an extension onto the existing needle valve and have it protrude out the side of the cowl. With Cox type needle valves, it's even easier to slip a piece of regular fuel line tubing over the needle valve, and use that for the extension. Simple, effective . . . but are you satisfied with the way it looks? How far do you want to carry the scale bit? If these two former methods don't appeal to you, then this next one may. It hasn't been too long since I mentioned this particular method in this column. One day at Lake Elsinore I saw Bob Haight adjusting a hidden needle valve (coweled in) on a float plane. (See Figure 3.) Naturally, my curiosity was aroused, and I'm glad it was. It is simple yet very effective. Simply stated, it is nothing more than a short extension with a pin going through it. With a tommy bar like tool, you can reach in and make the necessary adjustment. Typically, a short piece of brass tubing can be Zapped onto the existing needle valve. A small .015 hole is drilled into the tube and a short pin forced into this hole. A hole in the side of the cowl will be necessary so that the tool can be inserted for adjustment.

Are there any other alternatives? Yes. It depends, of course, on how much work you're willing to put forth, or how much of a hole on the side of a model bothers you. Take a look at Figure 4. A simple pulley system can be employed with a tiny wire handle protruding slightly on the bottom of the cowl. All it takes is a couple of small pulleys, a rubber band (the belt) and some fine piano wire. If you wan't make your own pulleys, you can buy them from (I believe) C.B. Associates, an accessory manufacturer for quarter scale models. The only requirement is that the needle valve has to be very easy to adjust back and forth, otherwise the rubber band will merely slip and no adjustment will be possible. To assure this, simply (in the case of Cox engines) remove the spring. With most other types of engines, the spring clip either has to be removed or sprung open so that it doesn't come in contact with the needle valve. That's it. There are variations to this that many of you ingenious ones can come up with. How about a thumb screw arrangement? In other words, just a bit of a knurled wheel sticking out the side of the cowl where adjustments could be by rolling the wheel back-and-forth with your thumb!

OK, just one more way to go for those of you who like to build models with radial engines. I'm sure I don't have to tell you that there is always one cylinder that is in the way of the needle valve. This usually means that the dummy cylinder has to be worked over in order to gain access to the needle valve. Naturally, this ruins the appearance of the engines. With the WW-I rotary engines, sometimes this isn't a problem as they turned with the prop, so *any* position of the cylinders is OK. With them you can set the engine so that the needle valve falls between two cylinders.

What do you do with radials? I solved the problem by simply attaching that "troublesome" cylinder to a rubber band between hooks. This way, when you are adjusting the needle valve, the cylinder can be removed from its hole on the cowl. This is accomplished by stretching the rubber band to which the cylinder is attached, adjusting the needle valve, then placing the cylinder back in the hole. Obviously the tension of the rubber band holds it firmly in place. I did find that the diesel fuel takes some of the elasticity out of the rubber bands, so it had to be replaced often, or before each flying session.

There you have it, hopefully food for thought. I've tried all of these different methods and systems and I know they work.

Starting this month, I though that it would be interesting to make a list of common items that can be used for scale in one respect or another. Then, I would like to ask you to send in some that we can add to the list that you've been using successfully so that we may be able to share them with others.

Snaps: Use dress snaps. I mentioned these last month *for attaching cowls* onto fuselages.

Small tube caps: These from prescription ointments, et al. Cut down in height and painted, make excellent *fuel caps*.

Elastic thread: No, not for rigging biplanes, but to use as *shock cord* for WW-I airplane (or earlier) landing gear.

Silk thread: This is excellent for rigging purposes, particularly for biplanes. This is available in several different sizes. It comes in a silver-gray color. Search for it, it's great!

Fine sandpaper: When painted black, it's ideal for wing walks . . . Don't wince on this next one!

Toothpicks!!! (The flat variety.) I find these to be poor for picking one's teeth, but ideal for antenna masts when sanded a little and pointed.

Wire insulation: For small rubber models, say 24 inches in span or smaller, a thin slice of this insulation makes super wheel retainers . . . small, yet very effective.

That's all for now. Granted, the ones I've listed are the more common ones, but they'll get better as we all chip in!!•

Flying Near Airports? Be Careful!
PROTECT YOUR RIGHT TO FLY!
Safe Flying Is No Accident!

Parakeet . . . . . *Continued from page 55*

Hold one side of the wing on the board and block the other side to a dihedral of about five-eighths of an inch. Water spray and lightly dope the wings. Sand 1/16 x 1/8 balsa strips to a streamline shape. Use these for the cabane, N and dummy LG struts (1/64 plywood may be used instead).

Scrape a little covering from the upper wing strut points and cement the cabane struts in place. Cement the stab halves and rudder to the fuselage, checking the alignment while they are drying. Cement the windshield to the fuselage before the top wing is put in place. Scrape a little covering from the fuselage at the struts and cement the upper wing on, checking the alignment with the fuselage and tail surfaces. Allow drying time, then place the model upside down and cement the N struts to the bottom of the upper wing. Cement the lower wings in place, checking their alignment.

When the wings are dry, take a length of streamlined 1/16 x 1/8 balsa and cut to fit between the top wing rear N strut and the lower wing fuselage joint at the Station 3 upright. Cut and try until it fits, then cement in place. Bend the tailskid from 1/32 music wire and cement in place. For a removable nose block, bend two wire hooks and place one above the dummy cylinder on one side, and below the dummy cylinder on the other side. Hold the nose block on with a small rubber band.

The rear rubber hook is a common pin pushed through the fuselage at the 1/16 x 1/8 piece below the stab. Leave an opening at the rear of the fuselage for changing the rubber. •

Workbench . . . . *Continued from page 6*

changing editors.

As indicated at the end of his first column in the July '83 issue, Mike is from Oregon, 1040 Windemere Dr. NW, Salem, OR 97304, to be exact, and the success and interest in his column depends on you, the readers. Let him know what you want to read about, and most of all, if you want to see photos of activities in your neck of the woods, for Heavens sake send them to him. Black and whites are preferred, though sharp color prints can *sometimes* be used, depending on quality.

And finally, there is R/C Pylon. Pylon is all at the same time the most exciting, the most controversial, the most dangerous, the most difficult to successfully compete in and the most macho cate-; gory in R/C modeling. I may get some arguments on a few of those points, but I've watched it since its inception in about 1960, its first official demonstration races at the 1961 Nationals in Willow Grove, and attended some of its gigantic, over 125-entry races in Bakersfield, California in the early 1970s when it reached its peak. (In 1983, the Bakersfield race had dwindled to 25 entries.)

As in any racing sport (model or full-size) land, sea, or air, safety and power maximums become premium concerns with most of the argument coming between the concerned and the macho camps. In R/C Pylon racing, there are two other major divisions of argument: those who must race on small fields close to "civilization", and those who race on large, paved, out-in-the-boonies, deserted air bases, etc. The latter are in the minority . . . and mostly in the West or Southwest.

Our new pylon racing contributor, John Smith, 27 Fulton St., Brockton, MA 02401, much like our former pylon contributor, Jim Gager, is a member of both the concerned and the small field factions of racing. John is also a strong proponent of the new Formula One-40 development, which is rapidly gaining support in the majority, "small fields" areas of the country.

As we requested for "Jake" and for Mike Hazel, your feedback is the most important source of writing material inspiration for John, and for that matter, all of our contributing editors. They can't attend all activities, in every part of the country, at the same time. Let them know about activities in your area so they can pass it on to all modelers who read our magazine, here in the USA as well as in the many other countries reached by **Model Builder** . . . Canada, Australia, New Zealand, the Philippines, Japan, China, Taiwan, Korea, Russia, Czechoslovakia, Poland, Rumania, Italy, France, Germany, Denmark, Holland, Norway, Switzerland, Sweden, Finland, Luxembourg, Austria, South Africa, all of the South Americas, England, Ireland, Scotland . . . please excuse the incomplete list I'm writing this while on jury standby in the Court of Orange County, California, and cannot consult our

subscription files.

The point is that this, in a way, is your magazine too, and the more you're a part of it, the more you'll enjoy it.

NOISE CURE

The following information arrived just a little too late to include in Bill Young's article on his Northrop N9M-A flying wing. However, this solution to an electric motor "noise" problem that plagued the N9M, may help other electric powered R/C model fliers with similar problems.

Although Bill built and flew several other twin electric powered flying wing models, the only one that had demonstrated radio interference from its electric motors was the Twin Astro 05 Cobalt powered model featured in last month's issue. By the way, the reason we published a not successfully flown model was that we felt there was sufficient proof of its flying capabilities although it had not completed a flight. First it was one of several similar models that did fly well, and secondly, we actually had it take off and fly well for a few brief seconds before the interference took over. Our faith in its flying ability was rewarded after the correction was made.

The solution? Two .02 mfd capacitors were added to each electric motor. One capacitor was soldered across each power lead and the case of the motor, as shown in the illustration. The stock 02 mfd capacitor across the two power leads is left in place. Even if you don't suspect that a similar problem may exist in your own electric powered model aircraft, the precaution is an inexpensive one that could prevent a major catastrophe.

PETTIT PAINT POINTERS

Continuing its series of releases on accurate World War II military aircraft paint colors, Pettit now provides formulas for accurately duplicating two shades of the yellow zinc chromate primer that was used both as an undercoat over bare metal prior to the finish color coats, but also as the only coat over interior surfaces, such as cockpits, wheel wells, inside cowlings, hatches, and so forth.

The dirty yellow zinc chromate primer is created by mixing three parts H47 Bright Yellow, three parts H49 Cub Yellow, and two parts H70 Gray.

For the inside of cockpits, it was decided that a more olive-green shade, designated "Interior Green No. 611", should be used. It was achieved by tinting the zinc chromate darker and greener. The formula is: five parts H49 Cub Yellow, three parts H47 Bright Yellow, two parts H33 Stinson Green, and one part H81 Black.

In both of the above formulas, the colors are all Part A. After mixing, add an equal total amount of Part B Flat Hardener for the proper matte finish.

DEBOLT RELOCATES

Harold deBolt, long time modeler, kit manufacturer, and modeling consultant, has retired and moved to Florida. After 40 years in Buffalo, New York. Harold, and his wife Arlene, have relocated at 2206 Greenwich Dr., Kings Point, Sun City Center, FL 33570. Their phone number is (813) 634-7668. Geographically, Sun City is about 20 miles south of Tampa, nearest the west coast and Tampa Bay.

PEANUT LIST

9-10/71	Jodel Mascaret	Walt Mooney
11/71	Fokker D-VI	Mooney
12/71	Laird LC-DC	Mooney
1/72	Ord-Hume O-H 7	Mooney
2/72	Ford Flivver	Mooney
3-4/72	Bucker Jungmann	Mooney
5/72	Fokker V-23	Mooney
6/72	3 Profiles: D.H. Chipmunk, Yak-18PM, Speed Spitfire	Mooney
8/72	Taylorcraft w/floats	Mooney
10/72	Bellanca Light Tractor	Don Butman
11/72	Skyraider	Mooney
12/72	Stahlwerk	Mooney
1/73	Ole Tiger racer	Mooney
2-3/73	Travelaire 2000	Don Butman
4/73	Evans VP-2	Mooney
5/73	Monocoupe 110 Special	Mooney/Pardoe
6/73	Huntington H-12	Mooney
7/73	Microplano Veloz	Mooney
8/73	Bleriot Canard	W.C. Young
9/73	Mr. Mulligan	Hank Nixon
10/73	Piper Vagabond	Mooney
11/73	Waco SRE	Mooney
12/73	Speed Spitfire	Mooney
1/74	DeHavilland DH-6	Mooney
2/74	Culver "Dart" GW	Mooney
3/74	SE-5	Mooney
4/74	Stinson Trimotor	Don Butman
5/74	Miles Sparrowhawk	Mooney
6/74	Wickner "Wicko"	Mooney
7/74	Wittman VW Racer	Mooney
8/74	Macchi MB 308 Idro	Mooney
9-10/74	Renard R-17	Mooney
11/74	Curtiss Seagull	Pres Bruning
12/74	Stinson Reliant	Megow plans
1/75	AVRO 534 C	Mooney
2/75	Avions "La Cigale"	Mooney
3/75	"Redhead" Racer	Ted Vogel
4/75	Robin HR 100 "Tiara"	Mooney
5/75	1908 Bleriot IV	Mooney
6/75	B.A.T. Baboon	Mooney
7/75	P-47D Thunderbolt	D. Norman
8/75	Castaibert IV	Mooney
9/75	Jodel D. II	Rex Powell
10/75	1912 Blackburn	John Blair
11/75	OKAY	Don Butman

12/75	Roland D-VIII	Ed Heyn
1/76	Davis DA-5A	Mooney
2/76	Lanier Paraplane	Don Brown
3/76	Spad XIII	John Walker
4/76	Saab "Safari"	Monty Groves
5/76	Lockspeiser LDA-01	John Walker
6/76	Hergt Monoplane	Mooney
7/76	Bell Airabonita	Mooney
8/76	Ol' Ironsides (homebuilt)	Mooney
9/76	Hirondelle Monoplane	J.F. Frugoli
10/76	Udet U-12	Mooney
11/76	Nakajima KI-27a	Mooney
12/76	Spirit of St. Louis	D. Norman
1/77	Lederlin Flying Flea	Mooney
2/77	Tupolev ANT-2	Mooney
3/77	Sorrell Hyperbipe	Pres Bruning
4/77	Aeronca 0-58A/L-3A	Mooney
5/77	Aviatik-Berg C-1	Ed Heyn
6/77	Western "Meteor"	Al Lidberg
7/77	Morane-Saulnier racer	Mooney
8/77	Fletcher FL-23	Charles Schaaf
9/77	Halberstadt D-II	John Walker
10/77	Loire 46	Don Butman
11/77	"Rivets" racer	Mark Drela
12/77	F4U-1 Corsair	Mark Drela
1/78	Folkerts SK-3	Kurt Enkenhus
2/78	Lemberger LD-20b	Mooney
3-4/78	Found Bros. "Centennial"	Mooney
5/78	Upton Baby Ace	Mooney
6/78	Siemens-Schuckert E-1	Mooney
7/78	Swedish Thulin-K	Mooney
8/78	1913 Deperdussin	Al Lidberg
9/78	Sopwith Pup	John Blair
10/78	Vari-Viggen	Steve Gardner
11/78	Ikarus IK-2	Mooney
12/78	Vari-Eze	Hank Nixon
1/79	Cierva Autogyro	Don Drury
2/79	Dornier "Libelle"	Mooney
3/79	Bristol "Red Devil"	Mooney
4/79	Republic XP-47H	Pres Bruning
5/79	Euler D-2	Mooney
6/79	Pegna P.C. 1	John Walker
7/79	Bellanca Aries T-250	Mooney
8/79	Monocoupe 110 Special	Butch Hadland
9/79	EAA Baby Ace	John Blair
10/79	Lublin R-XII	Mooney
11/79	Martin-Baker MB-5	Mark Drela
12/79	Chiribiri N. 5	Mooney
1/80	Alco Sport	Bernard Shulman
2/80	POGO (Owl Racer)	Mooney
3/80	Quail (homebuilt)	Mooney
4/80	P-40E Warhawk	Steve Gardner
5/80	Stearman 4E	Tom Cadogan
6/80	Cessna Cardinal RG	Nick DeCarlis
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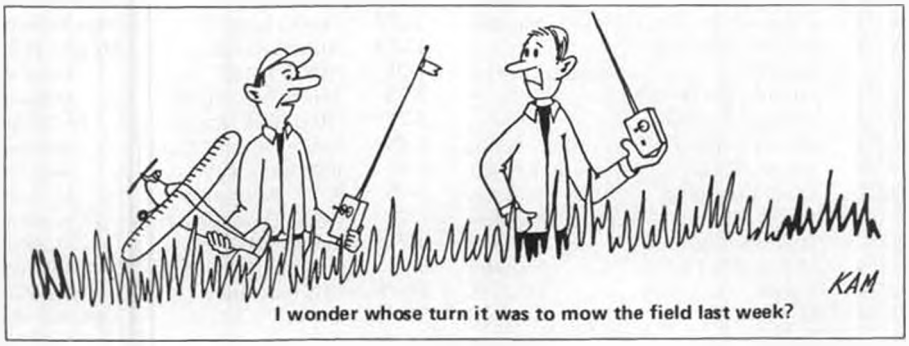
9/80	Hanriot H-19	Mooney
10/80	Marquart Charger	Don Butman
11/80	Jodel Mascaret	Mooney
12/80	Embraer "Impanema"	Mooney
1/81	Aero-Torpille	J.F. Frugoli
2/81	Turner T-40	Mooney
2/81	Dyke Delta	Ken Johnson
3/81	Viri OH-IIK	Mooney
4/81	BD-8	Mooney
6/81	Aichi D3AI "Val"	Mooney
8/81	Pottier P 100 TS	Mooney
9/81	Boeing Monorail	Keith Lazerson
10/81	Sea Fury	Steve Gardner
11/81	Gadfly	Sherman Gillespie
12/81	White Monoplane	Mooney
1/82	Laird LC-DC	Mooney
3/82	Hot Canary	Bob Sweitzer
4/82	Keleher Lark	Mooney
5/82	Corby Starlet CJ-1	Mooney
7/82	Heath 2B	Hoby Clay
8/82	Super-Sytky PIK 21	Mooney
9/82	Sorrell Guppy	Hoby Clay
10/82	Saiman 200	Mooney
11/82	Grumman Turbo Ag Cat	Hoby Clay
12/82	FRED	Siegfried Gloeckner
1/83	Mooney Mite	Mooney
2/83	Grahame-White 20	Maj. Ed Heyn
3/83	de Havilland Tiger Moth	Hoby Clay
4/83	Morane-Saulnier MS50C	Mooney
5/83	Zlin 526 AS Akrobat	Stephen Hales
6/83	Hovey Wing Ding	Mooney
7/83	Grumman Avenger	Callaghan
8/83	MH 1521 Broussard	Steve Gardner



I wonder whose turn it was to mow the field last week?

Dear Jake . . . . . *Continued from page 6*

DeHavilland biplane. The caption said he had crashed it at a scale contest in Port Russell, Oklahoma. Was that you?

Curious in Columbus

Dear Curious:

Was it a Puss Moth or a Tiger Moth?

Jake

★ ★ ★

Dear Jake:

I bought an R/C helicopter real cheap [sic] at our club's Christmas auction last year. It had been crashed a few times, the fly bar was bent, the rotor blades had been glued back together in several places, the tail boom curved to the left a little bit, and it had two different kinds of tail rotor blades, but other than that, it was in great shape. It even had a Torpedo .45 in it. However, every time I tried to fly it, it shook so badly that most of the parts fell off before I could get it off the ground. What do you think I should do?

Grounded in Green Bay

Dear Grounded:

Sell it at this year's Christmas auction.

Jake

Dear Jake:

My name is Tommy. I'm eleven years old. My mommy is always telling me not to sniff glue because it will do bad things to me. She was right. I put some Hot Stuff in a paper bag, and when I sniffed it, I glued the whole thing to my face. What should I do now?

Tommy Smith

Dear Tommy:

You must be the only eleven year old with bags under your eyes.

Jake

★ ★ ★

Dear Jake:

What gives you the right to sound off and inflict your stupid ideas on us? Who died and left you an authority? If I needed answers as dumb as yours, I'd ask my dog.

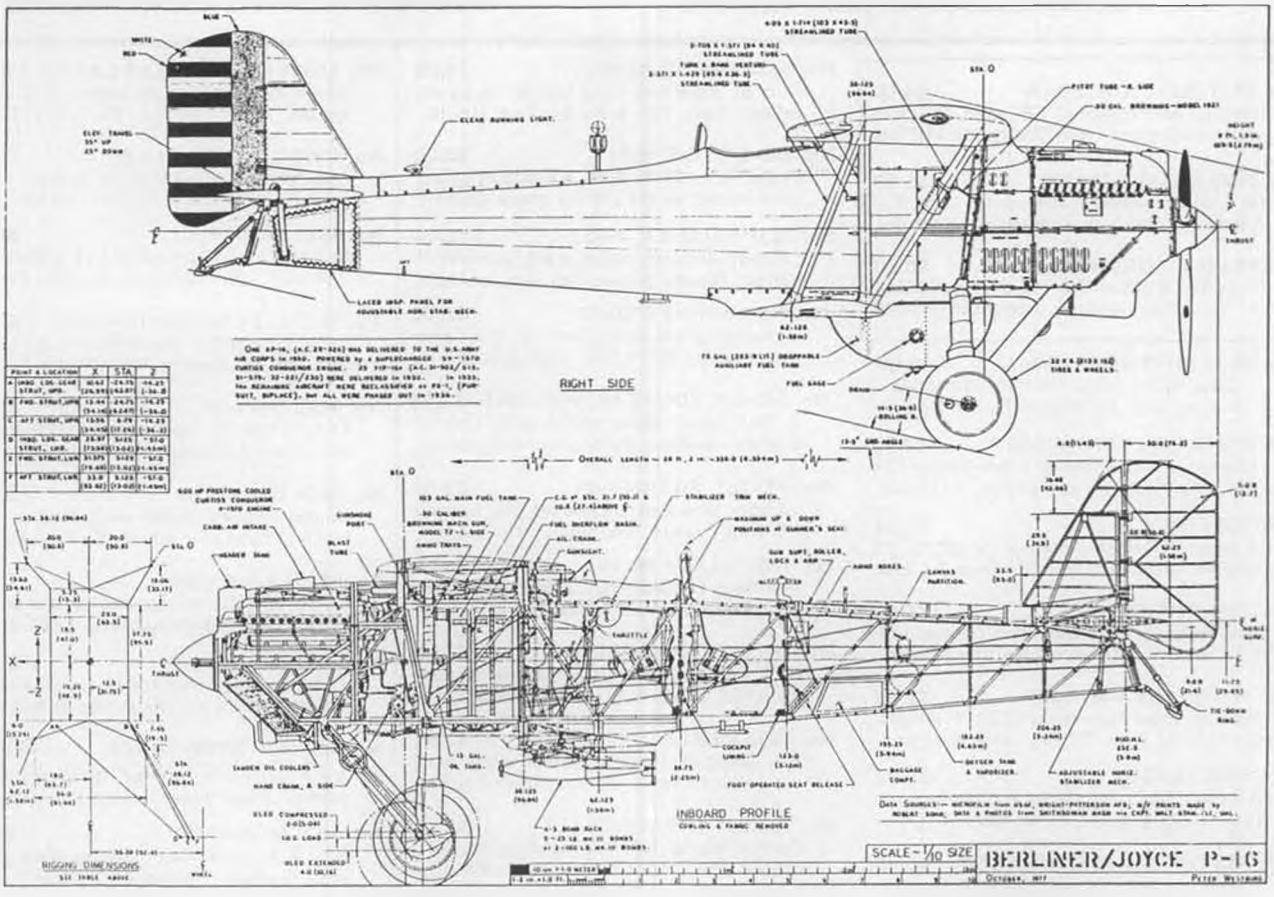
Torqued in Toledo

Dear Torqued:

Thank you for your continuing support.

Jake •

Peter Westburg's
SCALE VIEWS



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Douglas XO-36-XB-7	1	4
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Boeing P-12E	3	12
Curtiss A-8 Shrike	3	12
Curtiss Gulfhawk IA	2	8
Curtiss N2C-2 Fledgling	4	16
Curtiss O-1B/A-3 Falcon	3	12
Curtiss P-1B Hawk	3	12
Curtiss XP/YP-23	3	12
Curtiss SBC-4 Helldiver	4	16
Czech Avia B-534	2	8
Davis D-1K	2	8
Douglas O-25C	3	12
Douglas O-31A/O-31B	3	12
Douglas O-38/O-38B	2	8
Douglas O-43A	3	12
Douglas O-31C/Y1O-43	3	12
Douglas O-46A	3	12
Fokker D-17	3	12
General Western Meteor	1	4
Grumman F2F-1	3	12
Grumman F3F-2	3	12
Stearman 4E Mailplane	2	8
Travel Air 2000	2	8
Waco ATO Taperwing	2	8
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Great Lakes Trainer	4	16
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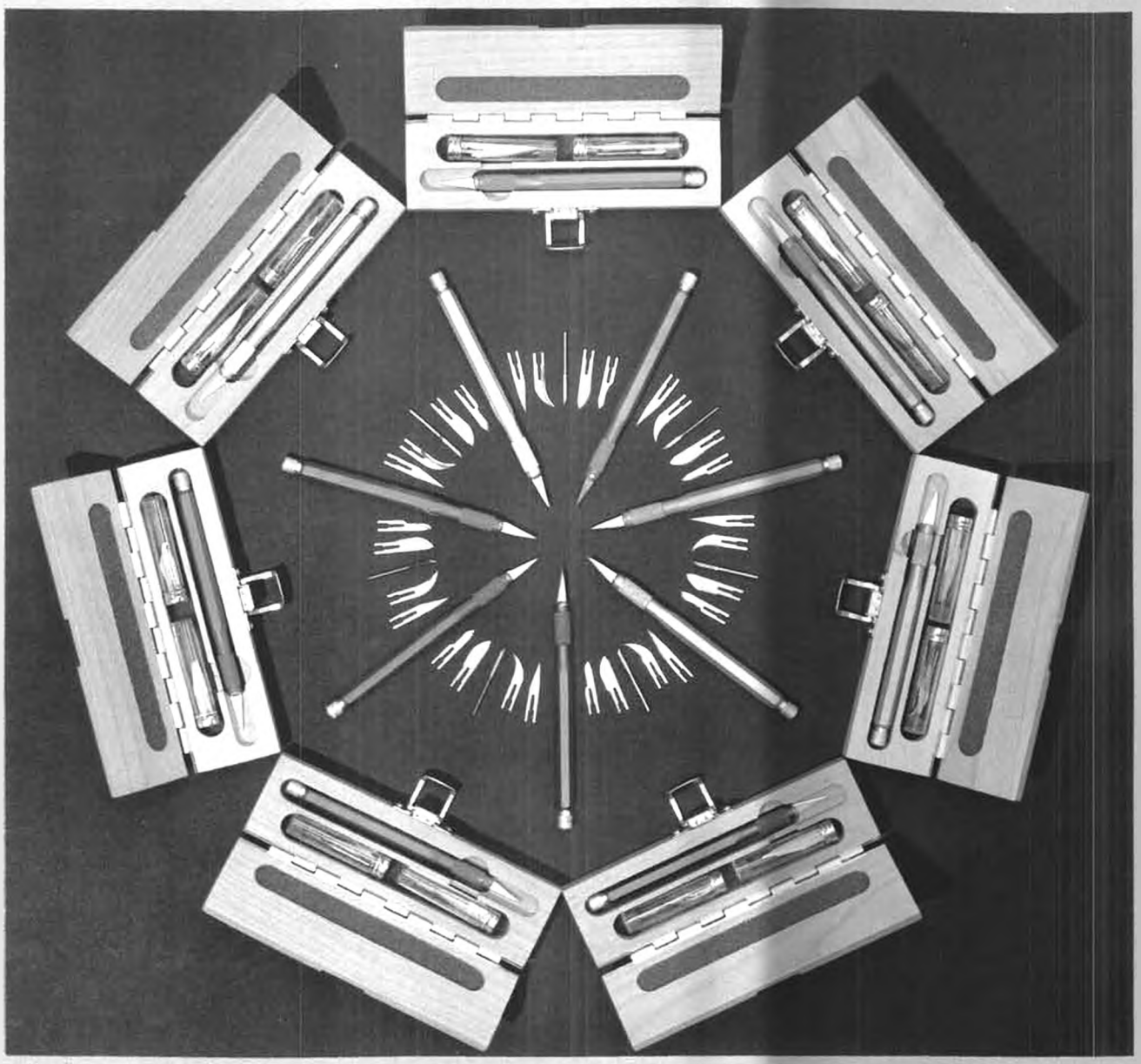

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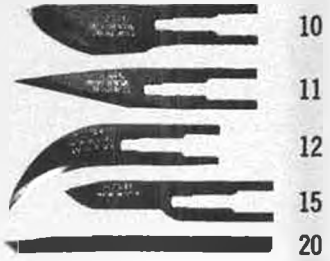

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