MODEL BUILDER

JUNE 1976

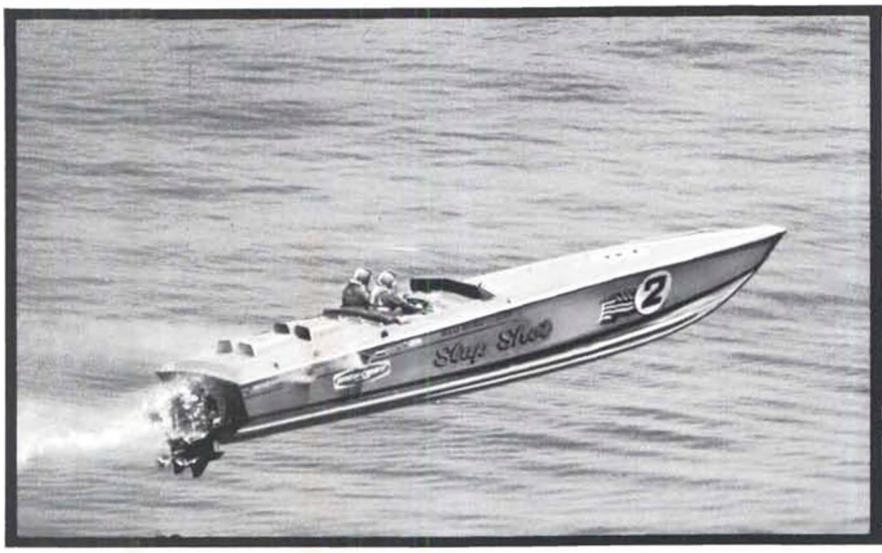
volume 6, number 54

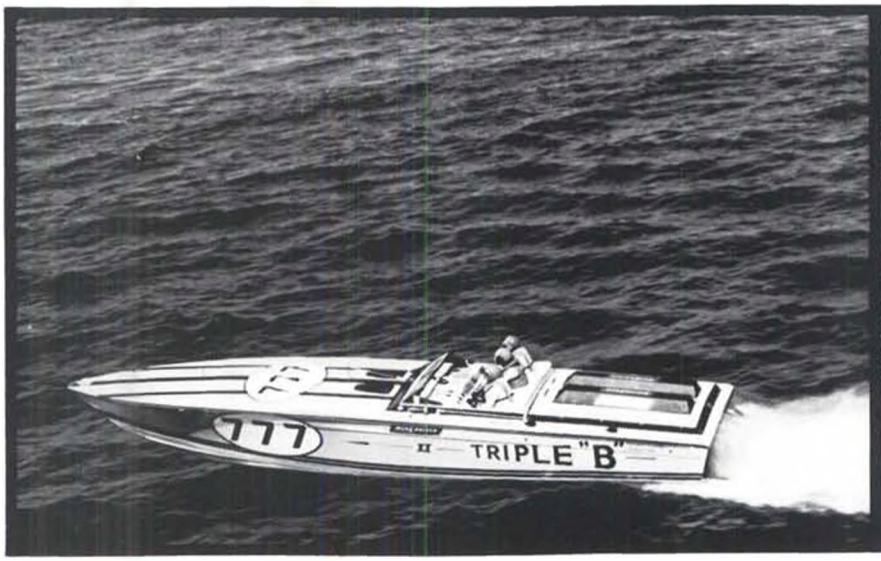
$1.50

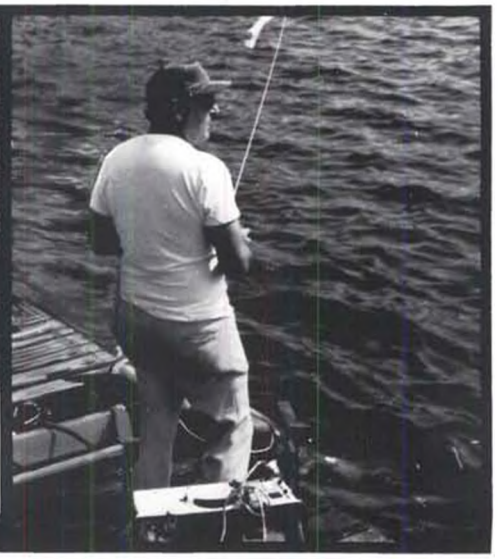
RACE THE MODEL BOATS THE "BIG BOYS" DRIVE

Art "Snapper" Norris, Vice President, Detroit Red Wing Hockey Team, and 1974 offshore racing champion, puts his full-scale Slap Shot through her paces. In his "spare time"...

...Snapper is an avid model boat fan, too. Here he prepares his Dumas Deep Vee 60 CF for a trial run around the course.







C. Stephen Babin, President of Marwood, Inc. and 1974 Overall Third Place winner in open offshore racing, drives his full-scale Triple "B" down the course. Steve also campaigns...

...his Dumas Deep Vee 40-CF with equal enthusiasm and promises to give current model offshore champions stiff competition this year.

DEEP VEE 40 CF 40" (for .40 engine)

Outdrive for Deep Vee 40 and 60 boats (hardware kit H-22)

If you'd like to join the "big boys" in competitive model boat offshore racing, Dumas has a full line of Deep Vee 10's, 20's, 40's, & 60's plus a new competition series with fiberglass hulls.

And if you're a sailing buff, you'll want to check out our new competition sailboat models.

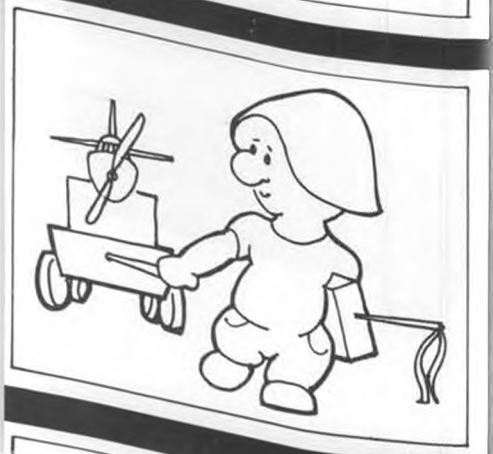
See your hobby dealer or send 50¢ for complete catalog.

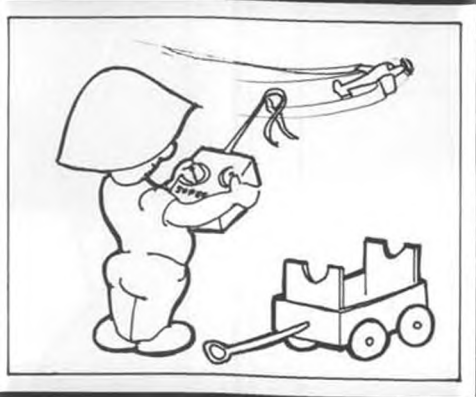
dumas boats

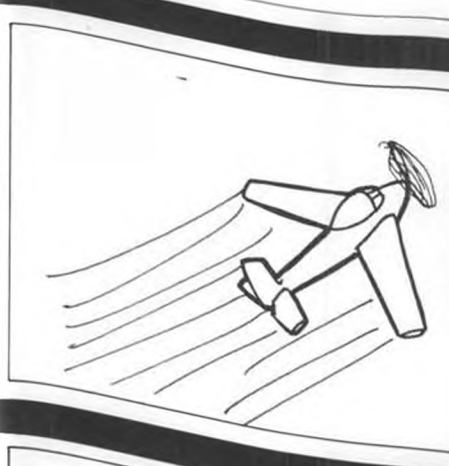
Dumas Products, Inc.,
790 South Park Avenue,
Tucson, Arizona 85719

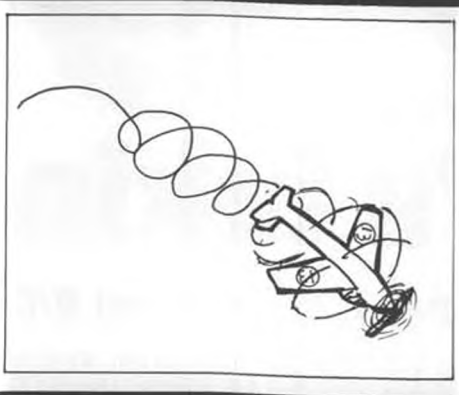
HARVEY HARDWAY

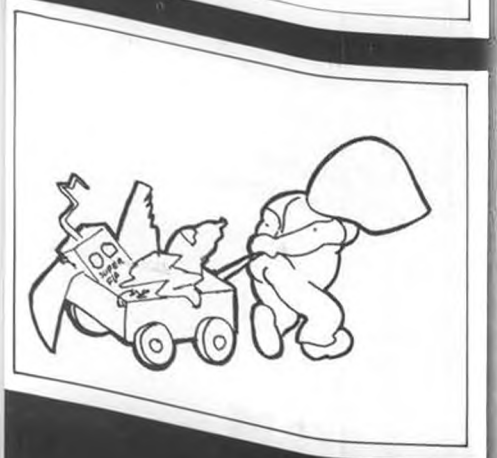
DON'T MAKE
THE SAME
MISTAKE...
ONCE!











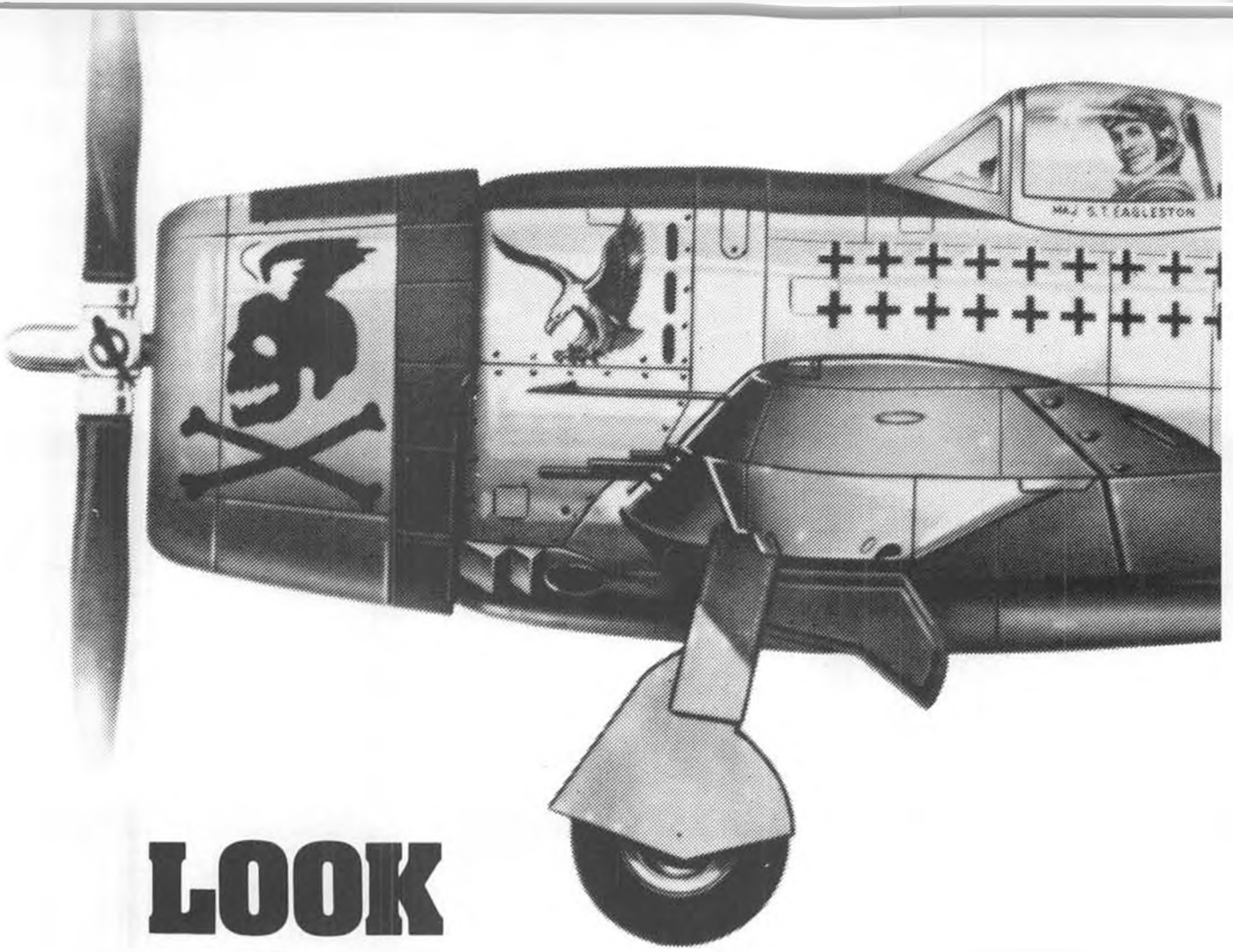
EVEN THE FINEST
RADIO CONTROL EQUIPMENT
FAILS OCCASIONALLY
BUT A LOT LESS THAN
SO-CALLED
BARGAIN SPECIALS.

WRITE FOR FREE CATALOG

KRAFT SYSTEMS, INC.®

450 WEST CALIFORNIA AVENUE
P.O. BOX 1268 · VISTA, CALIFORNIA 92083

World's Largest Manufacturer of Proportional R/C Equipment



LOOK what's taking off!

Top Flite's NEW P47-D Thunderbolt R/C · Stand-off Scale

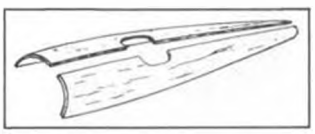
It's here at last—World War II's favorite fighter aircraft. Affectionately dubbed the "JUG" by American fighter pilots, the P47-D Thunderbolt proudly joins Top Flite's squadron of stand-off scales.

Just like our P51, P40 and P39, the new P47-D combines the appearance of a true scale model with the fly-ability and building ease of a sport R/C.

And, just like the original "JUG", our stand-off scale version has already built a pretty impressive performance record at the 1974 Nationals with the highest flying scale score, and first place at the Chicago Scalemasters contest.

So, drop by your dealer for the new P47-D today, then watch the "JUG" live up to its incredible reputation.

ALL BALSA KIT features: Machine-Shaped Parts, Tough Injection-Molded Cowl, Authentic Matte Finish Mylar Monokote Markings, Plus Many More Time Saving Features.



EXCLUSIVE Formed Balsa Fuselage Shells

Span: 60″
Length: 48″

Area: 720 Sq. In.
Engine: 50 to 60

Kit RC-19
$79.95

TOP FLITE

TOP FLITE MODELS, INC.
2635 S. Wabash Avenue, Chicago, Ill. 60616

R / C ELECTRIC FLIGHT SYSTEMS*

*Patent Pending

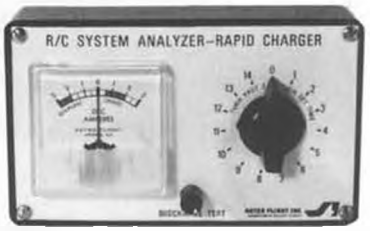
from

ASTRO FLIGHT INC.

PIONEERS IN SILENT FLIGHT

13377 Beach Avenue
Venice, California 90291

NEW R/C SYSTEM ANALYZER — RAPID CHARGER



This is the answer to your battery problems. Two years of development by the company that k nows batteries best — Astro Flight — has resulted in a great little unit that will:

- *Charge your receiver in 15 minutes.*
- *Charge your transmitter batteries in 15 min.*
- *Test for a high resistance cell in two min.*
- *Test for a shorted cell.*
- *Indicate the capacity remaining after a day's flying in 10 minutes.*
- *Measure the capacity of a fully charged battery in 10 minutes.*

This unit tells you what you have and allows you to do something about it at the field, not after you get home. This unit obviates the need for battery discharge units, expanded scale voltmeter and quick chargers.

$38.00 retail

SPECIAL TWIN PACKS

ASTRO-02	$ 30.00
ASTRO- 5	$ 50.00
ASTRO-15	$115.00
ASTRO-25	$150.00

NEW MARINE SYSTEMS

MOTORS	SYSTEMS
ASTRO $10.95	$27.95
ASTRO 10 $32.95	$59.95
ASTRO 15 $32.95	$84.95
ASTRO 25 $44.95	$99.95

Shown Above in Dumas SK20

R / C SAILPLANES AND ACCESSORIES

Stake, line, reel, parachute, all hardware included. Std. Hi-start, 100 ft. Surgical Tubing — **$29.95.** Astro Start — for big planes — 100 ft. Bungee — **$34.95**

MODEL BUILDER AND PANA-VISE®

presents the

MASTER MODEL BUILDER of the month CONTEST

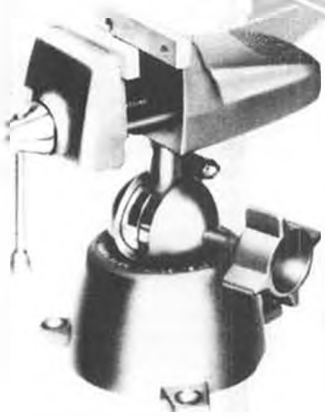
Send all entries to:

MODEL BUILDER/PANA-VISE CONTEST
1105 Spurgeon St., Box 4336,
Santa Ana, California 92702

COLBERT INDUSTRIES, manufacturers of PANA-VISE, the unique hobby vise which turns and tilts to any position, in conjunction with MODEL BUILDER magazine, is sponsoring a design competition for MODEL BUILDER readers.

This monthly contest will be judged for originality and/or craftsmanship for all types of models (excluding plastic static scale). Entries will be judged purely on the basis of photographs and drawings supplied by the builder of the model. Emphasis in judging will be on originality, technical achievement, and craftsmanship, as found in the submitted material.

A MODEL 301 PANA-VISE WILL BE AWARDED EACH MONTH TO THE WINNING ENTRY



Requirements for entries:

1. Any type model may be entered (aircraft, cars, boats, etc.). Kits may be entered if significant modifications have been made to the stock kit.

2. Do not send the actual model. Send only black and white photos, showing at least three views of the model. Include some familiar object in at least one photo to indicate the size of the model. Try to include photos of any significant details.

3. If photos cannot offer sufficient information about the model, the construction drawings may also be submitted. Drawings should be clean, pencil drawings with all pertinent dimensions indicated. A print of the drawing is acceptable.

4. A written description should be included with photos and drawings, explaining in fair detail any unusual features of the design, and explaining any unique technical difficulties that the model may have achieved.

5. Please do not submit any designs that have been accepted for use in another publication. MODEL BUILDER requests first option on publishing any submitted design. Payment for published designs will be at our regular rates. Any prizes awarded do not represent an agreement to publish any design.

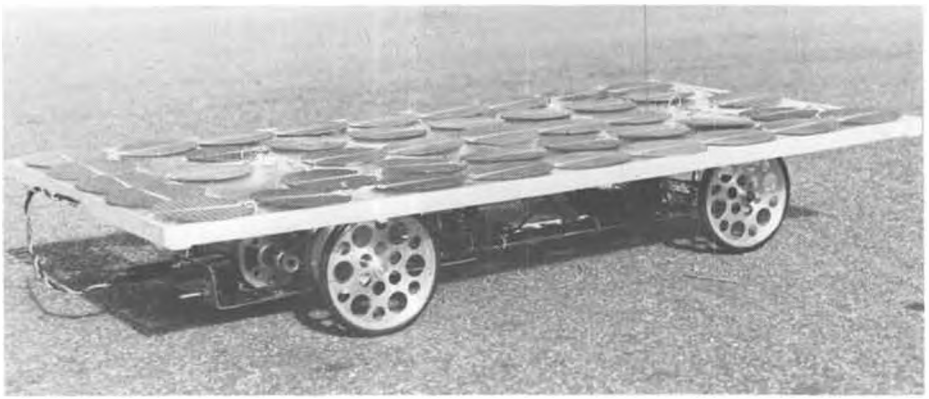
6. Entries will be judged by the modelers on MODEL BUILDER's editorial and art staff, and all decisions of the judges will be final.

7. Postage must be furnished if return of submitted entries is desired.

8. Deadline for entries in the first contest of the series is July 1, 1975, and winners will be announced in the September 1975 issue. Subsequent entries will be due the first of each month and winners will be announced the second month following each closing.

The winner this month is **LARRY GODDARD**, of Pacific Palisades, California. His entry is a solar cell powered electric, radio controlled car.

Because solar cells put out very little current, Larry spent much time on saving weight. Total, including the 9 oz. Astro Flight 15 motor, is 1 lb., 14 oz. Entire car, including wheels, is made of aluminum, with as many lightening holes as possible and not weaken the structure. Radio is MRC, and the car moves along at about 10 mph, for as long as the sun stays out!



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Subscriptions $15.00 per year, $27.50 for two years. Single copies $1.50. Add $2.00 for postage per year outside of U.S. (Except APO). Add 75 cents for Canada and Mexico.

Published monthly by MODEL BUILDER Magazine, 1105 Spurgeon, Box 4336, Santa Ana, Calif. 92702. Phone (714) 547-3963.

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

Second Class postage paid at Santa Ana, Ca.

CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Several weeks after this 45 inch span Gotha Taube LE4 was accepted as a construction article for publication in MODEL BUILDER, it won the F/F Scale event at the prestigious Flightmaster's all-electric contest, Mile Square Park, Fountain Valley, California. To win, it had to gain the highest number of static scale fidelity points, and then qualify with a flight of 20 seconds or better. Designed and built by Bill Stroman, from 1/72 scale drawings by Dick Zasadney, it is powered by an Astro Flight 020 electric motor. The excellent 4 x 5 transparency was produced by John Williamson, Whittier, Ca.

AMA invades MB! Executive Council members take a farewell look at MB's Spurgeon St. office (we're about to move to larger quarters again) prior to MAC Show. (l to r): Glenn Lee, Johnnie Clemens, Earl Witt, Anita, Murry Frank, Homer Smith, John Worth, Bill Rohring (proxy for Hardy Broderson, Velma Teubner, Marlene Chisolm, Lil Worth, Alex Chisolm, and John Berne.

from Bill Northrop's workbench . . .

FLASH! . . . DEADLINE EXTENDED TO JUNE 9

• Did you write your letter to the FCC and your representative in Congress? By the time you read this, the original deadline of May 26th has passed (and chances for an extension were minimal), so it's too late if you haven't. Let's hope that enough of your friends wrote to take care of the situation for you.

Of course, what we're talking about is the totally rotten move that the FCC (Federal Communication Commission) is making to take the six already somewhat unusable 27 mHz frequencies away from the R/C modelers of our country and feed them to the pointless, ugly, insatiable, 95% illegally operated, CB communication system which is now being popularized by cop-ducking motorists and truck drivers, and by our current first lady, Betty Ford. The action is a shameful display of political influence, the power of big money, and the total disregard for those who are engaged in a wholesome and educational sport/hobby . . . in favor of an overbearing mob of "ugly Americans" who are crapping up the airwaves with illegal overpowered equipment, obscene language, useless and never-ending talk about nothing in general, call-girls soliciting business, etc. The expression "Garbage Band" is putting it mild!

The whole thing started innocently enough back in the early 50's, when the FCC legalized the 27 band as an examination-free means of allowing hobbyists to operate radio controlled models, and allowing unknowledgeable ham enthusiasts to enjoy voice communication . . . the only requirement being a license which was purchased from the FCC. Modelers stood in line to fly one airplane at a time with the simple broad-tuning, super-regenerative radios of the time, and the "SHAMS" (ham radio enthusiasts wouldn't or couldn't, for one reason or another, pass the examinations to become regular ham operators, and therefore resorted to the Citizen's Band) began feeble attempts to emulate their more knowledgeable counterparts.

Communication radio manufacturers soon realized they had a golden opportunity to expand their market, as the examination-free license meant that money was the only restriction on the use of CB radios, and so, they began to crank out more exotic equipment. Along with this, accessory manufacturers started offering "hop up" items which could be tacked on to increase the voice quality and operating range of the CB radios. Of course, none of this stuff was illegal until it found itself installed on the SHAM's radio, so no one could really be "responsible" for unlawful operating . . . Like the science fiction movie, featuring a strange little grape sized "blob" of unexplainable origin that grew and grew, consuming everything in its path, and seemingly with no way to prevent complete destruction of the earth and possibly the universe, the CB "blob" was on its way . . . and the FCC, its creator, lost complete control of the situation.

Superhetrodyne receivers and closer tolerance crystals soon came along, which narrowed the signals down so that separate "channels" within the 27 band could operate independently of each other. This temporarily relieved some of the danger from the ever-enlarging "blob", as the FCC assigned 5 channels for R/C and 23 for voice communication. One of the 23 (27.255) was laughably offered for "sharing" between R/Cers and SHAMS . . . in the time that it takes to do the Broderick Crawford bit and rasp out "Ten-Four", a $300 R/C model could be completely destroyed!

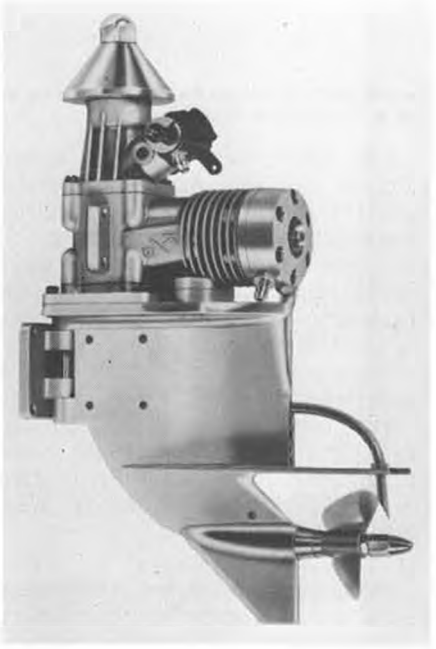
Why only 5 out of 28? While R/C modeling expanded at a rapid rate, CBers multiplied like lethal bacteria. The reasoning is simple. Being able to

Continued on page 91

Jerry Adams' modified Aeromaster II, with smoke screen, bomb, and parachute drop equipment, is all ready for the 4th Annual Multiwing Champs in Omaha, Neb. See R/C column for info.

OVER THE COUNTER

Heathkit's 1976 catalog of electronic kit items.



K & B's 3.5cc (.21) outboard marine engine.

With a span of 34 inches, the kit includes printed parts, FAI rubber, precut prop, folding prop hardware, and tissue. It was flown by Bob DeShields, 1975 Southern California point champion and Bob White,FAI Champion.

Even if your name isn't Bob, you can get one from Hi-Fly Enterprises, 7212 Vassar Ave, Canoga Park, CA by sending them $9.95 plus $1.50 for UPS and telling them you read about it in MB.

* * *

C.B. Associates, until recently known

● Peck-Polymers promises all of you perpetually perspiring prolific producers of Peanuts prompt shipments of their latest; English scale kits of the Luton 'Minor' and Comper 'Swift' by Andrew Moorhouse. Reported to be of first class quality, with excellent plans, printed wood, and everything required except glue and dope, these fine kits are only $3.98.

Available also are two Designer's Kits, for the scratch builder of rubber-powered models. Included are thrust bearings and washers, props, and prop shafts in two sizes. One kit for small models, the other for the larger sizes. Handy, at $1.25 and $2.25.

Further information can be obtained from your peanut pushing dealer, or from Peck-Polymers, P.O. Box 2498, La Mesa, CA 92041.

* * *

SPARROWHAWK; Websters: A small American Falcon that feeds chiefly on insects and small birds and game.

SPARROWHAWK; Hi-Fly Enterprises: A small American unlimited rubber flyer that feeds chiefly on the competition.

Designer Kit by Peck-Polymers, for scratch builders.

Comper Swift is English Peanut scale kit by Andrew Moorehouse, sold in U.S. by Peck-Polymers.

Sparrowhawk, small unlimited rubber ship by Hi-Fly Enterprises.

as C.B. Enterprises, announces availability of its European style transmitter tray. Designed to hold your transmitter securely and at the height and angle of your choice, it provides a resting place for your hands alongside the transmitter. The results are supposedly a more positive control of your flying machine. Certainly Matt and Prettner would recommend it!

With instructions, in gold colored vinyl-clad aluminum for $19.95, black for $23.95. From your dealer, or from C.B. Associates, 21658 Cloud Way, Hayward, CA 94545.

* * *

The latest from Downey, California's engine-land is another first; a 3.5 cc outboard model boat engine. Designed to withstand the stresses of serious competition, no compromises are apparent in its construction. The accepted racing engine features are all there; ABC piston, liner, and husky ball bearings. The well known and proven Perry carb is included, and the cup type flywheel for an electric starter will take care of getting the show on the road in a hurry.

A simple four-bolt transom mounting plate provides ease of installation, while the built-in underwater pickup and provide extra reliability. An integral cavitation plate, skeg, and prop complete the package.

Available at most boat oriented hobby shops, or write K&B Mfg, 12152 Woodruff Ave, Downey, CA 90241.

* * *

Scale R/C builders would do well to send 30 cents to Aero-O-Scale, P.O. Box 3413, Granada Hills, CA 91344. In return, you will receive their descriptive brochure of copyrighted R/C plans.

Included are seldom-seen R/C's such as the Grumman F5F Skyrocket and TBF Avenger; and would you believe, a 77-3/4 inch B-17G.

Claimed to be scaled from actual aircraft, measured and verified in some cases. Others are based on the best available data. Well done, as well as interesting.

* * *

A Stick by any other name is apparently still a lot of flying fun. Witness the latest in the Stick series from GMC Models; the 'Kwik Sticks.'

Available in three sizes, for various engine displacements from .15 to .60, wingspans 44-1/2 to 58-1/2 inches, and claimed to be fast eight-hour builders, the Kwik Sticks are designed for the beginner. Built-in stability insures an easy-to-fly trainer, with enough inherent strength to take the hard knocks.

Molded wings, machine cut parts, hardware, and formed Dural landing gear, are all parts of the kits. Priced at $34.95, $44.95, and $54.95, at your dealers or direct, postpaid, from GMC Models, 28062 Glasser St., Canyon Country, CA 91351.

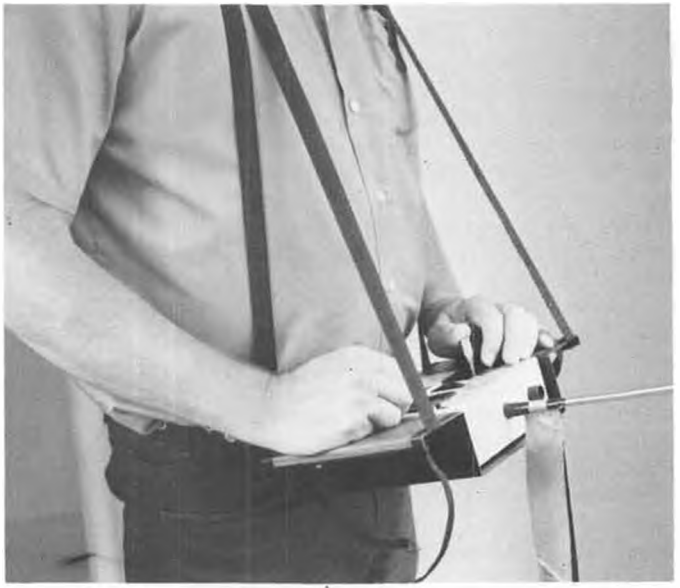
* * *

For Vortex Soling-M owners, old and new, a new two-piece keel is now available. A die-cast stub is joined to a permanent-mold cast weight, after which the assembly is filled and painted. All hardware, in stainless steel, is included, both for assembly and installation.

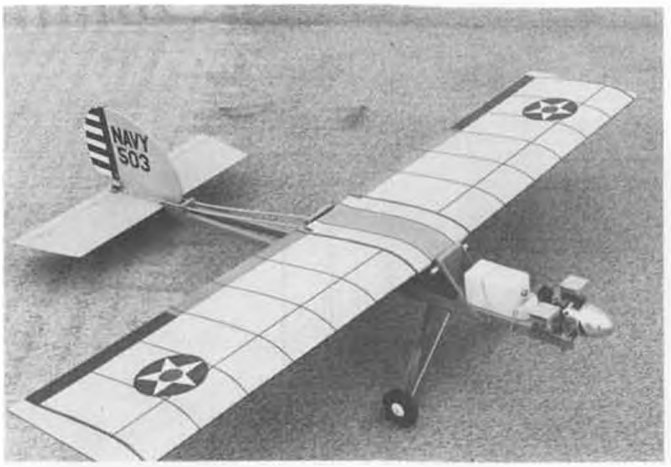
The keel is available as part of the Soling-M, or separately at $28.90 for the stub, and $26.15 for the weight.

It can be obtained from your favorite

Mil-Comm distributes this 12 volt Gel/Cell and charger, by Globe.



Transmitter tray, by C.B. Associates.



Kwik Sticks are available in 3 sizes, from GMC Models.

Luton Minor, another Andrew Moorehouse Peanut kit available through Peck-Polyners.

boat shop, or direct from Vortex Model Engineering, 210 East Ortega St., Santa Barbara, CA 93101.

* * *

Maintenance Free . . . a claim that certainly deserves a second look at the products that it is made for. And when you add reliability, small size and long life, the product deserves much closer scrutiny.

Such is the Globe Gel/Cell rechargeable battery, available from Mil-Comm Distributors, 1616 Cotner Ave., Los Angeles, CA 90025. These batteries are the latest development from the battery maker's art, and are available in enough voltage and current capacity combinations to satisfy any modeler's requirements.

Completely sealed and using a gelled electrolyte, they may be mounted in any position. When properly charged, a life of 300-500 cycles can be expected, without any apparent formation of memory or reverse charge possibilities.

As in all batteries, the proper charger is all-important. These too are available from Mil-Comm, designed and manufactured especially for the battery of your choice. When you write for more information, mention you read about them in MB.

* * *

Are you tired of showing up at the field with an airplane having a finish that looks like it was applied with a wisk broom? Or do you actually use a wisk broom? In either case, we've found just the book for you: "The Art of Airbrushing," Grenadier Books, by William J. Dario and Sydney P. Chivers.

According to these authors, there are three things that can give you trouble in the use of your airbrush, the airbrush or associated equipment, the paint, or YOU. This excellent book explains in detail how to go about isolating and correcting your particular problems. This book is current, copyrighted just last year, and covers the subject like it was painted with an airbrush.

Detailed explanations are included about the internal workings of airbrushes, paints and how to mix them, preparing the object to be painted, and the actual application of the paint. The mysteries of what basic colors to mix to get different colors are cleared away. If you feel that you are not getting the best results from your airbrush, or are contemplating the purchase of one, this book is for you. Ask your dealer, or contact Grenadier Press, 7950 Deering Ave., Canoga Park, Ca. 91304.

* * *

Have you been exposed to the RPM that some of the gang is getting out of their Half-A's? Upwards of 25,000, would you believe? You've got to tie them down, and that is where the Fourmost Power Cradle comes in. This is a new type engine mount, designed to be built into the fuselage structure, providing maximum vibration dampening. Two sizes are available, to fit either a 1 inch, or a 1-5/16 inch spinner, permitting small frontal area and clean lines. The Power Cradle is fuel proof, and can be drilled, tapped or filed as necessary. Attaching to the firewall is done with Weldwood contact cement, claimed as a nitro-resistant bond. Try your dealer, or the manufacturer, Cooney Tool, 4040 24th Ave., Forest Grove, Oregon 97116.

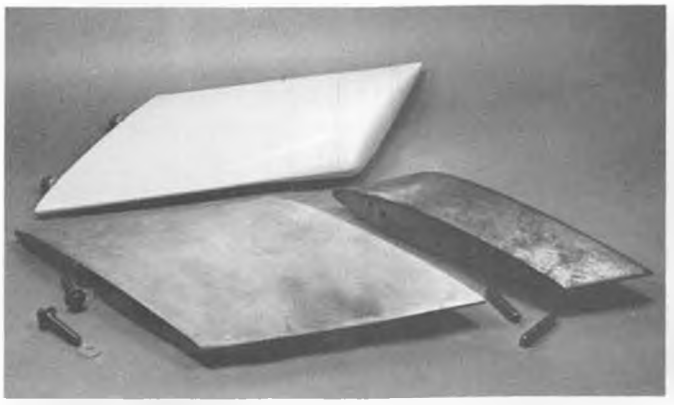
* * *

FREE HEATHKIT CATALOG. The Heath Company, which needs little or no introduction, has its new Spring catalog available for the asking.

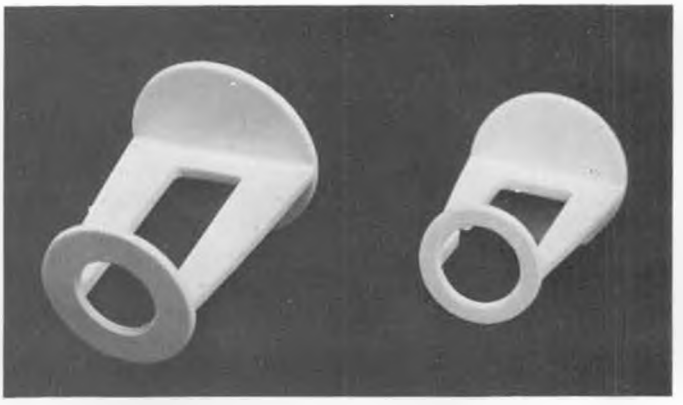
This electronic wish-book contains something for every body and every home. Of primary interest to modelers is the line of R/C systems, accessories and test instruments, Hobie Hawks, books, tools, and ultra-sonic cleaners. For those of you who have everything, four-channel stereos are offered . . . to keep you company while you build that latest bomb.

To help understand more about R/C systems, glowdrivers, tachometers, and other electronic goodies that modelers are seeing more of, the new Heath record-manual training programs should

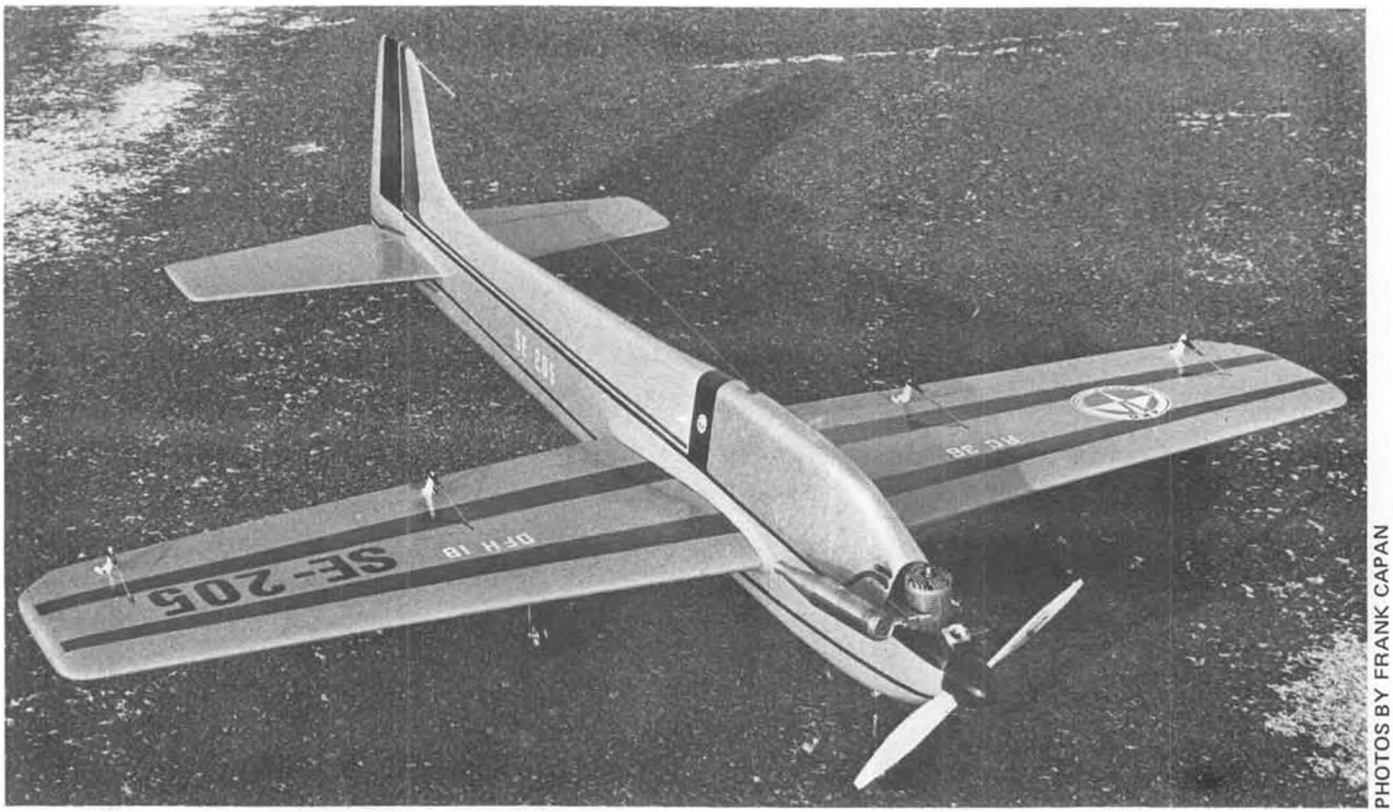
Continued on page 73



Soling-M keel stub and weight, by Vortex Model Engineering.



Fourmost Power Cradle for Cox .049/.051 Tee Dee engines.



PHOTOS BY FRANK CAPAN

● DEN FLYGANDE HYVELBANKEN (DFH) 18 ●

By BENGT LUNDSTROM . . . No molded fiberglas fuselage, no foam core wings . . . just a top-notch pattern ship built out of exotic balsa and ply. It placed a very credible 23rd at the 1975 World Championships.

• The name for this model is "DFH 18", or in full, "Den Flygande Hyvelbanken 18". In English it is "The Flying Carpenter's Bench 18". It sounds like something square and dull and so it was with the first 5 in the series. Some evil tongues invented the name and as I couldn't fight the name I adopted it for the coming models.

This dull design evolved into DFH 18. I used similar models at the world championships in Italy, 1973, placing 33rd, and in Switzerland, 1975, placing 23rd, with variations in size and so on.

THE DESIGN

The first design goal has been to make a "clean" plane with as little inter-action or deviation as possible when applying aileron, rudder, elevator, upright or inverted, or when applying full throttle from idle. This means to me a mid-wing design with symmetrical airfoils and a 0^{o}-0^{o} set-up. It is only the fin that can't be made symmetrical. To counteract the rolling action when applying rudder, there is some dihedral. To make it smooth and stable, a quite long tail is used. The fuselage is longer than the wing.

The second goal has been to make it possible to fly quite slow in rolls . . . not losing height in knife-edge and at the same time, keeping the fuselage axis as much as possible in line with the rotational axis. This goal is met by a very high-speed fuselage. In Switzerland, it was not needed, as several top flyers were not penalized when making 7-8 second top speed rolls. This far exceeded the rule book's statement of 4-6 second rolls within a 90^{o} sector and with the normal flying distance of 50-100 meters. I think the judge's policy must change, and in the meantime you can try to make knife-edge loopings. I have made it, but be careful!

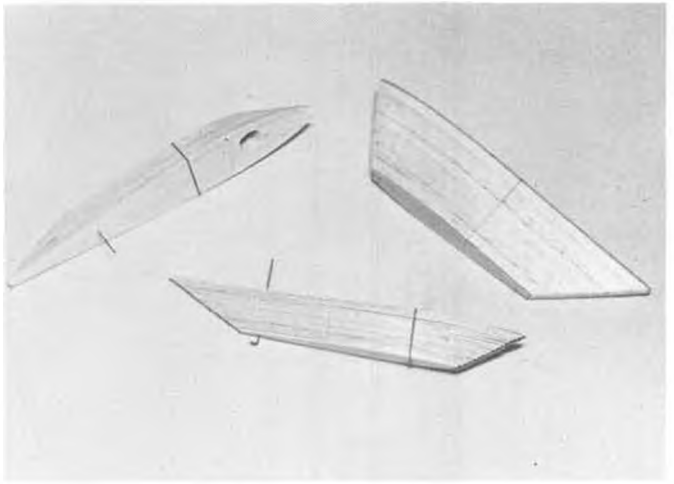
Many consider it best to slow down the plane by using the thick airfoils. I consider it wrong, as it won't help in knife-edge, which the highsided fuselage does. I also like thin airfoils to speed up the plane in the round manuvers, where there are no problems with the 90^{o} sector.

One other probably distant excuse is that the very roomy canopy can hide a big muffler. I think the engines will evolve like to day's powerful 2.5cc engines, with rear facing exhausts. To reduce the noise, we also need a rear intake to put a muffler on the carburetor.

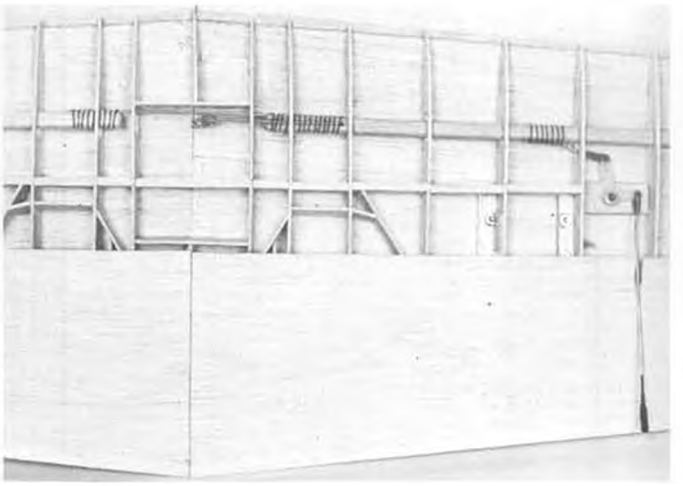
The third noise producer is the propeller. The trend today to make slow-revving, 15cc engines can reduce the propeller noise. But otherwise, this idea seems ridiculous. We have models today

Just in case you thought this design fell together in one evening, here are only three of the predecessors, all showing variations of the progressive aileron deflection system which Bengt talks about in the text.

Profile view shows proper set-up of landing gear, giving slight positive angle to wing as plane sits on ground. This assures a smooth, jumpless takeoff. High fuselage profile permits sustained, even climbing knife-edge flight.



Ribs are sandwich-cut. The rear 1/3 of the airfoil is straight, permitting construction on a flat surface. No spars are used.



The sparless wing gains its strength from the proper adhesion of all structural parts to the wing skin. Note wood pushrod and linkage.

which are too big, too fast, too noisy, and which even kill people. And this makes very big airfields necessary. With a 15cc engine, the planes will be still bigger, and what contest flyer can resist using some of the 5cc's to get more power? I find it better, to reduce the engine size to 2.5-6cc (by FAI rule), but that seems to be very, very far away. Already we can fly a decent aerobatic program with as small as a Tee Dee .049, which is quieter without muffler than today's 10cc engines with muffler.

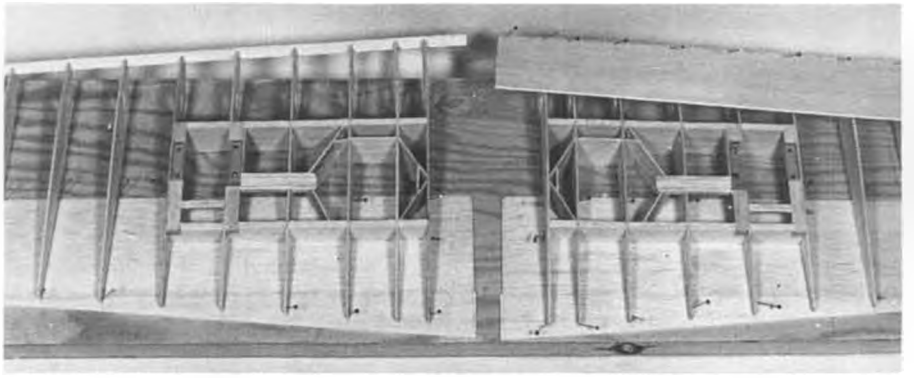
The third design goal has been to make a plane with a good control margin in critical positions . . . for example, losing speed and making a roll, as on the top of an Immelman. In Bern, most top flyers avoided this problem by rolling before the first half loop was finished *(Cliff Weirick put us on to this trick way back in 1967! wcn)*, again with no penalty. I also want the control response to be the same at high and low speed. All of this is made by:

A. Using thin wing, stabilizer, and fin airfoils.

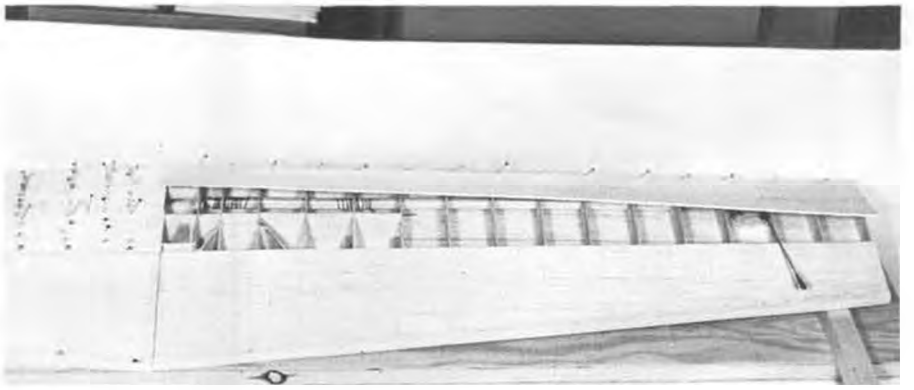
B. Using balsa to get a modest weight, which also enables an unusually long tail moment.

C. Using very wide ailerons and elevators.

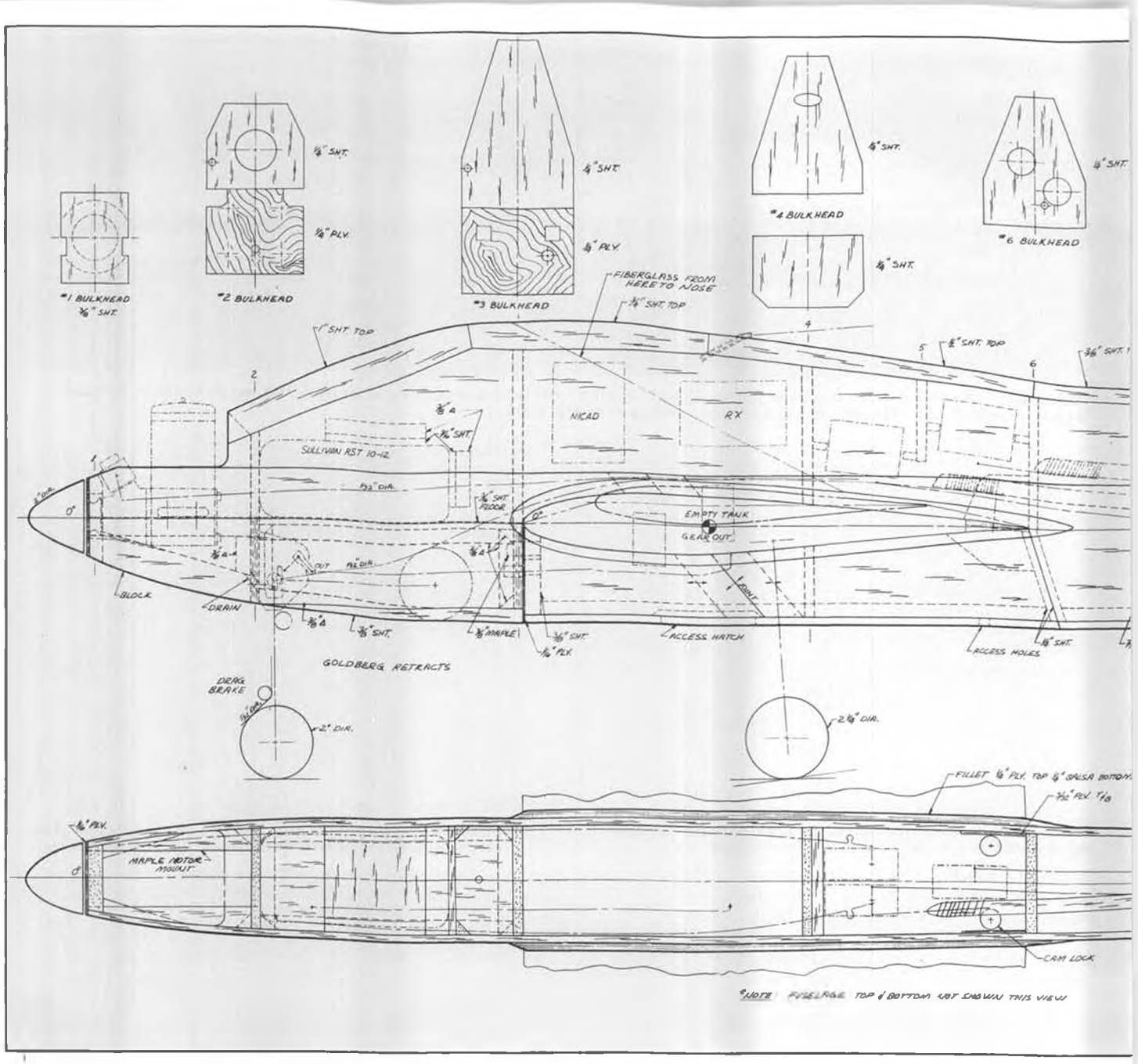
D. Using more effective ailerons by



At earlier stage of construction than in photo above, ribs are shown glued to flat partion of sheeting which is pinned to building surface. Webbing boxes in the landing gear area.



With all internals installed, wing is butt-joined at center, with required dihedral blocking. Joint is later reinforced with glass cloth and resin. Retract bays are cleaned out after top sheeting.



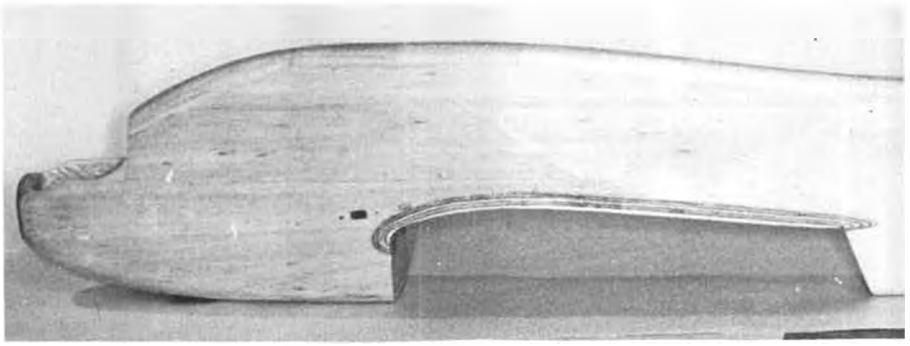
giving them more throw at the tips than at the root.

These warping ailerons are what catches most eyes. The funny thing is that they do not improve what people think they are for . . . making high speed rolls. There you don't need any more speed as you have power in excess. Instead, its advantages are:

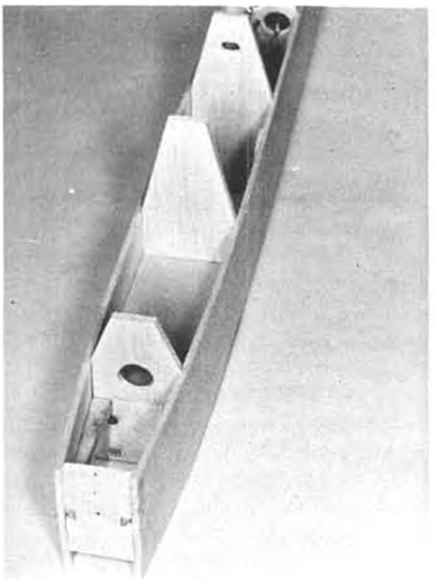
A. In combination with the wide ailerons you do not lose controls at slow speed, when the ailerons on other planes just die.

B. They are very distinct in response, which is good in an 8-point roll, for example.

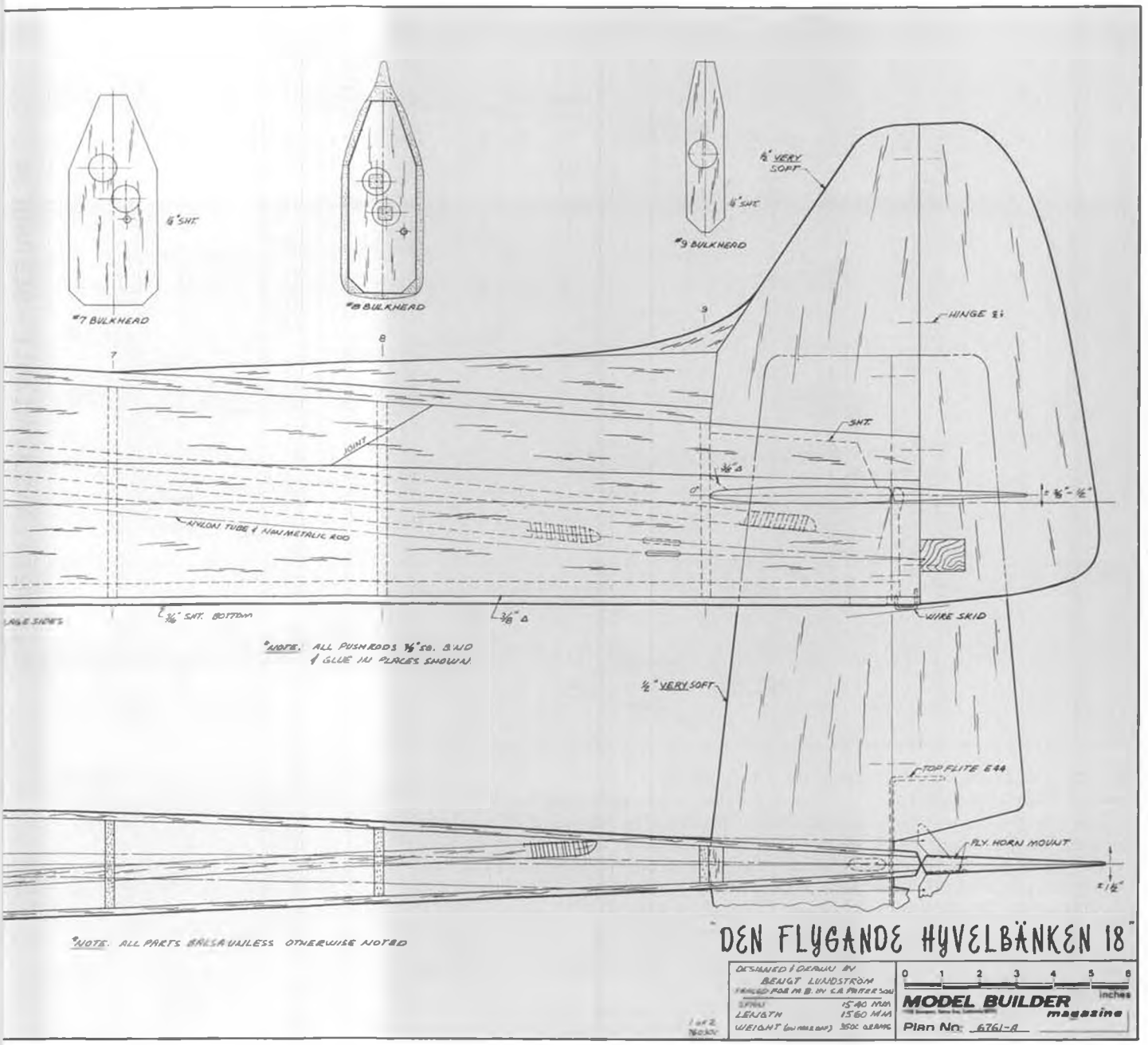
C. The two control rods on each aileron avoid any uneven throw on the



All sheet balsa fuselage has no doublers, gets its strength from careful gluing of skin to all structural parts. Upper wing fillet is shaped from 1/4 inch ply. Nose area is glass and resin reinforced.



Basic fuselage is sheet sides and bulkheads. Matching of side wood is important.



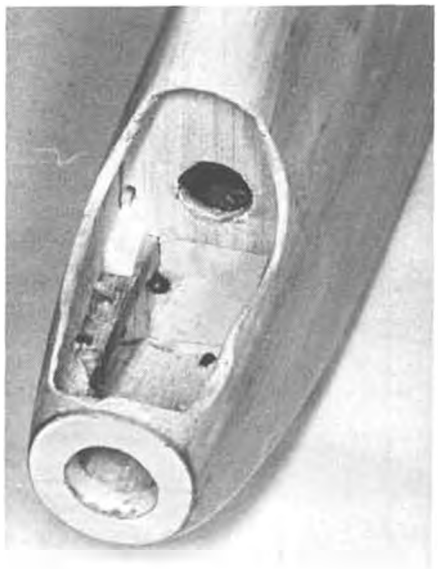
FULL SIZE PLANS AVAILABLE – SEE PAGE 94

two ailerons. It has surprised me to find how much a minor differential can influence the rolls.

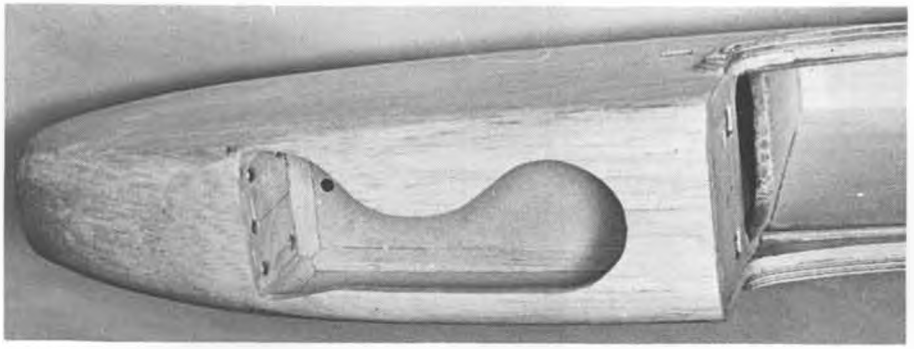
D. You won't have aileron flutter.

BUILDING OF THE MODELS

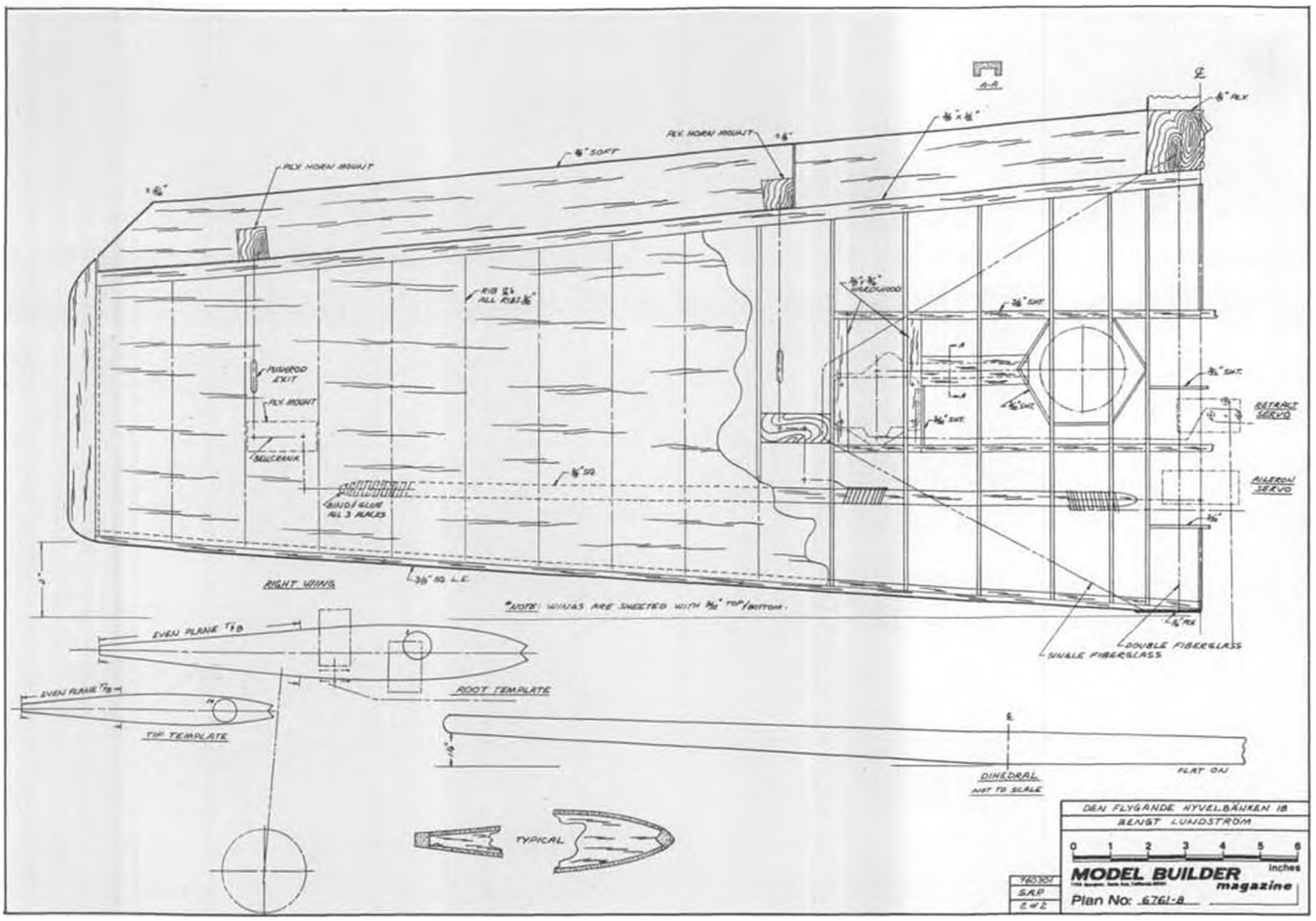
This model must be built light, particularly at the tail, to avoid a lot of lead in the front. The total weight with empty tank ought to be 3000-3300 grams (28.35 grams per ounce). If you think you will build it heavier, or will use a particularly light engine, please move the wing back a 1/2 inch. And if you will use a fiberglass fuselage and foam wing and stabilizer, move the wing back at least 1 inch. But this will shorten the tail moment, which is no good. And the foam wing is heavier at



Engine compartment is snug but accessible. Wood-constructed pattern ship rare today.



Nose gear retract bay, designed for Goldberg system. Note triangle section reinforcing in corners. Ship is built like proverbial brick outhouse, yet is lighter than many contemporaries.



FULL SIZE PLANS AVAILABLE – SEE PAGE 94

the tips, which makes the aileron response a little more mushy.

The way the plane is built may startle some people. There are no doublers in the fuselage, you find very short wooden engine mounts, and there are no wing spars. My latest 6 models have been built like this, and with no problems. The important thing is to make a strong skin to which all high forces are directed, by gluing to it . . . for example, the engine hardwood mounts. Make this skin of Hobby-Poxy 2, with fiberglass cloth (0.6-0.8 grams/DM_2) as indicated on the drawing.

The photos come from several models, and there are minor differences. I have tried to pick the best from them all to make the "DFH 18."

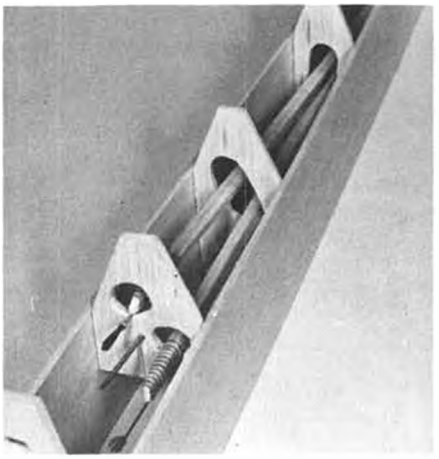
THE WING

The chosen airfoil has one very critical feature. The rear third of it is completely flat from the corner to the wing tip, as seen on the drawing. If you have a straight and even building board, you can just pin down the ribs on the rear part of the sheet skin. When making the rib packs, mark the front point of the straight portion as a help to line up the ribs.

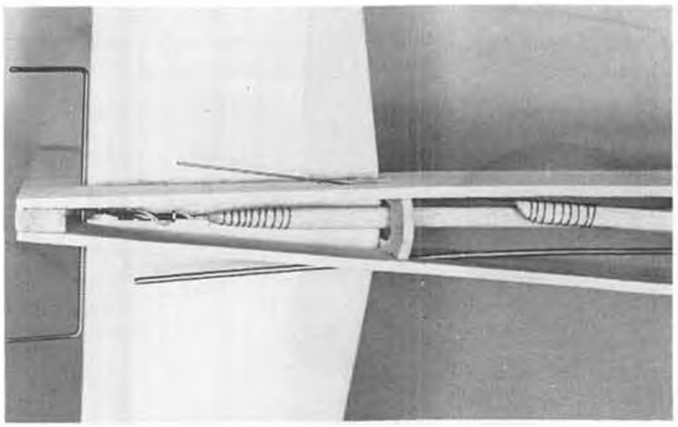
You *must* follow this sequence:

A. Start by building each wing half upside down on the rear flat portion.

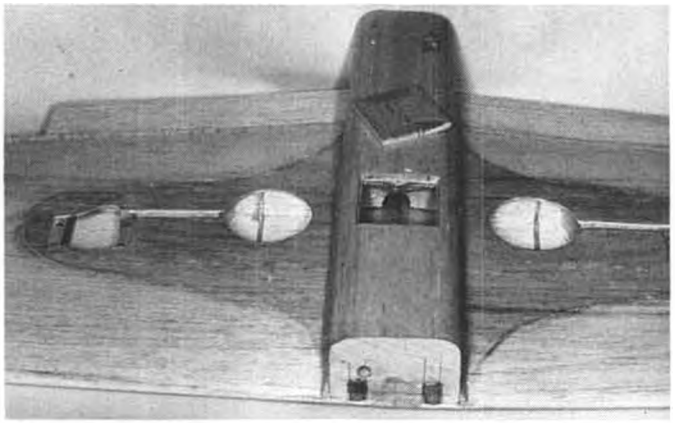
B. Fit all retract details, including the 3/16 spacers; which are a must. Also make thin spacers to be able to glue the retract hardwood mounts to the skin, with its fiberglass.



Fuselage aft of wing, showing pushrod installation. Nyrod is rudder return line . . no slop.

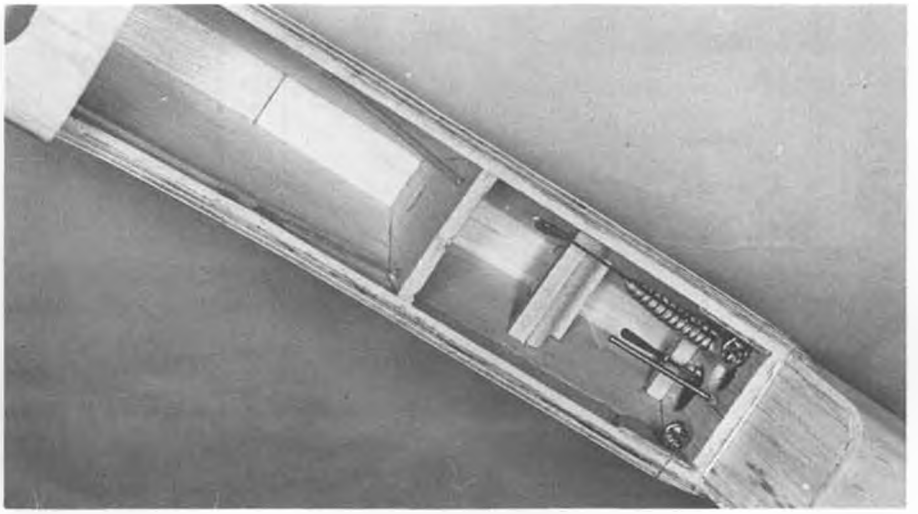


Tail control linkages. Note grounding wire for metal-to-metal connection for elevator. Too many overlook this important detail.



Glass reinforcing, retract wells, and inspection hatch all show up in this wing underside photo. Note balsa wing fillets.

Tail section prior to attaching control surfaces. Note elevator linkage inspection hole.



Radio compartment prior to installation. Longest rod and tube are for rudder. Elevator rod almost hidden. Note Dzus fasteners for wing, and tubes for throttle and nose wheel linkage wire.

C. Fit all sheets to the wing bottom.

D. Remove the wing halves from the board and fit the rear "spars."

E. Prepare to join the two halves and make the long push rod.

F. Join the wing halves with the correct "dihederal block" of 1-1/2 inches when the other wing half is lying flat on the building board. The push rod must be there.

G. Make all the details for the 90° cranks.

H. Complete the sheeting of the wing upper sides.

I. Cut the retract bays and make the servo compartments.

J. Put the fiberglass and epoxy reinforcement on the wing.

K. Make and install the push rods for the retracts.

THE FUSELAGE

Again, avoid all unnecessary weight at the tail.

A. Make the two vertical fuselage sides of equal hardness, all bulkheads, and the tail surfaces.

B. Make a sub-assembly of the bulkheads 1 and 2, and the hardwood engine bearers.

C. Glue the fuselage sides to the sub-assembled front and the fin. This *must* be done with a symmetrical curvature. If not, break it up and glue it again!

D. Fit the rest of the bulkheads, including the two balsa pushrods and the tube, which must be installed now. Note that it may be wise with some radios to fit a ground wire to avoid electrical noise at the elevator linkage.

E. Fit the bottom triangular longerons and the rear bottom sheet.

F. Make the retract bay.

G. Fit the bottom engine bay blocks.

H. Complete the tank compartment.

I. Fit the upper fuselage sides and the top blocks.

J. Cut out the wing "holes" and the bellypan. Glue the plywood reinforcement above the wing and apply the fiberglass with HobbyPoxy 2.

K. Make the servo compartment and install the cam locks.

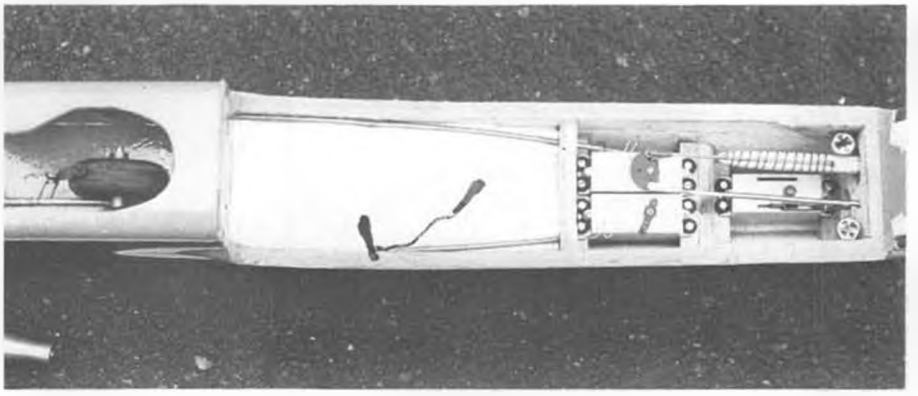
L. Fit the belly pan to the wing and mount all the details shown on photos 21 and 22.

M. Make the ailerons, elevators, and the rudder.

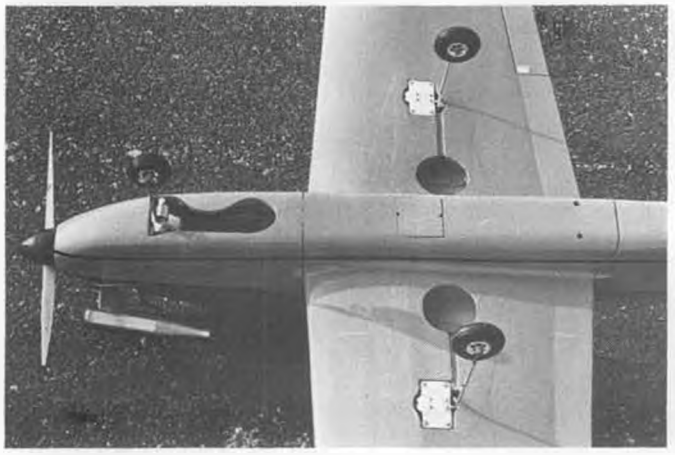
FINISHING

I use nitrocellulose car paint, and over on that, clear polyurethane. In the engine and tank surroundings, I use clear epoxy.

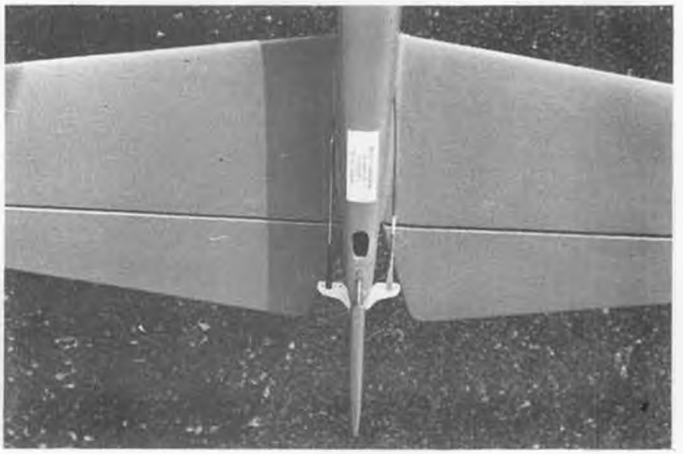
Continued on page 84



Radio installation completed. Note nose-wheel drag-brake, connectors for retract and aileron servos, and kinks in throttle and nose wheel steering control wires. Very neat office.



Underside of completed DFH-18, showing Goldberg retracts extended. Hatch is for access to retract servo. Note inner aileron horn pads.



The end! Note dual rudder linkages which eliminate slop, also wire skid to protect rudder during nose-high landings, identification tag.

Col. Bob Thacker's DH Comet "Grosvenor House" Golden Era racer. Opposite rotating Veco 60 "pumpers", 13 pounds, and about 640 squares Yipes!

"Buy your old man a subscription to MODEL BUILDER, and I'll give you a sip of my beer." Belinda Northrop has her own way of pushing the world's best model magazine!

'REMOTELY SPEAKING...

R/C News, by BILL NORTHROP

• The major portion of our writing effort this month went into the lead-off article in the "Workbench" column; having to do with the FCC's proposed and pretty-sure-to-go-through action regarding our 27 mHz R/C frequencies. We hope that many R/Cers made the effort to write commenting letters to the FCC, and to their appropriate congressmen. The point is, that even if the 27 mHz band is closed to us, we want to trade new and uncluttered frequencies for the "garbaged" ones we're being forced to give up.

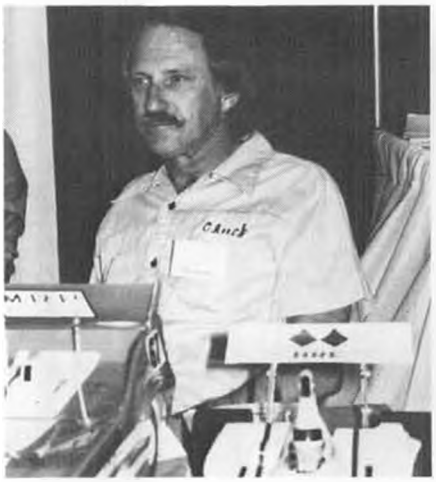
In the AMA's most recent conversation with FCC people, several possibilities were discussed, including FM, and frequencies at the upper end of the 27 band. The latter would probably mean simply the replacement of crystals and retuning, rather than having to replace the whole RF section.

As for FM, we hear more and more about its use in R/C, particularly in that it permits more channels within a given band-width, and that it is much more free of interference. In Germany, where it is now in use, 89 frequencies are available for R/C. (Just imagine the crazy combinations of frequency flag colors!)

In a conversation with York Daimond, of Futaba, we understand that this Japanese firm is making FM R/C units for the European market, and is ready, willing, and able to supply the U.S. market, if it should be legalized by the FCC. Somehow we feel that FM R/C will be the next major change on the U.S. R/C model scene.

The following is a translation (by Phil Bernhardt) of a flyer/user's guide to FM, taken from the 1976 Graupner catalog. Don't run away, it is not very technical. You won't be able to read it and then convert your present system

Somehow, we never noticed what else JZ Products is noted for. You'll have to write to them at P.O. Box G, Lomita, Ca. 90717, and find out for yourself!



Chuck "I'd rather be driving my Pantera" Hallum, MB's R/C Auto columnist, also HRE.

No wonder things keep "whirling" at Kavan/ USA. This is Vice President Chris Blum.

"Boy, these trade shows sure are hard work!" Nancy & Roland Boucher, Leisure Electronics.

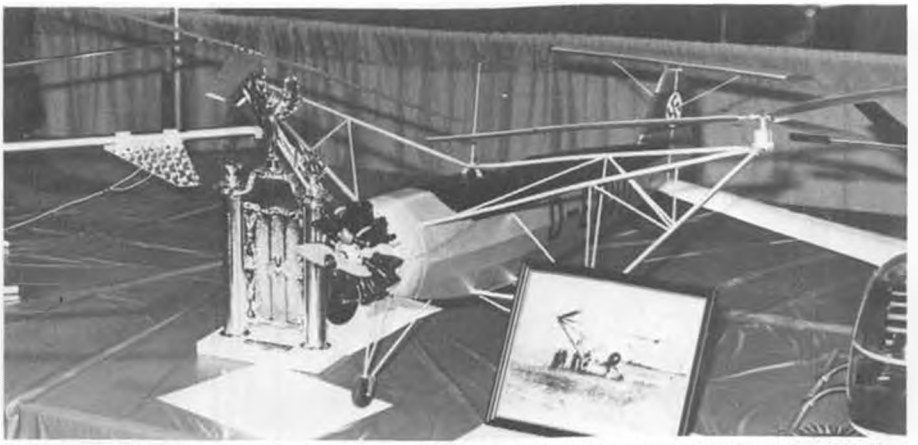
or build a new one (even if it was legal). It only explains the basic differences, and points out some of the advantages.

In every R/C transmitter with proportional control, impulses are produced with a duration which is dependent upon the position of the individual control sticks. These "steering commands" are radiated by the transmitter on a high-frequency band (27 or 72 mHz, for example) by means of "AM" or "FM." These are abbreviations for the technical terms "Amplitude Modulation" and "Frequency Modulation."

With AM, the RF (or radio signal) remains constant in its frequency, and the rhythm of the control impulse remains the same, while the amplitude (the oscillation width of the signal) is changed; in other words, the information for the receiver lies in the amplitude.

With FM, on the other hand, the amplitude remains constant, and the RF is varied back and forth between two frequencies in coordination with the control stick movements. The difference between these two frequencies is known as a "frequency shift" and amounts to about 3 kHz. With FM, the information lies within the two frequencies.

Since the RF transports the control commands to the receiver to a certain extent, it is also called a "carrier frequency."



Skip Ruff, whose semi-scale Focke-Achgelis 61 was featured in the April '75 issue of MB, took first place in choppers at the MAC Show with this full scale model. It flies. To be published.

The advantages of FM are as follows: The FM system is largely insensitive to variations in amplitude. This means a noticeable improvement against interference, especially that from the growing number of 27 mHz band voice modulated radios being used. Moreover, there is greater freedom from strong field-strength fluctuations. Cross-modulation effects and interference are also noticeably suppressed.

Narrow-band operation is fundamentally possible with AM and FM, but it requires special measures and is expensive. Only with FM are the advantages of the narrow-band system fully realized.

Every transmitter radiates "side bands" in addition to and next to the actual "carrier frequency." The radiated width of these "side bands" determines the difference between broad-band and narrow-band. The narrow-band system allows more transmitters to be used within the range of the available frequencies.

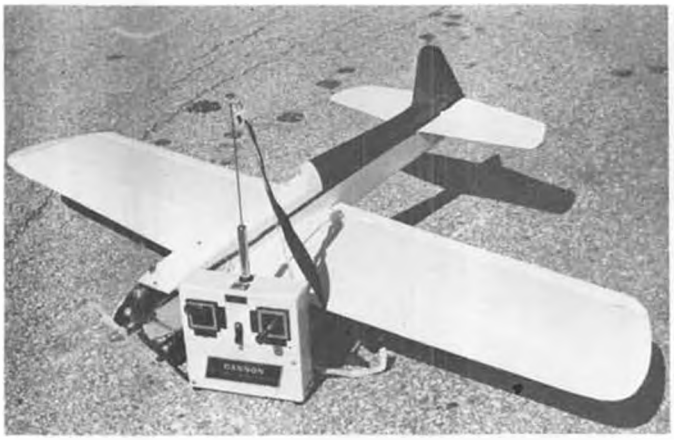
The receiver also picks up a more-or-less wide slice out of the frequency band, in addition to the "carrier frequency." Now, the more narrow-banded the receiver design is, the more selective it is and the less interference it picks up, since nothing is picked up that lies out-

John Simone, Jr., American R/C Helicopters, Inc., and the company's "Rev-Olution" helicopter, available as kit or finished, also with radio.

MB's editor examines Gil Peyton's R/C flying wing glider. A compact unit, it will be reviewed soon, along with new RS radio.

"Would you believe I just bought 10,000 crystals for the 27 mHz band?" EK's Bob "Tex" Elliott didn't really . . . his feets hurt.

Lou Proctor is experimenting with electric powered model aircraft, but doesn't quite have the knack of it yet. It's his Nieuport kit.



Jim Houston's Junior Nobler, converted to R/C with Cannon Mini-Twin, and Cox .051 Tee Dee. Fuselage length unmodified.

Photographer Jim Houston displays the usual backyard photo so dreaded by magazine editors. MAN plans reduced to 6 ft. span.

side of the band width of the receiver. The slice picked up out of the frequency band must be adjusted to the band width of the transmitter for optimum operation.

With narrow-band installations, the frequency difference between neighboring RF channels can be reduced from the usual 20 or 30 kHz to 10 kHz. Consequently, the number of overlaying RF channels in the 27 mHz band increases from 12 to 32. In the 40 mHz band, all four channels are useable (reference here is to European bands . . . at last count, Germany has 89 channels available for the R/C hobby).

The first developments and practical experiments with FM R/C systems were carried out by Grundig in 1969 and 1970. Applications for patents followed in some European countries at this time.

FAI TEAM SELECTION

Dick Sonheim, who is heading up the FAI R/C Pattern Team Selection for the NSRCA (National Society of Radio Controlled Aerobatics) reports as follows:

"Here is an opportunity for flyers in other classes to fly in a Masters Contest. On September 4, 5 and 6, the N.S.R.C.A. Masters Contest will be held at Mile Square, Fountain Valley, California. Twenty flyers in each class . . . Novice, Advance, Expert and Masters . . . from all over the country, will compete for the best in their class.

"Qualifying will be based on where the flyer places in local contests held between April 10, 1976 and August 10, 1976. Entry fee for this program is $5.00. Mail your check to Richard Sonheim, 15856 Falconrim Drive, Canyon Country, California 91351, for program certification forms.

"Those flyers in the Masters Class who are interested in qualifying for the 1977 FAI Team Masters selection program must send an additional Ten Dollars ($5.00 will go to the AMA)! The Team Masters event will be held in June 1977. The site has not been decided on at this time. The qualifying dates for the Team Masters selection program are

Jim's DC-3 with a more suitable background. What a difference a little planning can make! Ship has homebuilt retracts, Freon operated, and Wankel engines. Neato!

May 28, 1976 to October 25, 1976. An FAI stamp is required for this program."

Dick also has a point chart from which your earnings can be determined from each Masters Program Contest entered, based on your placing in the event and the number of contestants making official flights in that event.

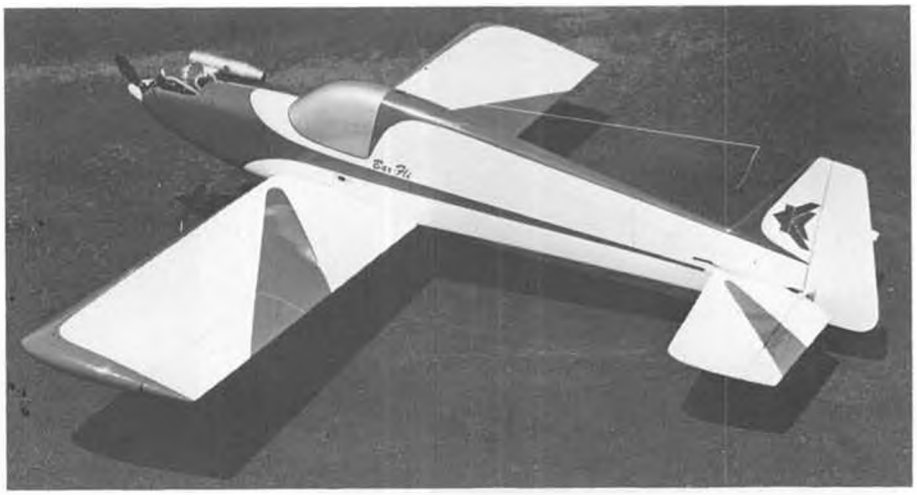
FOR BIPE TYPES

From Olie Olson, we learn that the Fourth Annual National R/C Multiwing Championships are scheduled for July 10 and 11, in Omaha, Nebraska. As in the past, this contest is strictly low key, for bipes and tripes.

The so-called "Omaha Rules" will be used, and a stamped addressed envelope sent to Olie at 6111 Maple St., Omaha, Nebraska 68104, will bring you a copy of them. Phone 402-551-4662 for any other info.

Briefly, the rules are as follows, and pay particular attention to the new Sportsman Class. There are three aerobatic events:

1. Omaha Sportsman, for contestants who have not placed 4th or better in



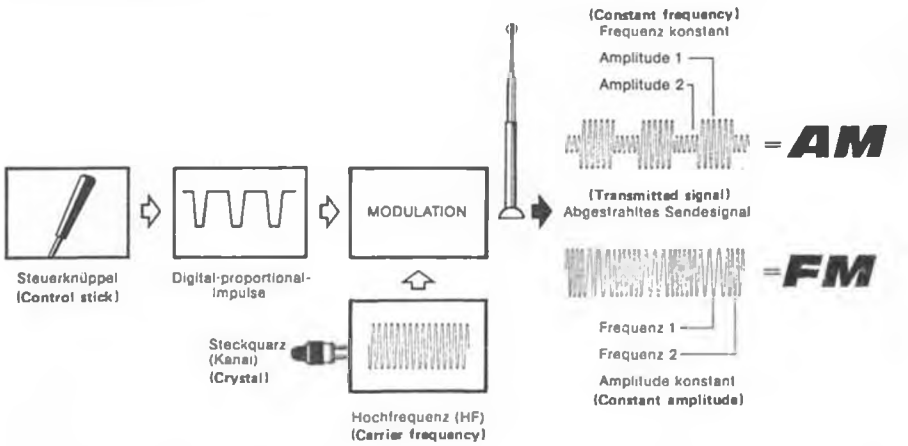
Phil Kraft's own .40 powered Bar-Fli taildragger, built from die-cut set available from MODEL BUILDER. Plans originally published in MAN, now available with die-cuts from MB. See text.

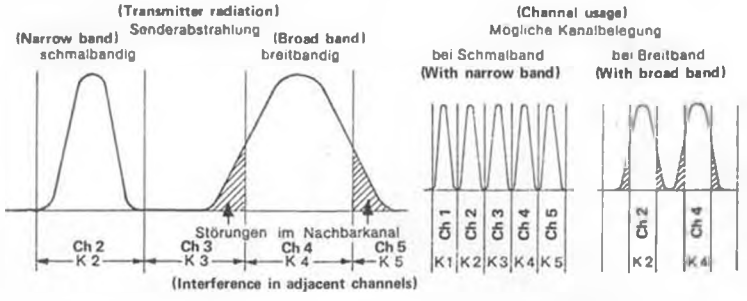
Nick Nichols presents QM racing equipment to 'Pancho' Lopez and Raul Sanchez Diaz during banquet at Mexicali races. See text.

"After you complete the turn, you roll out and . . ." Kathy Root explains the fun of 1/2A racing to Benny Sanchez and Raul Diaz.

Guess what plane is most popular in Southern California QM racing! Eleven (count 'em) Bob Root-designed "Li'l Cobras." See Classifieds for ordering a kit.

The winner in Mexicali, Kent Thomas. His own design P-63, K & B engine, RS Systems radio.





That †%&*@ Hot Stuff DOES stick your fingers together. Bob Novak learned to fly "lefty."

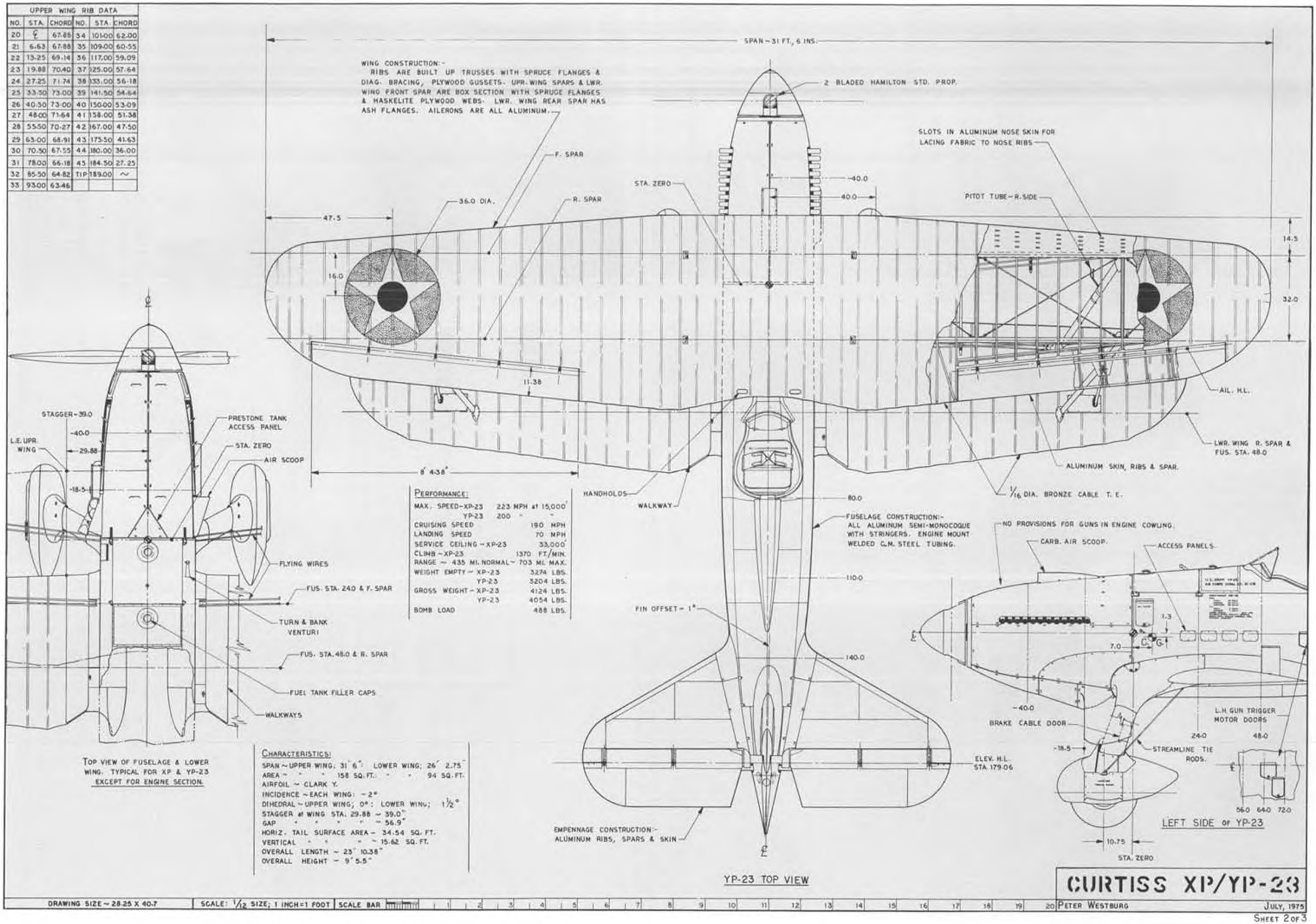
any AMA sanctioned event, including fun-flys and novelty events.

2. Omaha Advanced, limited to AMA Novice pattern fliers, and those Advanced, Expert, and Master fliers who have not placed 3rd or better in any AMA sanctioned pattern content within the past three years.

3. Omaha Unlimited, anyone left over from the above (our words, not Olie's!).

The Omaha Sportsman Pattern consists of one each 360° turn, inside loop, roll, Immelmann turn, and stall turn (school maneuvers), followed by three

Continued on page 79



Standard PR photo of the 1930's shows that the YP-23 was in the same class as the Hawker Fury, Avia B-534 and Fokker D-XVII. With supercharger removed, it had classic lines, but speed was reduced to 200 mph at 15,000 feet.

THE LAST OF THE TWO WINGED HAWKS

By PETER WESTBURG

CURTISS XP/YP-23

Part II

Adjustable horizontal stab moved in cutouts covered with sliding plates. Landing gear of YP was beefed up with streamlined cross-strut and wires.

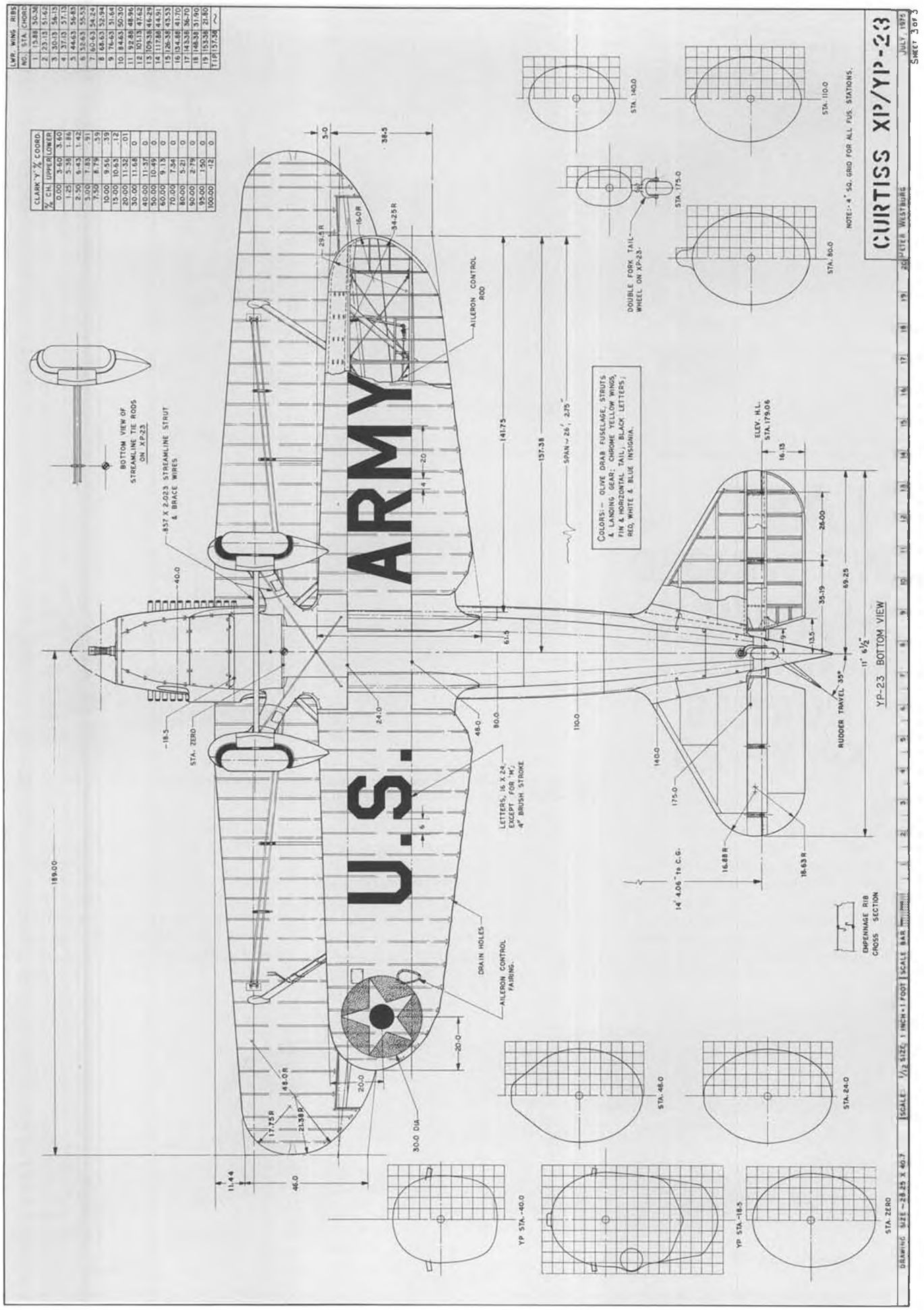
• Little is known of the career of the P-23 while at Wright Field. It was thoroughly checked out in its supercharged configuration, and at one time was equipped with the ancient antipersonnel bomb racks of the Curtiss A-3 Falcon. It was a makeshift installation, with the release cables running spanwise on the bottom surface of the wing, on the outside, in the airstream. It was, perhaps, the world's only supercharged, high altitude attack plane.

Following this experiment, the supercharger was removed. The airplane was usually referred to as the YP-23 at this time, but the designator was actually changed before the supercharger was removed. However, it is convenient to refer to the un-supercharged version as the YP-23 and the supercharged as the XP-23. In its cleaned up configuration, the YP-23 was one of the most beautiful fighters to ever grace the skies. My pilot friend who flies DC-10's for United, put it better than anyone; "If that airplane could cook, I would marry it," he said.

Continued on page 90

While at Wright Field, the XP-23 was fitted with A-3 bomb racks, making it the world's only supercharged high altitude attack plane!

Goodbye, beautiful biplane! The Boeing P-26 Peashooter had flown more than a month before the XP-23 was delivered to Wright Field.



CLARK 'Y' % COORD.		
% CH.	UPPER	LOWER
0.00	3.60	3.60
1.25	5.38	1.86
2.50	6.43	1.42
5.00	7.83	.91
7.50	8.79	.59
10.00	9.56	.39
15.00	10.63	.12
20.00	11.32	.01
30.00	11.68	0
40.00	11.57	0
50.00	10.49	0
60.00	9.13	0
70.00	7.54	0
80.00	5.21	0
90.00	2.79	0
95.00	1.50	0
100.00	.12	0

LWR. WING RIBS		
NO.	STA.	CHORD
1	13.88	50.38
2	23.13	51.62
3	30.13	54.13
4	37.13	57.13
5	44.63	59.63
6	52.63	55.53
7	60.63	54.24
8	68.63	52.94
9	76.63	51.64
10	84.63	50.30
11	92.88	48.96
12	101.13	47.62
13	109.38	46.29
14	117.88	44.91
15	126.38	43.53
16	134.88	41.70
17	143.38	36.70
18	148.38	31.90
19	153.38	21.80
TIP	157.38	~

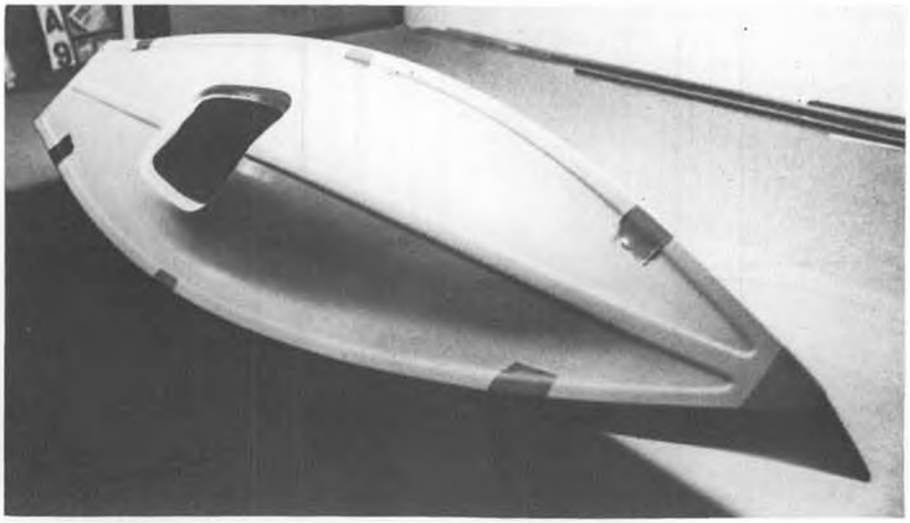
Jack Elem's photo of Tony Johnson proves that you don't need a van or station wagon to transport a big Newport 12-meter . . . just a little careful planning!

STRICTLY SAIL

By ROD CARR

• While standing at the lake, we seem to hear over and over the local hot shots muttering about the terrible weather helm they have discovered in their boats. What are they talking about? It is just "in-group" jargon, or is there something to it that will help us improve our performance if we could understand it? To my way of thinking, the conditions which produce weather helm are so meaningful, and weather helm's effect on boat handling and efficiency is so drastic, that we must learn about it, and in so doing, put it to work for us.

Simply put, weather helm is that tendency of a sailboat to head up into the wind while sailing closehauled. This is a natural result of the forces which act on the boat in the air and in the water. It is called weather helm because, unless the rudder were actuated to prevent this rounding up or luffing movement, the boat would eventually put herself in irons, head-to-wind, with the sails flapping like mad. In a full-size boat, with tiller steering, the rudder was moved to head the boat off the wind. Inside the boat, this translated into a movement of the tiller arm toward the windward, or weather side of the boat (FIG 1). In a properly balanced boat, a small amount of compensating rudder is carried to balance the natural attempt of the boat to luff itself into irons. If it takes large amounts of opposing rudder to accomplish this balance, the boat is said to carry a lot of weather helm.

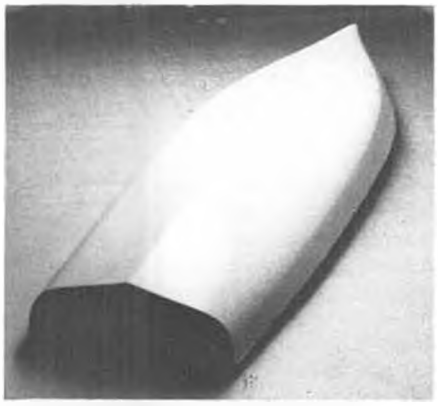


An ocean racer "Bubble Deck" on Ray Ozmun and Tom de Lombardi's "Aquilo 50" makes for a snappy appearance.

We need to first find out what produces this tendency to round up. Then we need to understand what forces associated with the hull cancel such a tendency. Lastly we should become familiar with the adjustments necessary to the sails and to the boat to bring these two forces into a balance which will give our boat the desired amount of weather helm. Some weather helm is highly desirable in a sailing model, since this tendency will always try to work the boat to windward, shortening the distance traveled to the windward mark. Too much weather helm will require such massive amounts of correcting rudder that drag will increase and your boat speed will drop. It is little advantage to out-point everybody in the fleet if your boat speed is only a fraction of theirs.

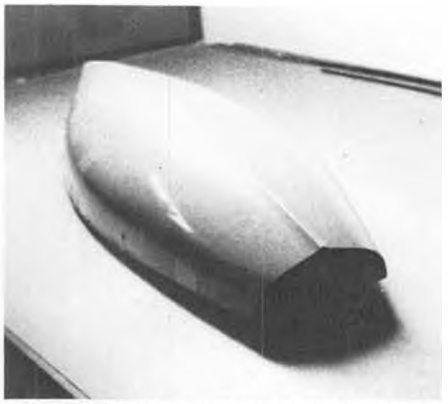
It is the action of the wind on the sails that produces the rounding-up susceptibility. We need to find the Center of Effort of the sail plan. This is a point on the sails from which we can imagine all the wind forces act. In practice, the True Center of Effort (TCE) is difficult, if not impossible to locate. However, a reasonable approximation can be made by finding the Geometrical Center of Effort (GCE). Draw your sailplan to a convenient scale as if the main and jib were both strapped in on the centerline of the boat. Then draw a line from each corner of a sail to the midpoint of the opposite side. (Ignore leech roach, use a straight head-clew line.) The three lines will meet at the GCE for that sail (Fig. 2). Connect the two GCE with a straight line. The combined GCE of the two sails will lie along it somewhere. Drop a perpendicular to the baseline from each GCE (JIB and LMN). Figure the ratio of jib area to main area by dividing the main area by the jib area. In the figure, main/jib is 900/300 or 3/1. Now, carefully, measure off one unit (an inch, a centimeter, whatever fits your paper conveniently) corresponding to the jib area *Down LMN* from the main GCE. In the figure this is labeled OM. Then measure 3 units *UP* JIB from the jib GCE. This is labeled IH. Now draw a line connecting H and O. Where it crosses the IM line is the location of the combined GCE for the two sails. It is, incidentally, the place where the sail plan would almost balance if cut out and somehow held on the point of a pin. *(Any similarity of Center of Lateral Area, CLA, of an airplane, is purely fact. wcn)*

This is a simple approximation. The True Center of Effort is really related to forces acting on the sail, not just the areas. Since sails are of different efficiencies . . . jibs working better than mains because they don't have a mast disturbing their airflow at the leading edge . . . there are designers who will



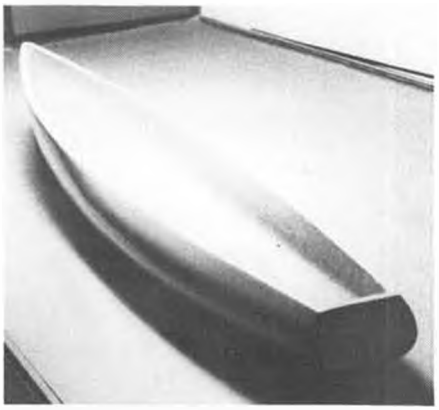
Note wide afterbody on Bill Nielsen's "Checkmate."

Chip Bullen's "Liberty 76" shows narrow bow sections for minimum wave resistance on wind.



"Aquilo 50" shows well-rounded sections for all-weather performance.

"Checkmate" shows distinct kinship to the Flying Dutchman in her bow configuration.



Hull lip on "Liberty 76" makes deck attachment easy, maintains hull shape at sheer line.

treat the jib as if it were a bigger sail in hopes of more nearly approximating the TCE. Different parts of the same sail provide more or less force with the leading parts of the sail being more valuable than the after parts (Figure 3). As a result, the TCE is always forward of the GCE . . . because the after parts of the sail are loafing while the forward parts are producing more force per unit area and are underrepresented in our GCE drawing.

What we are after here is an understanding of the Center of Effort, rather than the ability to predict how a newly designed boat will act. Through the GCE we can imagine that all the sail forces will act. The total force applied to the sail plan can be split into two vectors acting through the GCE. The damaging one is *heel.* This force operated perpendicular to the centerline of the hull, and serves to tip the boat over. The beneficial one is *thrust,* which acts in a direction parallel to the centerline of the boat and propels it forward (Fig. 4). It is the simultaneous action of these two parts of the total force applied to the hull which will result in the boat trying to luff.

But meanwhile, back under the water . . . The hull is resisting the sideways pressure of the wind on the sails. Whether it is a centerboard, fin keel, or full keel, the underbody is shaped to efficiently resist sideward motion. If you put your particular hull in the water without the sails and push on its sheer, you will find a place that will allow the hull to balance and move sideways in response to your push without yawing. Somewhere down inside the hull in the plane of your push is a point called the Center of Lateral Resistance. If you press on the hull forward of the CLR, the bow goes around. If you push aft of the CLR, the stern moves. The hull will pivot around the CLR like it was an invisible, internal hinge. In general, when the hull is underway, the True CLR will be somewhat forward of the CLR just determined, since, when moving, the forward part of the hull works in undisturbed water, while the after part may be working in eddies and turbulence which apparently don't resist sideways motion so well.

Now we can put the two halves of the story together. We have an approximate idea of where the sail forces act, ie, the GCE, and now we have a similarly approximate idea of where the resistance forces of the hull can be considered to be centered, ie., the CLR. In Figure 5, we see two parts of the same picture which have been separated for clarity. In (a), we see only the thrust part of the sail force, and since the sails are never actually on the centerline of the yacht, we see a lever arm labeled "t" through which the thrust force is able to

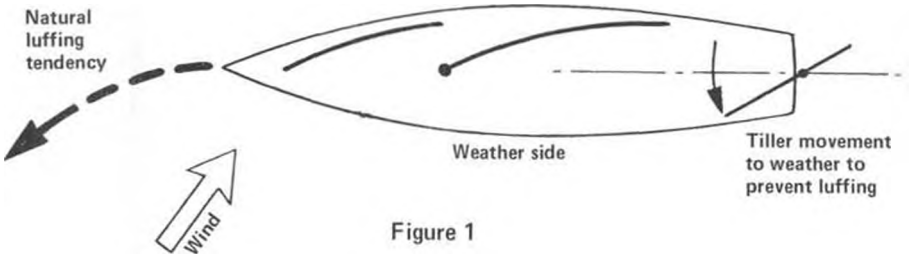


Figure 1

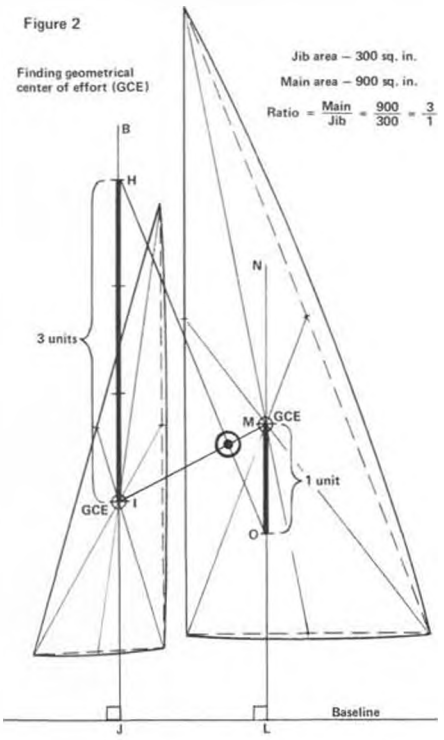
Figure 2

Finding geometrical center of effort (GCE)

Jib area – 300 sq. in.

Main area – 900 sq. in.

Ratio = Main/Jib = 900/300 = 3/1



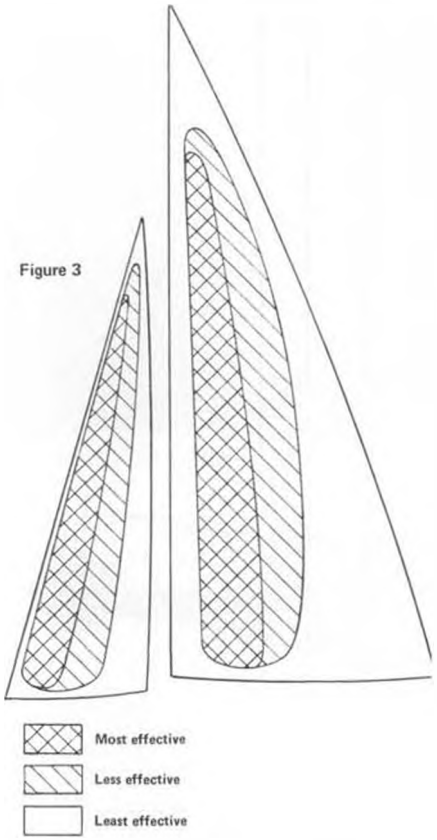


Figure 3

act on the hull. Remembering that the hull will pivot around the CLR, we find that the thrust vector will cause the boat to luff up into the wind. Precisely what weather helm is all about. In (b), we show the corresponding heeling force. I have placed the sail plan on the hull, so that the heel vector operated right through the CLR, and causes no contribution to a change in heading.

In Figure 6, however, we have moved the entire sail plan aft. In (a), as before, the thrust force produces a luffing moment. However, in (b), the heeling force is no longer acting through the CLR, but somewhat aft of it by a distance H. This will cause the stern to be forced around, reinforcing the luffing moment already due to the thrust force. The result is a boat which requires so much rudder to keep her from luffing

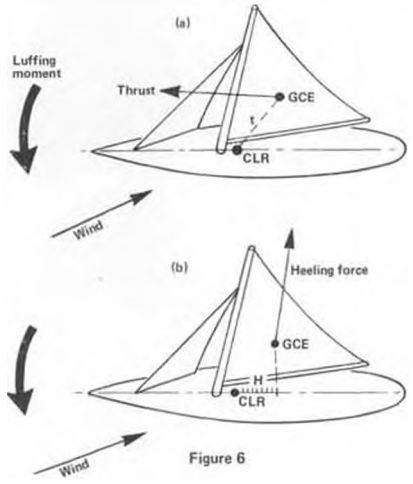


Figure 6

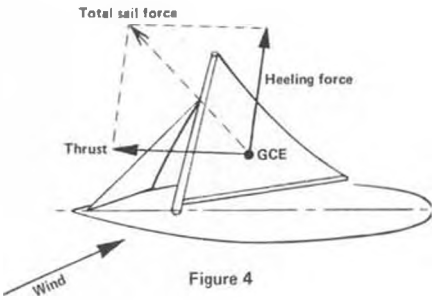


Figure 4

that it is almost uncontrollable. The boat in this configuration is said to have too much weather helm. The first move to cure it should be to shove the entire rig, mast and all, forward on the hull. This we have done in Figure 7. In (a), we see the thrust force producing a luffing moment as before. But look at (b). Now the heeling force is operating on its lever arm H, which is in front of the CLR. It will try to hold the head of the boat off the wind, opposing the luffing tendency of the thrust force. I think this may be hard to grasp, because we have to think of a total sail force being split into two separate parts, thrust and heel. Under the proper conditions (ie. Figure 7), each part acts oppositely on the hull.

The distance H is known as "lead". This lead is really the length of the lever arm that the heeling force is going to act on away from the CLR. The longer the lead, the more the tendency for the boat to fall off the wind or to have lee helm. It should be obvious that a skipper will now spend some time balancing his sail plan until the heeling force moment is just slightly less than the thrust force moment. In other words, the boat will have just a slight tendency to luff up, and can be balanced with about 3 or 4 degrees of rudder offset. Just the amount available from the trim lever on your R/C transmitter. A well balanced boat should take herself to weather, with the skipper touching the trim lever now and then to allow for changes in the wind speed that the boat meets.

We have really just scratched the surface. We need to delve into the other kinds of changes that we can make to produce fine balance. And we should discuss the effects of heel on the locations of the true CLR and true CE, as well as the wind speed changes that have to be cranked into the system.

As a first approximation, if your boat heads up too much in the puffs, move the sailplan forward. If, in a puff, the boat falls away from the wind, move your sailplan aft. Further details of these and other mysteries will be covered later.

* * *

I must thank Jack Elem for this month's lead photo. In his capacity as Class Secretary for AMYA's Newport

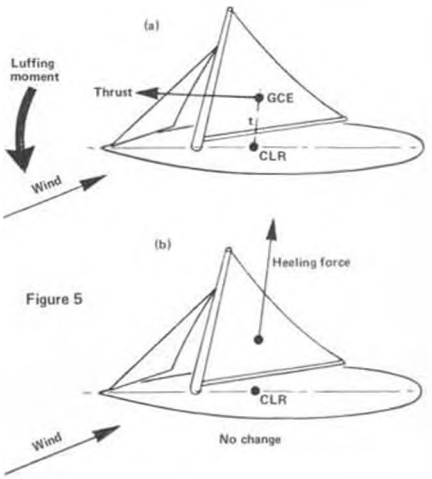


Figure 5

12-Meter Class (ex-West Coast 12) he is constantly queried about the portability of the 72 inch LOA, 45 pound boat. Anyone who complains that it is too big is immediately faced with this photo of Tony Johnson and his never-give-up method of transporting his 12 to the lake. Apparently the sails come off the spars and the whole package rides comfortably beside Tony down the freeway. How's that for ingenuity?

The list of AMYA Sanctioned Clubs continues to grow by leaps and bounds. Add to your list the following:

No. 54 Du Page MYC - Robert Borla, 10 W. Burlington Ave., Westmont, Ill. 60559.

No. 55 Bermuda MBC - C.F. Langton, P.O. Box 603, Devonshire, Bermuda (Mostly East Coast 12's, and what a site for an ACCR!).

No. 56 Sydney MYC - Max Lewis, 4 Ogmore Ct., Bankstown, New South Wales, Australia.

No. 57 Potomac R/C Sailing Assn. - Cas Woodbridge, 3411 Mansfield, Falls Church, Virginia 22041 (Previously the sail division of the Capitol R/C'ers.).

No. 58 Iowa MYA - B.J. Kelch, 431 Scandia Ave., Des Moines, Iowa 50315.

Write directly to the contact men to find out what their regatta schedule is and to learn of the classes of boats they are sailing.

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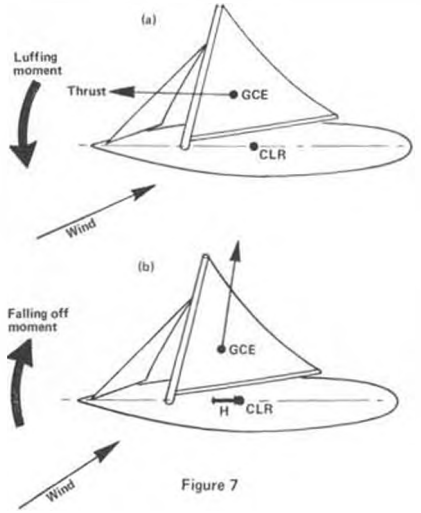
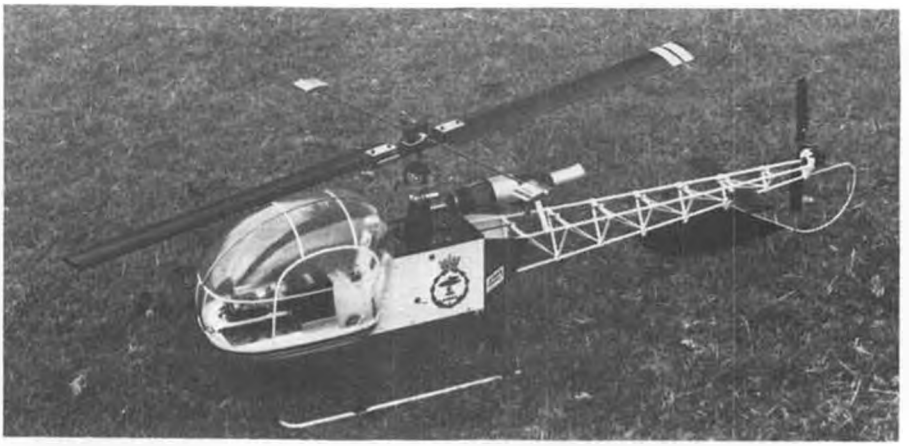


Figure 7

"Chopper" editor, John Tucker, with the test model Kavan Allouette, in front of MB office.



Full view of the latest proptotype Kavan Allouette. The much-delayed project is just about into production. Note Kavan gyro in cockpit.

CHOPPER CHATTER

By JOHN TUCKER

• Although I am generally opposed to "stealing" a new design from a manufacturer who has spent many hours and dollars in developing his idea, I did run across an item in the Japanese Radio Control Technique-Helicopter Annual that might be of interest to the new R/C Helicopter pilot.

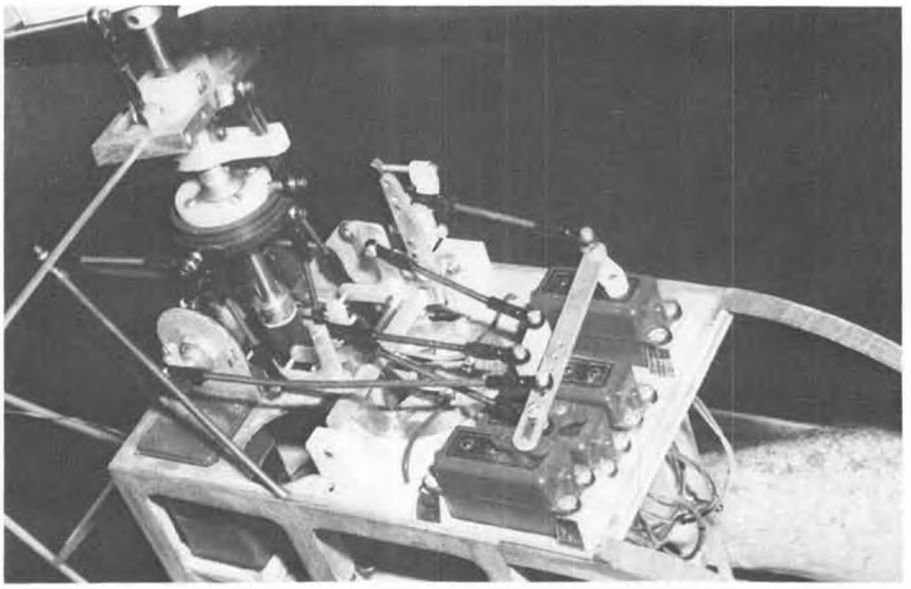
As a matter of fact, I have always believed that the best way to trim-out a new chopper was to keep it unrestrained and let it swim around on a hard surfaced area while you adjusted and learned without benefit of training platforms and mickey-mouse aids (other than wide-stance landing gear or floats). Well, this little gadget permits movement in all directions, including up and down, but still limits the chopper to ground operations only, and can be put together in a couple of hours for a couple of bucks. There have been dozens of training table/platform designs in recent years, including one which straps the model on one end of a long counterbalanced boom and allows plenty of freedom vertically as well as around the circle, but none of them really give the freedom of the device described below.

TRIMMING AND TRAINING PLATFORM: By referring to the drawing, you can see that a written description is almost unnecessary. The finished unit consists of an "H" shaped wood platform, upon which the helicopter skids are clamped. This platform is attached to an aluminum tube or wood dowel which telescopes into another aluminum tube mounted on an "X" shaped base. By installing conventional casters on the base, complete freedom of movement is allowed and trimming now becomes an easy chore. Fore and aft cyclic will result in the entire assembly moving across the ground foreward and backward, whereas left/right cyclic will cause sideward movement in the appropriate direction. Rudder (tail rotor) control will permit rotation in either direction and throttle (or collective pitch) will allow the helicopter to rise vertically to the limit of the telescopic tubes.

For gosh-sakes, don't forget to install a pin in the telescoping tubes so they won't pull apart when the power is increased to lift-off position . . . you may find landing on a broomstick a little difficult! Even if you're the world's best pilot, I don't think you could thread the airborne tube back into the ground-based tube! Ha!

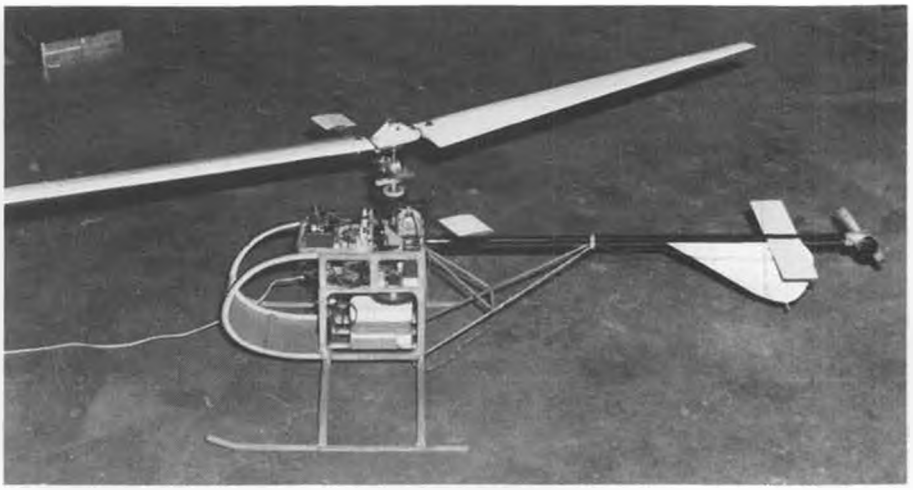
Seriously, a slot should be cut verti-

Separate tail drive motor on Gilbert's electric chopper solved underpowered problem.



Control system on Charlie Gilbert's electric chopper appears Rube Goldbergish, but everything has a purpose. Main purpose is to keep weight to a minimum. Power-to-weight is excellent now!

Electric chopper flight is here! Charlie stabilizes tail as main rotor does its thing.



Electric chopper lifted 2 pound weight bar that was supposed to hold it down while Charlie was testing it . . . nearly went through the basement ceiling!

cally into the outer tube and a pin or machine screw installed through the slot and into the inner tube to limit its vertical travel. Another way would be to attach a safety cable or small chain between the two platforms to limit the travel. Both ways are shown in the drawing.

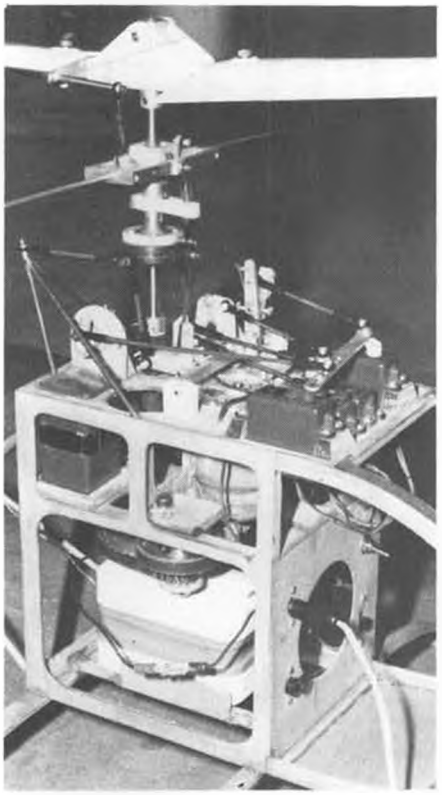
A final note . . . if your chopper has lots of lift, you might find it necessary to add a small amount of weight to the platform's base to prevent it from becoming airborne! Build it sturdy and fly on a smooth surface. Basic trimming instructions are found in the April 1974 issue of MODEL BUILDER.

ELECTRIC CHOPPER NEWS:

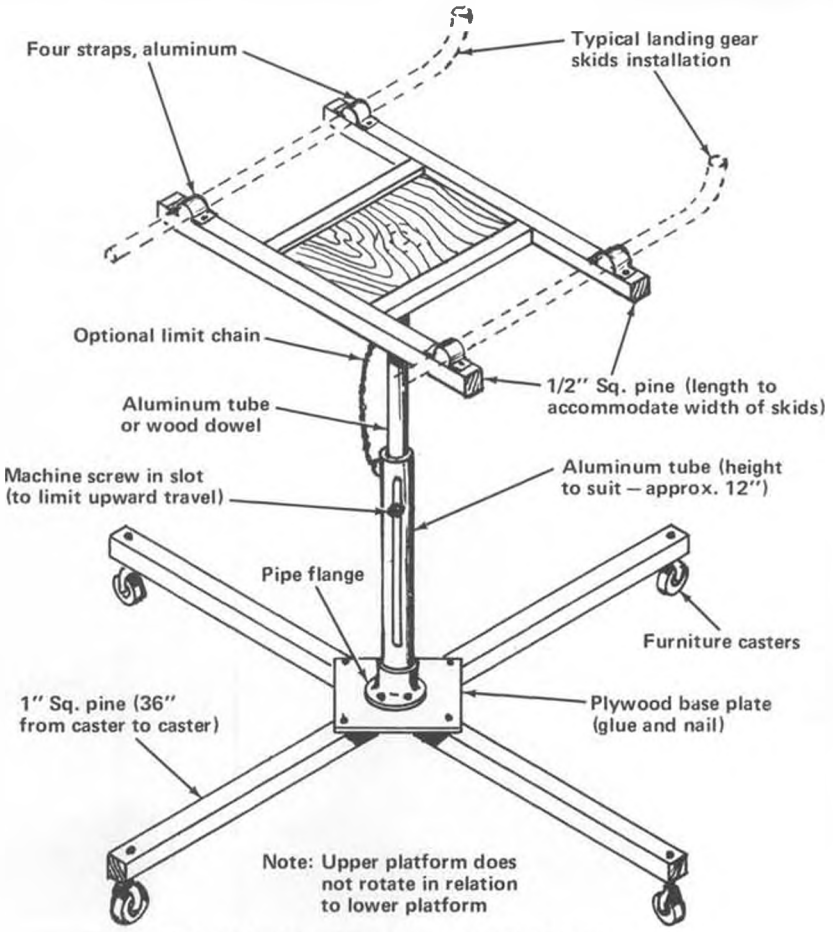
It flys! Yeah, Charlie Gilbert's electric helicopter finally gets airborne after much modification and new design concepts. He called me the other night and was so excited he had a hard time telling me about it, so I packed up my camera and drove over to his workshop in Fullerton, California to see for myself. If you've been following his progress in this column, you'll remember he was using a single Astro-Flite 15 motor driving the main and tail rotor through appropriate gear reductions. His experiments concluded that the tail rotor absorbed about 60% of the total power, which was too much to develop enough main rotor lift.

After much help from, and much consultation with, Astro Flight's Bob Boucher, Charlie installed an 02 motor on the tail, screwed on a Cox 6-3 plastic prop, and made a variable speed control unit to change tail rotor RPM. When it came time to try it, he placed a 2 lb. brass bar across the skids to hold it down and turned on the power. At first, the surge was so great that the blade holders bent under the sudden torque, so he installed a two-speed switch to start the main rotors slowly, then increase speed gradually to lift-off. Would you believe the little chopper lifted its own weight, including the 2 lb. brass bar, and almost went through the roof

Continued on page 60



The 14 to 1 reduction belt drive turns the main rotor at 1,000 rpm. See text for more.



TRIMMING AND TRAINING PLATFORM

You don't have to guess what Lin Haslin, Utah State Aeromodelers, is holding. An Orwick .64 makes it go!

Just in case you've forgotten winter already! Jerry Sanford stands by his monster Fiske Hanley, as Mark Fechner pauses while flipping.

PLUG SPARKS

By JOHN POND

• Ever hear of the EFRC? Well, you did now! This is the latest thing in old time F/F radio assist. How does Electric Fan Radio Club strike you? This is the greatest thing for flying in the city limits yet!

As Frank McKay, of Redwood City, Ca., points out, you simply cannot beat electric powered old timers for ease of flight and lack of noise. Frank sez the glow plug is going to be with us a long time, so he thinks the electric powered model is a beautiful transition between rubber models and internal combustion powered planes.

It all got started when Frank was in a local hobby shop one afternoon and in response to the clerk displaying some glow plug powered airplanes, said, "Being an Electric Fan (haw! a pun!), I have absolutely no business looking at this stuff."

When the clerk took Frank seriously and thought there was such a club, McKay had to fish or cut bait. In less time than I can say Frank McKay, he rounded up 12 members to form a real fun organization. With enthusiasm and interest whipped up by Frank, the Electric Fan Radio Control and Modeling Club was born in the local Denny's coffee shop.

Ground breaking occurred on March 21 at the local field (Stanford University farm grounds). Not everyone brought out an old timer (as defined by SAM rules) as McKay was using a Veco Souix with a Hy-Tork electric motor. A fly-off was held, squadron fashion. It truly was a thrill to see two different types of models flying over the green valley, gradually circling upward over the two oak trees below, while the spectators watched in awe . . . they did not understand they were witnessing history in the making.

With the EFRC officially launched, it didn't take long for some wag to come up with this slogan, "Whether it be in the valley or on top of a hill, you may see us, but you'll never hear us." Interested electric powered fans can exchange notes with Frank McKay at P.O. Box 5384, Redwood City, Ca. 94063.

ENGINE OF THE MONTH

The most startling motor directly following World War II was the Arden .099. If the modelers thought Ray Arden's Atom 09 was a cutie, the Arden was a real powerhouse by comparison. Best part of all, the Arden started real easy and needle valve adjustments were simple. The Atom, on the other hand, was a mite tricky to start, hence many would-be Class A type modelers shunned the small engine in favor of the larger.

The Arden was an absolutely radical engine for its day, featuring complete 360° porting. For those who didn't like to scorch their fingers, an exhaust attachment was made to deflect the exhaust port and starboard (left and right, you landlubber!). The bypasser appeared to be broached in the barrel but actually, they were a series of splines machined by an internal gear cutter.

Must be a first! A Carl Schmaedig Stick Gas with Ohlsson .33 ignition, by Otto Bernhardt. A 1937 Model Craftsman plan.

Smart looking .020 Replica Thermal Thumber, built from Kernoff's plans by Don Bekins.

"Jeez, Jerry, can't you get anything straight?" Otis claims improved spiral stability (uh-huh) by putting Super Cyke on bias in Bombshell.

Latest cutie by Sam Blumberg (Micro Models), is this Peerless Panther for OT F/F R/C assist. Kit due in late May.

On the intake, the original Arden engines were provided with throttle arms. However, after some running it was found (as in the case of the Atom) that the arms would move too easily, making the engine a little critical for settings. Subsequent models featured a standard needle valve that found a more favorable reaction among modelers.

Arden's engine was sensational in that it established many firsts for an engine of its size.

1. Main ball-bearings.
2. Motor mount (radial) was integral with the gas tank.
3. Fully adjustable timer points.
4. 360 degree exhaust.
5. Splined by-pass.
6. 2.25 ounces bare weight.

Full page advertisements in all major modeling magazines announced the arrival of this novel engine, and in less time than it takes to describe the action, the Arden .099 was adopted wholeheartedly by the modeling fraternity. The terrific success of this engine set the stage for the advent of the Arden .199, another tremendous engine and another story.

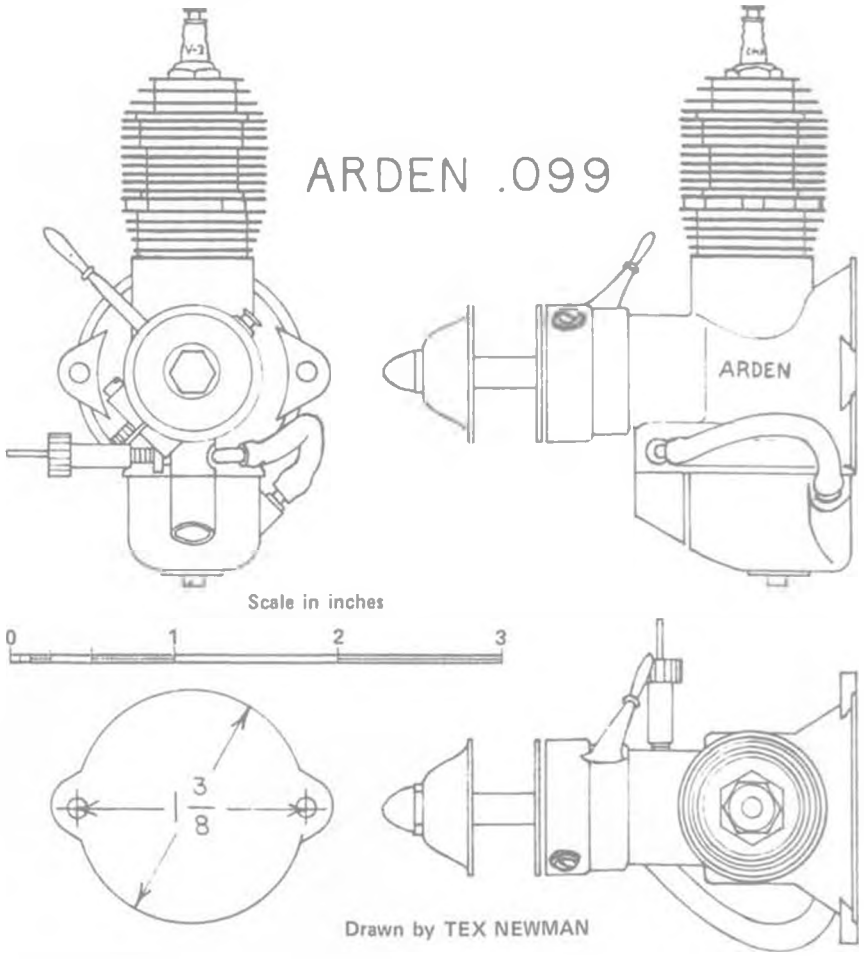
For the technically minded, the Arden featured a bore of .495 and stroke of .516 giving a displacement of .097. The sensational light weight of two ounces now made it possible to build 9 to 12 ounce models. Interestingly enough, the cylinder head is aluminum, with a chrome moly 4140 steel piston. No wrist pins were employed (ball joint employed) which gave a beautiful fit with the steel cylinder (the real secret of success for later Cox engines).

The fully adjustable timer points were easily accessible, the fixed point being inserted into an elongated hole permitting travel left or right. Adjustments are made by loosening the upper point and tightening until proper clearance is obtained.

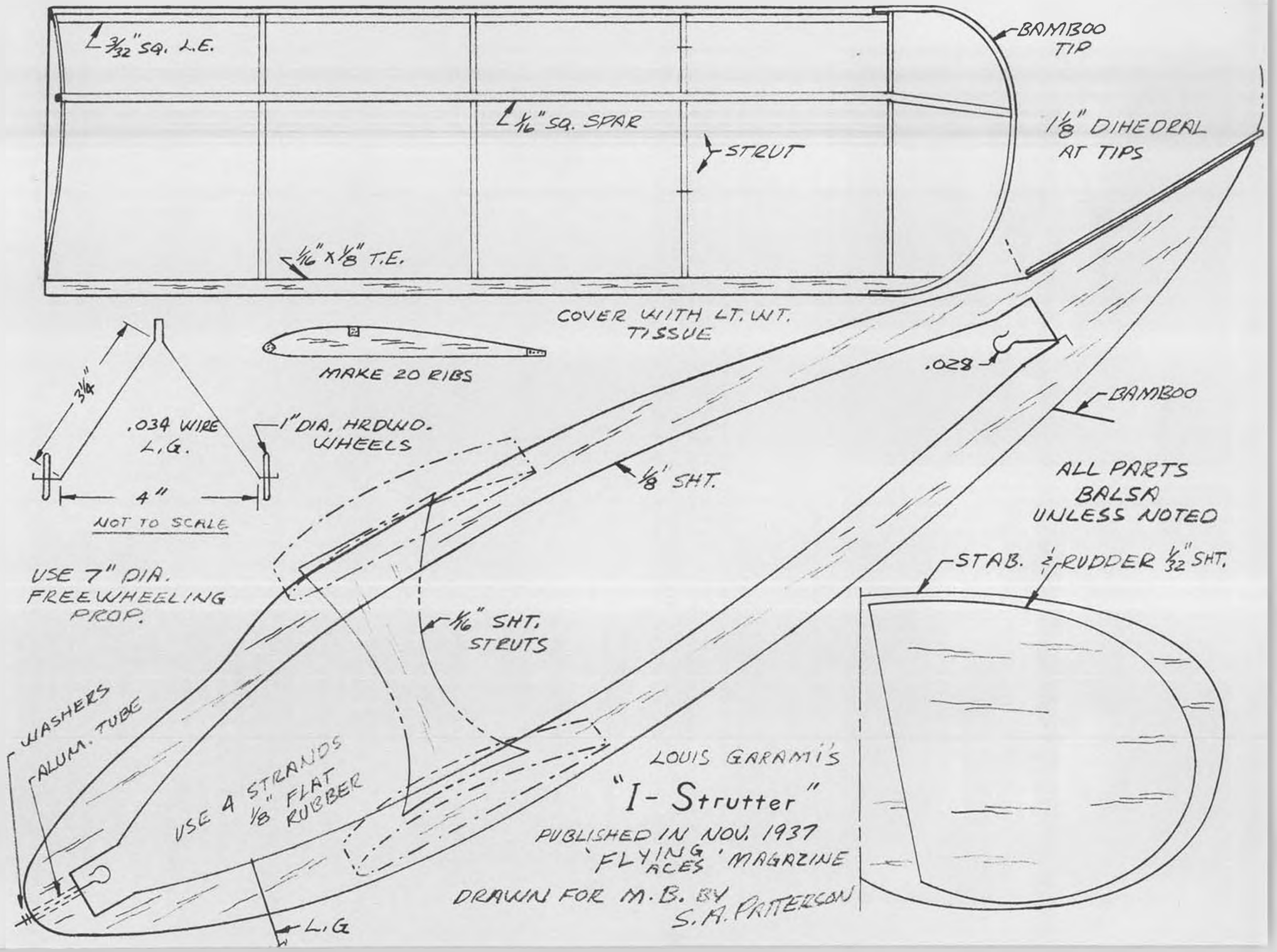
Running tests of the Arden .09 revealed that it truly was a hot engine, turning 8600 rpm on a standard 8-4 propeller. Even with a nine inch propeller, the motor turned 6,000 r.p.m. Of course, these figures were obtained using standard 3 to 1 mix. Using Blue Blazer, an alcohol-caster oil mix, the engine turned even better. Finally, when Ray Arden came out with his glow plug, the Arden 09 was truly a potent Class A engine. Too bad Ray died fairly early in life, as his contributions are missed.

SAM CHAMPIONSHIPS

We announced the dates of the SAM



Drawn by TEX NEWMAN


3/32" SQ. L.E.
BAMBOO TIP
1/16" SQ. SPAR
STRUT
1 1/8" DIHEDRAL AT TIPS
1/16" X 1/8" T.E.
COVER WITH LT. WT. TISSUE
MAKE 20 RIBS
.028
BAMBOO
3 1/4"
.034 WIRE L.G.
1" DIA. HRDWD. WHEELS
4"
NOT TO SCALE
1/8" SHT.
ALL PARTS BALSA UNLESS NOTED
STAB. & RUDDER 1/32" SHT.
USE 7" DIA. FREEWHEELING PROP.
1/16" SHT. STRUTS
WASHERS
ALUM. TUBE
USE 4 STRANDS 1/8" FLAT RUBBER
L.G.
LOUIS GARAMI'S
"I-Strutter"
PUBLISHED IN NOV. 1937 'FLYING ACES' MAGAZINE
DRAWN FOR M.B. BY S.A. PATTERSON

A few years ago (note cars and haircut) Bob Knutson hung two Ohlsson 23's on his Zipper. Btm engine cut 1-1/2 secs before top.

Ralph Brown ready to launch Olie Olson's Zomby. Getting ready for June 13 meet in Omaha, Nebraska. Olson's address in R/C column.

Championships quite some time ago, but according to the latest information from Bill Hale, Contest Manager, the flying now gets started on July 31 and concludes on August 2. In other words, things have been moved up one day.

Entry blanks and forms are now available from Bill Hale, 334 N. Remington Rd., Columbus, Ohio 43209. As per last year, the first event entered costs you $4.00, and each thereafter only $2.00, up to a maximum charge of $10.00. Any entries above four are strictly gravy!

The usual welcoming Bean Feed will be held at the Wright Patterson A.F.B., area "B", (this is Wright Field, location of the Air Force Museum), on July 30 for a get-acquainted session. The National MECA Collectogether is still up in the air, as it would have to be staged on a working day, namely, Friday, July 30. The National MECA Coordinator, Hank Hilscher, is now considering a separate National Collectogether. We'll keep you clued in on this!

Joe Beshar, SAM President, also reports that there will be a "Miss SAM Championships". Joe says the lucky girl is Pat Krapf from Butler, Pa. How about that? Now you old fogies have another excuse for cracking up your models! Pay attention!

While on the subject of Joe Beshar, the writer is looking forward to the results of the "no-downthrust" event and the participation thereof. Maybe this old writer doesn't know how to fly models but he hasn't seen very many models that will fly properly without downthrust. In short, Joe, we think you're nuts!

COMPRESSED AIR BEER TANKS

Since the announcement of the idea of beer can compressed air tanks and the subsequent description of how to do it, we have been receiving additional hints and kinks from the old master, Bert Pond.

Bert also wishes to acknowledge all

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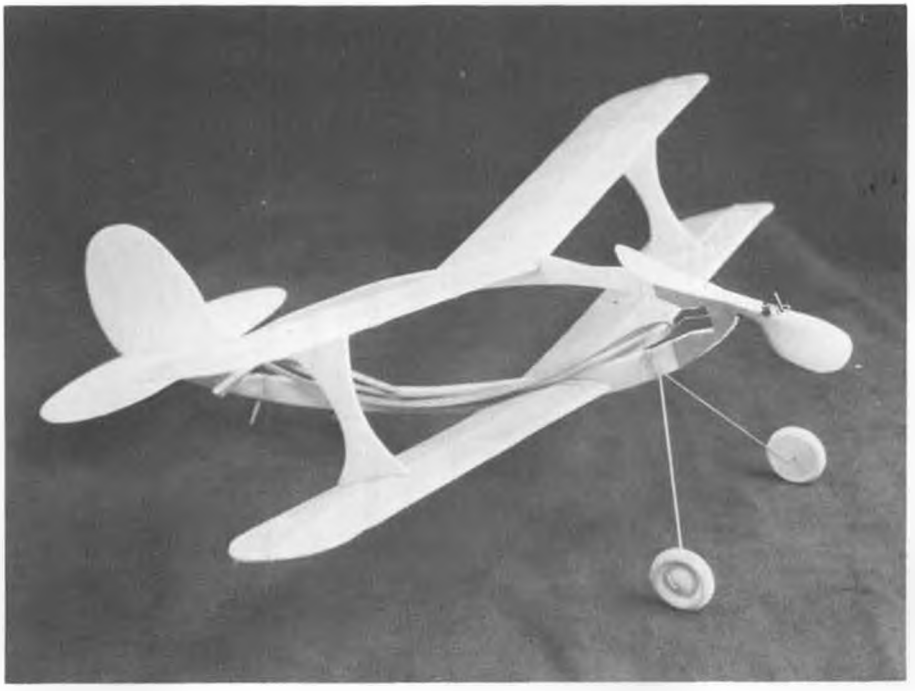
LOUIS GARAMI'S "*I-STRUTTER*"



OLD TIMER Model of the Month

Designed by: Louis Garami

Text by: Bill Northrop

Redrawn by: Al Patterson

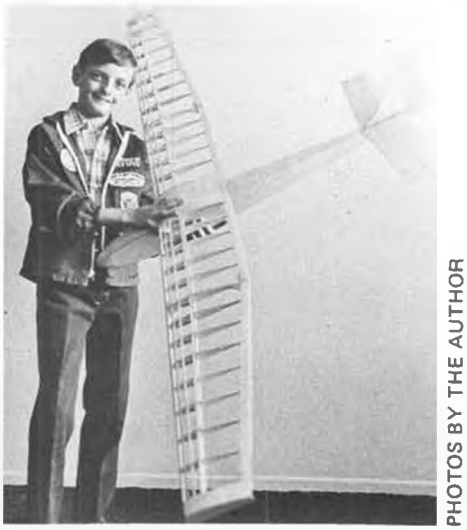
• In the same issue of Flying Aces (November, 1937) that is referred to in our "Workbench" column, there appeared a smart little rubber powered biplane sport model designed by a fellow who was famous for that sort of thing back in those days . . . Louis Garami.

Crude black pencil lines around the full size fuselage outline reminded us that at some time in the dim, dark past, we had built this one. Our draftsman, Al Patterson, a modeler of only a few years, was also intrigued by the perky little bipe. He borrowed the magazine (in exchange for his left arm!) and the next day brought back the completed ship . . . his first-ever rubber powered model, complete with carved prop!

The next obvious step was to reduce the two-page spread down to one page (we won't risk being assassinated by a group of angry peanut scalers!), so we could present this little gem out of modeling history, to our readers. You shouldn't need too much help in constructing the model and might as well suffer along with the rest of us as far as balance point is concerned. Start at half-way back on the bottom wing. Also allow yourself some means of adjusting the thrust line.

Have fun bending those bamboo tips!! •

Steve Upton, with Craft-Air "Drifter" and Kraft radio, ready to do some R/C soaring.



Completed framework, ready for covering. An excellent beginner's built-up model.

PHOTOS BY THE AUTHOR

PRODUCT$ IN U$E

By STEVE and BOB UPTON . . . Any model airplane that a father and son (age 11) can get together on is worth writing about. The CRAFT-AIR DRIFTER is that type. Good, basic constriction.

No pop-off canopy here! Hatch cover is firmly held in place by four screws.

• *The "Drifter" produced by Craft-Air is a more-or-less conventional balsa wood model that requires basic modeling skills to construct.*

I felt that my 11-year old son, Steve, had progressed well enough in his modeling abilities to take on this project on his own, with minimum supervision from me.

I was a big help, when it came time to paint the fuselage. I told my son that I would expertly spray his "fuse" with Superpoxy. (The wings are hand-brushed with dope.) I laid a couple of superb, flaw-free, coats of Superpoxy on his creation. My son, of course, was delighted with my handiwork. He did wonder, however, how come I didn't open the can of catalyst (in plain sight on the workbench). He then proceeded to inform me that, as far as he knew, you were supposed to mix equal parts of each before *applying the paint. I, of course, told him to shut up or I would nail his other foot to the floor. I sent him packing on some trivial chore and in his absence I removed the uncured, beautifully applied paint with Superpoxy thinner; dutifully mixed the catalyst with the paint (constantly looking over my shoulder) and painted his "bird" again.*

The following (slightly condensed and edited dissertation is Steve's description of the building process involved in constructing this rather typical model airplane. I might add, with an obvious sense of pride, that my son received an honorable mention for his glider at a recent Valley Flyer model-of-the-month contest.

FUSELAGE

I started out building the "Drifter" by cutting out the formers prior to building the fuselage. The fuselage consists of two 3/32 sheet side panels,

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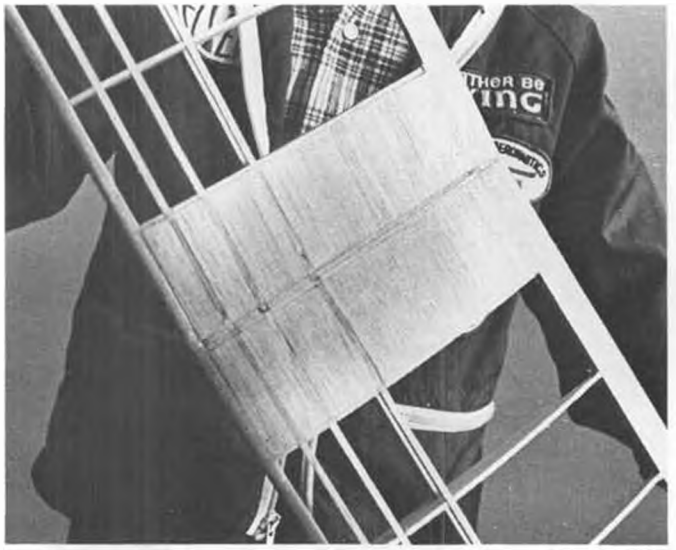
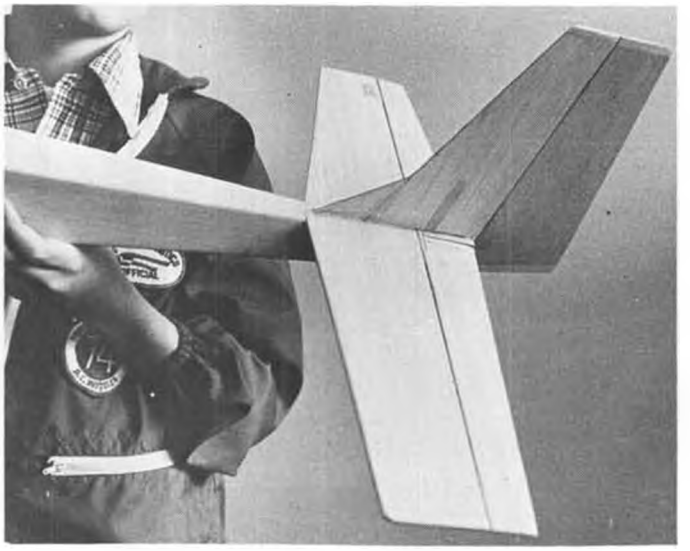


Filling in with sheeting around center section can be a little tricky, but what's most needed is patience.



Strategically placed reinforcing in tail surface sheeting assures strength in these areas. Again, simplicity is the key.

"IS SOARING FOR THE BIRDS?"

By JIM GRAY . . (Part 4): Continuation of a series on birds that soar, and what we can learn from them. Required reading for R/C sailplaners.

MIGRATION AND FORMATION FLYING

Why do migrating birds form large flocks in line-astern or Vee-formation on long migrations? What is it that large numbers of birds, flying together, can do that single birds cannot? The reasons I propose are speculative for the most part, but may bear looking into more deeply.

I think it is possible that the ascending induced vortex created by the wing flapping of a leading bird, together with the airwave so formed, provides turbulence in the boundary layer of the following bird. The file flight of ducks and the column flight of hawks may be the natural result of this phenomenon. In the soaring mode it is known, for example, that two sailplanes flying side-by-side, with their wing tips overlapping, reduce the drag and sink rate of a sailplane flying alone. This may be because the oppositely rotating tip vortexes cancel one another and thereby greatly reduce the induced drag of the combined wing. At least the effective aspect ratio would be doubled, and the induced drag halved, if this were true. One major disadvantage of this kind of tight formation flying is the effect on the nerves of the pilots who try to practice it . . . and it cannot be recommended. Such flying is out of the question for R/C sailplanes, at least for the present, unless the ability to closely control them is far better developed than I think it is. Nevertheless, if drag can be reduced by vortex coupling, then it is possible that the migrating birds instinctively "know" this and use it to reduce the energy expended on long flights. If this is correct, than it would seem that the leader of the flock would be the only bird working harder than the rest. And so it appears, since leadership of a Vee-formation changes frequently, and the leader is usually replaced by a "fresher" bird well back along one wing of the Vee. The former leader than drops back and "rests" awhile.

Considerable distance is covered by the spread of a large vee, and the search for suitable landing areas is facilitated. There is much reduced probability of one bird colliding with another in a large Vee, and if any bird must leave the formation, it need only drop back from its slot. No other bird is affected, except that the formation soon closes again to fill the gap. This makes the above explanation of soaring efficiency even more acceptable. The Vee-formation serves as a protective measure as well, since each following bird protects the tail of the bird ahead. Moreover, the following bird only has to observe the bird immediately ahead and on one side in order to fly, thus greatly simplifying formation flying and station-keeping. What about poor "Tail End Charlie"? Well, he is protected by a small group of birds flying back and forth between the tips of the Vee in a bird version of the "Thach weave" developed by Navy pilots in WW-II. This smaller formation or group is often four in number, breaking up into two-bird "scouting" elements when the flock alights. I've watched rafts of several hundred geese alighting and resting on some of the finger lakes in New York State. Invariably there will be a two-bird patrol circling the flock, replaced by two more birds every ten or fifteen minutes. Imitation is said to be the sincerest form of flattery, so man really flatters the birds by emulating some of their behavior.

SUMMARY

In terms of variable geometry, bone structure, aerodynamics and other features, birds seem to possess many advantages over the R/C sailplane model. I believe that much can be applied directly from the birds to R/C soaring, with only a small amount of adaptation and experiment. The study ought to be made under controlled conditions if at all possible and . . . at the very minimum . . . under conditions of natural flight and soaring. This would require a large sailplane for use as a flying laboratory which could fly with soaring birds, and preferably at their same speed and sink rate. A large American university has undertaken construction of such a sailplane and may already be making flight measurements. What is needed is a sink rate approaching one foot per second at low forward speeds; say 20 mph or so. Tubular tapered spars should be used in our models for their lightness and stiffness, and we may also want to try the hawk profile with its "step" and thin section. The "step" could be a "hat-section" spar applied underneath a curved sheet of aluminum, for example. For torsion resistance, the sheet could be corrugated in chord-wise fashion. Anyone care to try it?

As pretty as "scale" model sailplanes may be, I suspect that we have been scaling them from the wrong master plan(e) and from the wrong end of the size spectrum. Why, indeed, should soaring be (only) for the birds?

APPENDIX

In order to maximize thermal climb, a bird or a sailplane should be able to turn quickly and in a short radius. The wing's lift coefficient should be high and the onset of stall should be smooth and gradual. The tips should stall last and full control should be available even at steep bank angles. These requirements are best met to date by providing light and relatively short wings having wide chords, plenty of area and low aspect ratios. The short, light wings provide fast roll rate by virtue of reduced moments of inertia. Steep bank angles, however, increase stalling speed . . . and since turn radius is speed dependent . . . it is desirable to decrease wing loading.

For a given weight, one way to decrease wing loading is to increase wing area. If the span is to be kept short, then chord length must be increased to provide greater area. Inherently, and by definition, short wings of large area are low aspect ratio wings. Schweizer Aircraft Corporation of Elmira, New York optimized these features in a sport sailplane called the 1-26. There is probably no single-place sailplane that can out-climb a 1-26 in a thermal. Cross-country speed is greatly dependent upon climbing ability and efficient thermal utilization. When thermals are stronger, cross-country speeds increase and the reverse is also true. Thermal performance is not so greatly dependent upon low aerodynamic drag and high lift/drag ratios as it is upon low sink rate and good climbing ability. When thermals are wide and strong, even the lead sleds can fly reasonably well . . . although they don't climb as fast as the 1-26 type sailplanes. When thermals are narrow, spotty and ragged, the lead sleds do not do well, often failing to finish cross-country distance and speed tasks.

Unfortunately, low aspect ratios and light weights are not favorable for penetration; that is, the ability to maintain a good glide ratio at high speeds. Here, the heavier and more streamlined sailplanes of high aspect ratio come into their own. Attempts to compromise these two widely different conditions for soaring (straight gliding as opposed to thermal circling) are not entirely satisfactory for either mode. Another approach has been moderately successful; that of carrying disposable ballast, and varying the wing geometry by the use of camber and area changing flaps. Fowler

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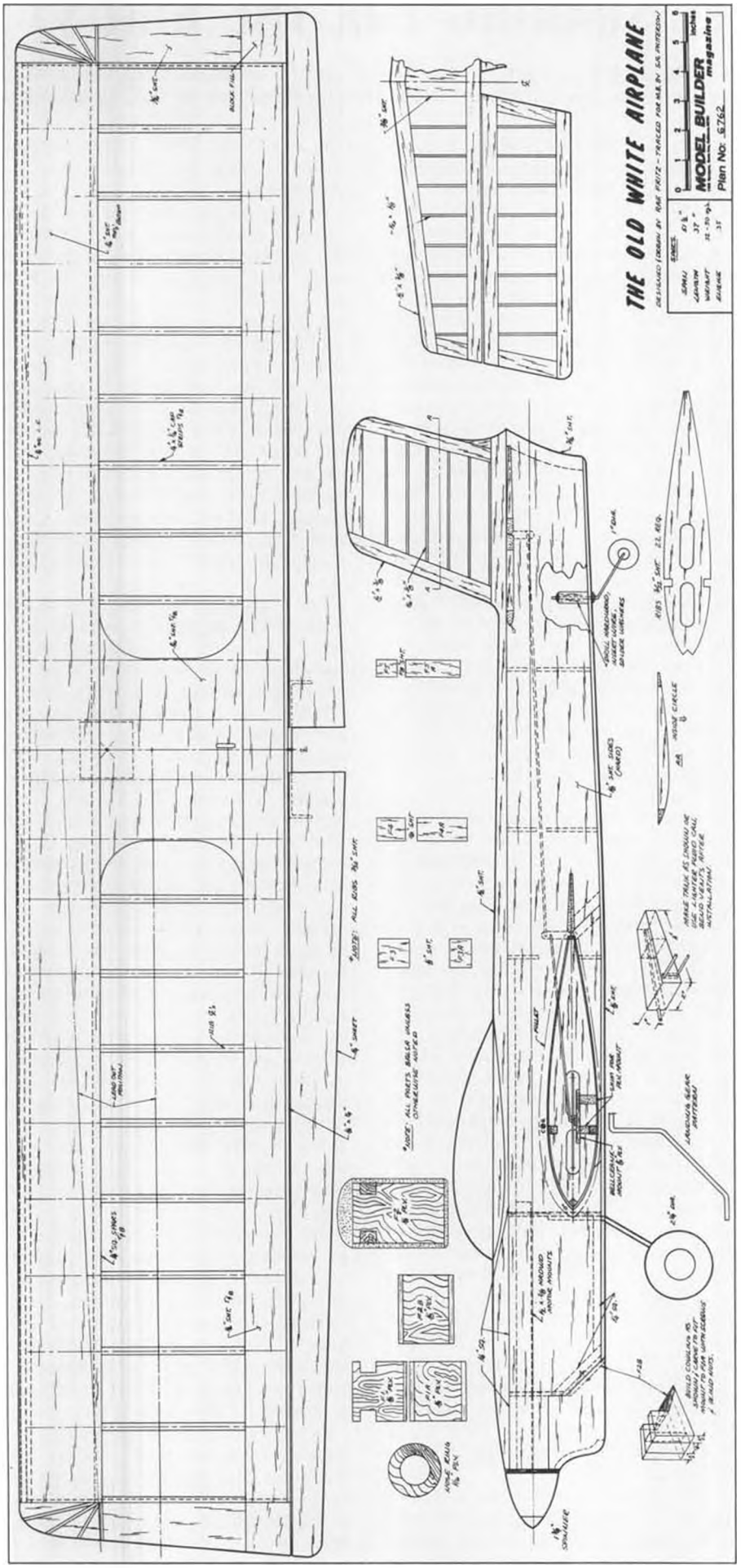


By RAE FRITZ & FERD CHAPPA

Everyone's most favorite model is the old reliable, consistent performer that is always ready to go, and do a good job of it.

● "Get yourself a good straight airplane, hang a Fox .35 on the nose, and fly the wings off of it."

The above quotation must surely be etched in bronze on somebody's flying box somewhere in the world.

If it isn't, it should be.

It's been standard advice for novice stunt fliers for decades.

And, it's that very advice that led Rae Fritz to design the first White Airplane nearly 20 years ago. It never has had a name . . . just the Old White Airplane (the first one was painted white). We didn't have the heart to hang a meaningless name on it after all this time.

The White Airplane was to be one that a beginner or an expert could build easily, fly often and, with proper conditioning, win with.

Being simple folks, the goals for the design were also kept simple. They were divided into three areas; building, flying, winning.

There were to be no exotic components. The aircraft would use a stock suction-fed Fox .35 and run on Fox Superfuel. It would swing a balanced but unmodified 10-6 propeller. The first series of White Airplanes used a shaft extension to clear the cowling, but this was eliminated on later versions.

The airplane was to be easy to build and not require any special tools or special skills. It was to be easy to keep straight, to align, and be capable of being built accurately by many different people.

It was to be able to incorporate minor modifications by many different people to meet their specific needs.

Finally, it had to be both easy to fly for novices and competitive for more advanced fliers.

With goals like these, you can't be choosy who you steal from. Consequently, the best features of many fine Precision Aerobatic airplanes were unabashedly "borrowed."

The first White Airplane built up fast and flew practically off the board. It proved to be easy to trim, easy to fly, and it was predictable. It went where it was pointed and it did it the same way every time. It didn't bobble, hunt, or go slack on the lines.

The Old White Airplane demonstrated another quality . . . a quality that stuck with the design and gave it a feared and respected reputation. It was, and is, reliable beyond a shadow of a doubt. When you go flying with the Old White Airplane you fly . . . Every time.

Build it straight, break your Fox in carefully and you will have a deadly

FULL SIZE PLANS AVAILABLE – SEE PAGE 94

The newest "Old White Airplane" rests among some of its laurels. There have been dozens of the planes built by many modelers, and used in competition. No way of knowing how many trophies the design has won.

The Old White Airplane

combination.

Reliability has conquered far more sophisticated engine/airplane combinations many times. And, yes Virginia, there are trophies to prove it.

BUILDING IT

Construction is extremely simple, so we'll just hit the high spots. One word of caution. Although this is a very simple airplane, it should not be your first. Sound airframe construction and alignment are critical on *all* stunt planes . . . including this one.

There are only five basic steps in construction. Cut the parts out; build the wing; build the tail surfaces; build the fuselage; put it all together.

If you prefer to build your own tank, then you have six steps. We do. Ours are made of cut-down Ronson lighter fluid cans. They are four ounces and run our Foxes about six to seven minutes.

A stock tank 1x2x4 inches will work just fine. You will, however, need to modify the vents as shown on the plans . . . and make sure that the tank is as clinically clean as you can make it.

Look at the plans and you'll see that when we say simple we mean simple. In cutting out the parts, you have only to cut (or sand) the wing ribs, fuselage sides, plywood bulkheads and cowling pieces. The fuselage sides are straight on top and require only a straight cut on the bottom, wing cut-out, and cowling cut-out.

The elevator is made up of a 1/4x1/2 frame with 1/4x1/16 ribs, then simply sanded to shape after construction on a flat surface. Because of the lifting surface on the inboard side of the rudder it starts out a little thicker. Rudder frame is 1/2x3/8, with ribs 3/8x 1/16. It also is sanded to shape after assembly.

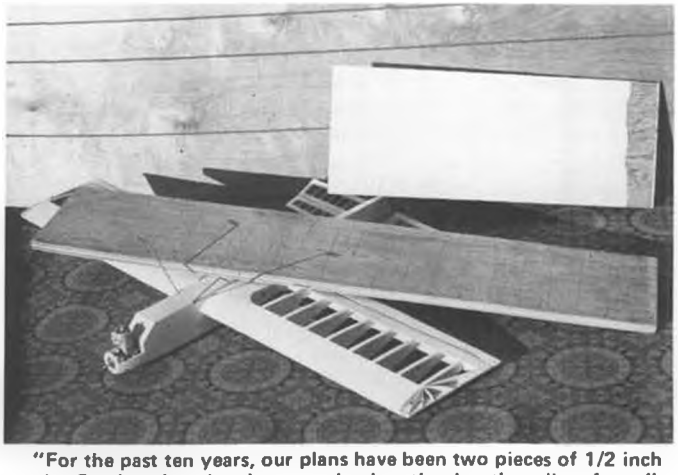
For the past ten years, our plans have been two pieces of straight 1/2 inch plywood. One piece has the wing drawn on it; the other has the tail surfaces.

We build our wings flat on our plywood plans. If that sounds too sophisticated, you can use anything you have that is flat to build your flying surfaces on. This is the only critical area in building the airplane.

Flying surfaces must be straight.

The engine mounts, F-1, F-2, tank and landing gear are built up as one unit using epoxy. Now is the time to mark and drill the mounts and to trial mount the engine using blind mounting nuts.

Regina Fritz with the oldest and newest "White Airplanes" at a recent flying session. The old airplane just went along to watch.



"For the past ten years, our plans have been two pieces of 1/2 inch ply. One has the wing drawn on it; the other has the tail surfaces."

Regina Fritz, 18, shows off 15 year old, battle-scarred White Airplane as it appears today.

Fifteen years earlier, the 6 week old White Airplane with Linda,10, and Regina, age 3.

Designer Rae Fritz (lt) and author Ferd Chappa with The Old White Airplane (TOWA).

Remove the engine and install the filler block. This will be hollowed out after the fuselage assembly. Drill two holes in the inboard fuselage side to accept the tank vents, then epoxy the sides to the mount assembly. Build it upside down, lay a brick on it and you won't have any alignment problems.

There are no formers as such behind the bulkhead that serves as the landing gear mount. Put a 3/16 shim between the fuselage sides at the tail, squeeze the sides together, and glue. That'll give you enough room for the control horn to clear. The braces (see plans) at stations 4 and 5 are only to prevent the push rod from bowing during violent up-elevator manuvers.

Turn the fuselage upside down, again on a flat surface, and insert the completed wing in its saddle. Now measure from the center of the leading edge and the center of the trailing edge to the top of the fuselage (resting on a flat surface). Make sure the wing fits in the fuselage saddle perfectly straight. If it doesn't, trim away the fuselage at the wing cut-out until the unit is perfectly level. When you are sure, glue the wing into the fuselage upside down, making sure one more time that it is straight.

Now, do essentially the same thing to the elevator . . . also upside down on a flat surface. Before you glue the elevator in, carefully bend the push rod to fit, making sure that the flaps and elevators are 0^{o}-0^{o}. Now glue elevator in position.

Insert top and bottom braces at stations 4 and 5. Don't bring them in direct contact with the push rod . . . just close enough to prevent the push rod from bending.

The basic airframe is now ready for the 1/2 inch top block. Add top block and shape rear of top block and rudder to the same airfoiled contour.

Add wing fillets, 1/8 inch bottom sheeting, and plywood cowl mounting plate. Mount engine, shape cowling blocks and cut holes for exhaust and venturi.

Weight is not supremely critical, however, the lighter you build your White Airplane the better it will fly. We've seen them from 32 oz. to 50 oz. The heavy ones are, in our opinion, too heavy, although they fly just fine. White Airplanes don't tend to build heavy . . . unless you're partial to using oak.

Finish the White Airplane any way that turns you on. There are hundreds of excellent articles on techniques available.

As we said, the White Airplane is adaptable and handles modifications well. We've never seen a White Airplane that hasn't been changed "just a little."

Matter of fact, we're changing a pair of them right now "just a little." They have foam wings (cut by Rae Fritz), muffler pressure, adjustable leadouts and tip weights, moveable rudders and wing mounted landing gear. A couple of trick handles for in-flight adjustment are also in the works.

The Old White Airplane is obviously not a "new wave" ultra-sophisticated airplane. It is not the ultimate stunt ship. It was never supposed to be. It will, however, fly better than 90% of the pilots who fly it.

This aircraft is your basic Precision Aerobatic pilot's "teething ring." It will teach you how to win . . . gracefully and often. When you are ready for one of the more complex and more sophisticated Precision Aerobatic airplanes, you will know it.

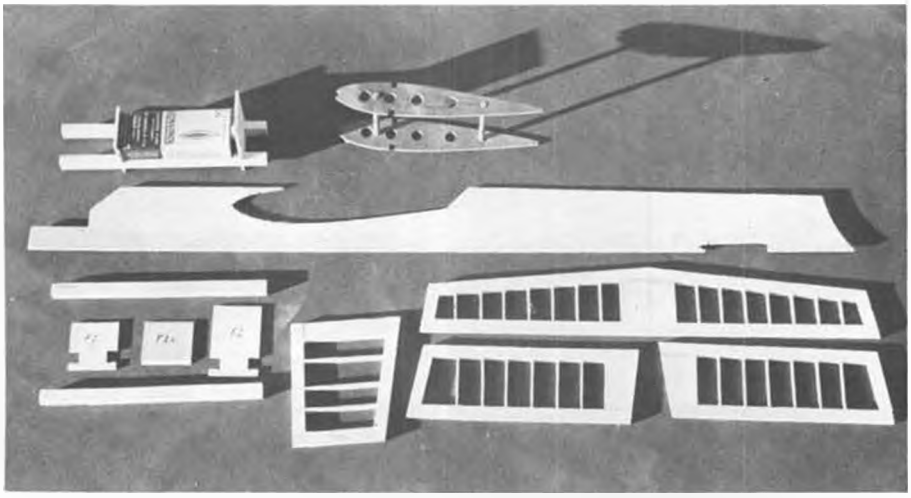
FLYING IT

Adjustments are standard. Make sure the wing is straight and that the aircraft balances on the CG shown. Weight the nose if it is tail heavy, etc. If the outboard wing flies high or low, bend the flaps. This is a minor adjustment and will *not* cure a badly warped wing.

Engine should run very old fashioned. It should four cycle, just on the verge of breaking into a two cycle and run that way until the last few laps when it will go lean, then stop.

Fly the airplane a lot. It's rugged, durable and reliable. Learn the pattern and everything you can about the airplane/engine combination.

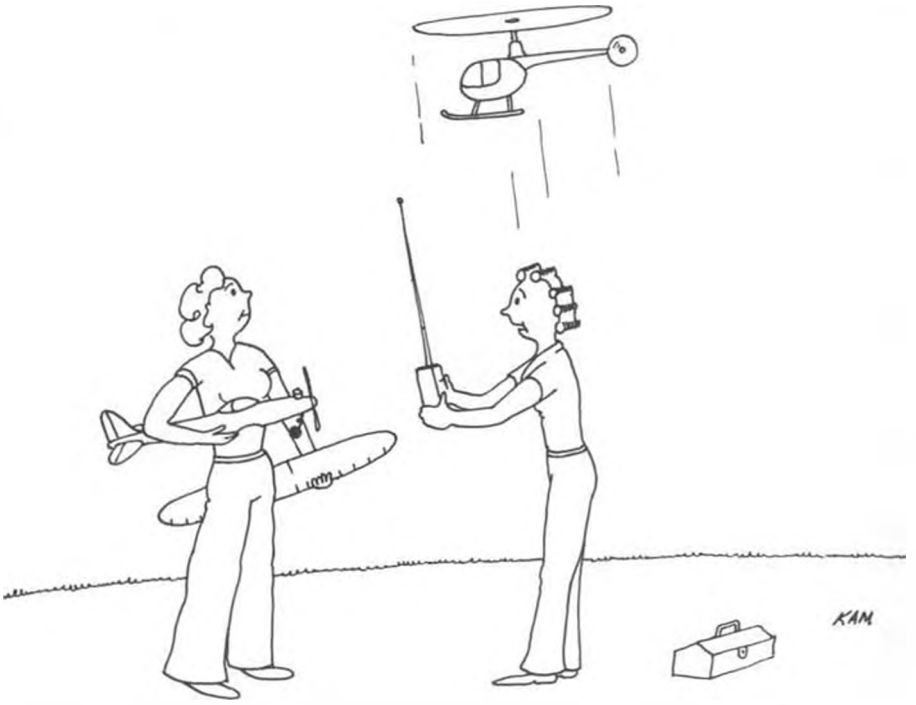
You will meet fliers who are better than you. Some will have exotic engines and airplanes. Some of the engine/airplane combinations will even fly bet- →



"Look at the plans and you'll see that when we say simple, we mean simple." Characteristic of a well designed model airplane. Make up a complete pre-fabbed "kit" and then start building.

FOR Ms ONLY

(Mrs.) CHAR ROHRING
4494 Tanglewood Trail
Saint Joseph, Mich. 49085



"I'LL BE WITH YOU JUST AS SOON AS I DRY MY HAIR"

● I keep getting letters from you gals telling how you help at the contests. I think it's great! I don't know how good I'd be under the pressure of contest timing and scorekeeping. Bill has never asked me. I've got this reputation of fritzing details. Occasionally I forget to punch the stopwatch during practice. Can I help it if I'm held spellbound by the beauty of a perfect launch or landing now and then?

Whether we help or not, Lois Zeigenfuse, of Reading, Pa. has suggested we girls should "shoot our own bull" like the guys do at the contests. Now here is a division we all could enter . . . both Standard and Open classes. I'll be right out there trying to help this summer, if someone will ask me and if my hairdo holds up.

Concerning this hair problem, I'd like to comment to the newly wed wife in Washington. So what if your husband has talked you into a vacation built around two weekend contests? I can see he doesn't have the nickname of Flannel Mouth for nothing! The same thing happens around here all the time. As you say, the only bad part about a contest on each end of the vacation is looking for a hairdresser before the second contest. All you girls who time and help probably have naturally curly hair that looks great after high winds and rains.

It's true that out of your own city you are at the mercy of beauticians who don't know your hair. You have to run around looking for a shop that will take critical emergencies. True happiness is finding a salon next to a store that sells hobby supplies.

If you forego the trip to the beauty parlor you can always tie a scarf around your head. I did this once and Bill told his friends that I was appearing that night as a townsperson in a road show of "Fiddler on the Roof!" And I thought I looked like Rhoda!

My worst experience with a contest trail hairdresser was last year. She wore orthopedic shoes and a paint spray mask, and informed me within our first two minutes of conversation that she wasn't impressed or interested in any kind of flying machine. She plastered my hair flat with clouds of spray and wrapped the ends into a neat little Grandma Walton wad. I had repeated "French twist" three times!

Bill recognized my blue pants suit and finally let me in the car. He was smart enough not to offer any comment. When he signed us in at the motel as Bill Rohring and Ma Kettle, I knew he had noticed!

I'll have to admit that I shed a few tears in the room. Wouldn't you? The real tragedy was I couldn't get my glasses off because I put them on while the spray was wet and the bows were stuck to my skin behind my ears. Bill wanted to go back for a can of that spray. He thought it had a lot of the qualities of Hot Stuff.

What I'm saying, I guess, is for the hobby trail we need a wig. At least I do. If you see a middle aged woman in a reddish Shirley Temple wig this summer, it will be me. I probably won't be counting down for anybody, but I'll be neat, and near the food stand, and right in there trying to place in the women's "Shoot the Bull" contest. ●

---

ter than yours.

You should, however, learn and develop the most devastating quality a competitor can have. Consistency.

WINNING WITH IT

It is our belief that consistency is the cornerstone to winning. This includes *any* competition, from a Camelia Show to Motocross Racing.

When you get to a meet, be ready. If you aren't ready when you get there . . . actually before you get there . . . you will never be ready for that particular meet.

Have your flying box in order and your act together. See that you have every piece of equipment you need, plus at least one spare of each. That includes everything! Engine, lines, handles, batteries, props, plugs, line clips. Everything!

Respect your judges and don't waste their time. They are not sitting in the scorching sun to watch you beat on a balky engine. The same goes with cleaning out a dirty tank, adjusting your handle, gluing parts back on, and any other non-professional nonsense.

When it is your turn to fly, fly. Know how everything works and do it right the first time.

If you have to crank your engine right side up, do it that way. Don't try to start it inverted.

Make sure your tank is full *before* you get on the flight line and when you go out there to fly, don't take along four steamer trunks full of gear. Take everything you need and as little as you can get along with. Make sure that everything is tight, that your engine is firing, your batteries are good and that your engine's needle is pre-set.

The idea behind this drill is to fire the bird up and get it in the air. No muss, no fuss, no excuses. Just do it!

Your professional attitude will impress the judges. Be sharp, be efficient, be airborne.

Once they know you mean business, you've got them hooked. Keep them hooked. Show them your stuff. Knock their eyeballs out.

To this point we have said nothing about luck. Luck is not a component you can bolt on, a piece you can glue in

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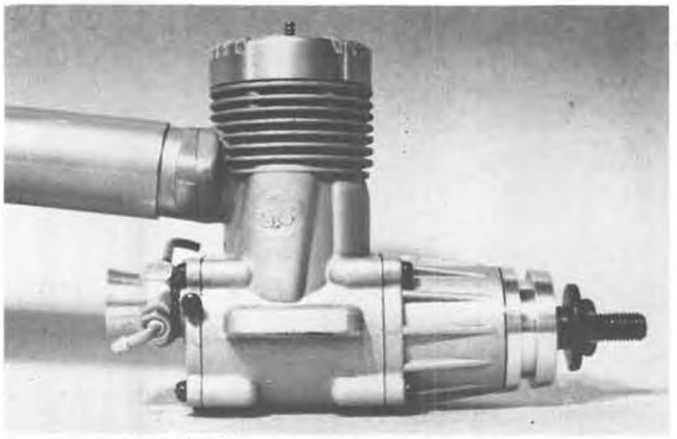


Close-up of the K & B 35, which is identical to the Pylon 40, except for displacement. Stack not legal for Slow Rat. Restarts are good.

John Junior (Brodbeck, that is) hands Dirty Dan his "cheater" engine for the year. See text. Photo by Larry Leonard.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY AUTHOR UNLESS NOTED

NOW THAT'S SERVICE!!

● In the March column, I mentioned that squeezed-down 40's would make great engines for the new AMA Slow Rat event. And I mentioned that K&B had made a few "stroker" 40's (up to 41 displ.) for the F/F guys, why not a 35.

That column had been out for a few days when I was in Van Nuys, California, for a sales meeting with A&L Distributors, the people I work for. During the sales meeting, in comes John Brodbeck, Jr., muttering something like, "I'm gonna take care of Dirty Dan before we get down to business". Terrible thoughts passed through my head as he came back to where I was sitting. He had his hand in his pocket. He had something in his hand. The "something" had a long barrel, you know, kinda like a *gun!* This is it, I thought. But, after closing my eyes and not hearing a loud bang, I ventured a look. Sure enough, I was looking down the barrel . . . of what appeared to be a K&B 6.5 (read 40) Pylon motor. What a relief!

Turns out that K&B put together some 35's (OK, 5.8 cc) using the 40 case, front end, back door, etc., and they decided to give me one of them to run in Slow Rat. Can you diggit!?

Soon's I got home, I put the K&B 35 on the bench and did a few tach tests. All right! Runs super! On the same props and fuels, the K&B 35 is pulling 800 to 1,000 rpm more than my best ST G-21 35, which is a plenty strong motor, incidentally. And the K&B has even more potential to go fast, as it seems to want to be turned loose on small diameter and/or narrow blade props and allowed to really wind. Also, as this is basically a 40, it is under-stressed by a comfortable margin with the 35 displacement, so we'll be running it hard (lots of nitro) and fast without too much concern about it's blowing up.

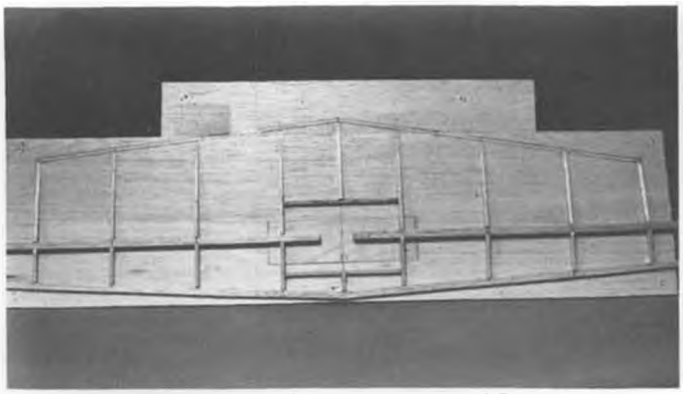
And you say, "That's cool, but when can I get one?" I can't answer that, but I do know that K&B is seriously considering coming out with a high-performance 35. It'll be about like the one in the pic, but will be a front-intake, which will make it much easier to mount on Combat planes, Slow Rats, etc. Johnny B. says that the front intake versions go almost as fast as the rear intakes, which ought to make them the strongest 35's available.

PROJECT GOODYEAR, HERE WE GO

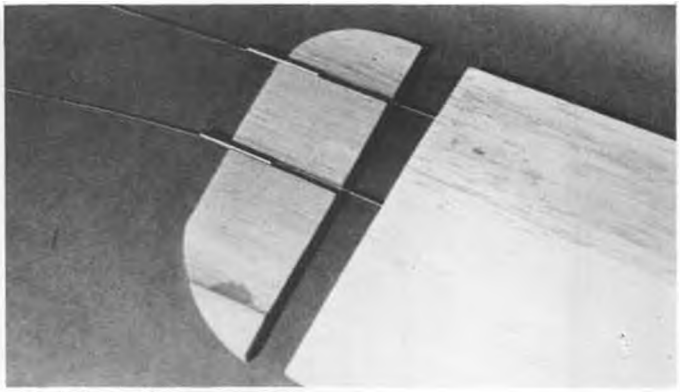
When I decided to attempt this project, I figured I ought to get in touch with somebody who knows all the Bad-year tricks and, more importantly, is willing to take the time to help and share their experience. John Kilsdonk has a reputation for going fast in all the Racing events, Goodyear included, and is noted for his "no B.S." attitude. So I wrote to him asking for help and he has really come through for me (and you, the readers of this column).

As mentioned previously, I am building John's Falcon Spl. No. 10. I must say that John's construction techniques differ considerably from what I have used successfully on my previous Goodyears. I've always used solid balsa wings with semi-symmetrical airfoils, for instance. I thought about "doing my own thing" in constructing the Falcon, but after a little consideration, decided to

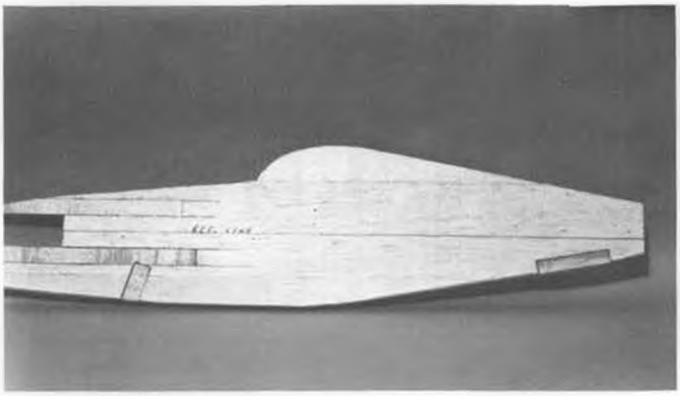
John Kilsdonk, John Ballard, and Gary Fentress (l to r). The two Johns are the baddest of the bad in Racing events. Fentress is very highly regarded as a pit-man. Photo by Howard Rush.



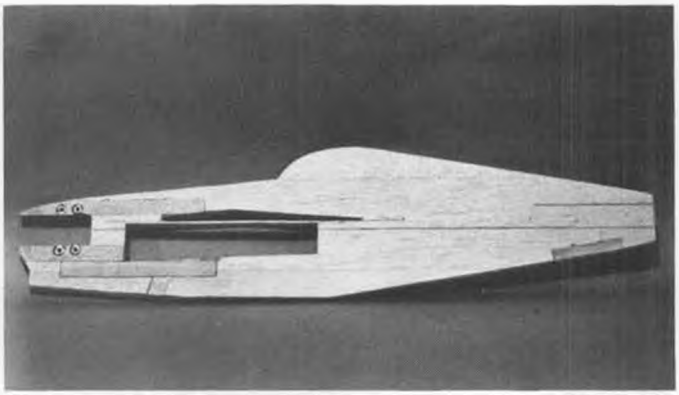
The Project Goodyear saga suffers a minor set-back! DD screwed up and made the left tip chord shorter than the right. Had to start over.



"Sandwich" method of constructing left tip firmly emplants lead-out guides. Tubing is sanded flush with tip after completion.



Fuselage blank ready for sanding of outline and addition of out-board doubler. Note hardwood skid mount.



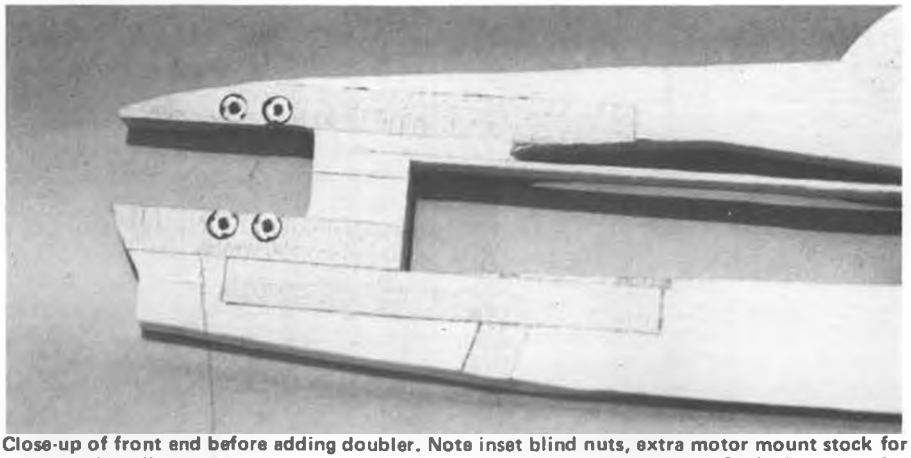
Fuselage blank has now been cut out for engine, wing, and tank. It's ready for addition of inboard doubler.

do it John's way, as he's the expert, not me.

So, for the most part, the Falcon is built as John designed it, and now that the plane is almost done, I can see that it will be a good plane and that I will probably build future Badyears with the same techniques. You can do whatever you want in building your next Bad-year, this Project Plane can only show one way to go about it.

The wing is first. I laid up the bottom 3/32 sheeting by truing up the edges of several pieces of sheeting and then joining them, edge to edge, with Hot Stuff. As can be seen from the photo of the partially framed wing, I made the bottom sheeting considerably over-size. This allowed me to simply pin the sheeting to my building board with thumbtacks.

Before pinning the sheeting down, however, I cut out a 4 x 1-1/2 inch piece of 3/32 ply for the bellcrank mount, and it was inlaid in the bottom sheeting. This is easy enough to do. First, be sure the crank mount is square, or at least has straight sides. Lay it on the sheeting and carefully cut around the ply with a single-edge razor blade. Pop out the rectangles of balsa and the crank mount should fit perfectly. It was then glued in with Hot Stuff. Don't say it should be put in with epoxy! I don't have time to wait for epoxy to dry and, if the fit is tight, Hot Stuff is plenty strong. Besides, the whole wing will be covered with glass cloth and resin which will help a lot on tying the crank mount and sheeting together.



Close-up of front end before adding doubler. Note inset blind nuts, extra motor mount stock for engine and landing gear mounting. Top mount glues directly to wing, a must for high rpm strain.

Now the bottom sheeting is pinned to the building board. Find a centerline of some kind to work from and draw the outline of the wing (less tips, of course) right on the sheeting. Double-check your measurements! If you'll look close at the picture, you'll see that I didn't!! Scrap one partially-built wing.

With the wing outlined, lay a bell-crank in there someplace so you can outline a compartment for it. The 1/4 sq. balsa spar is now glued in place, note that it is a two-piece spar. This didn't look like a good idea to me, either, but the crank has to go someplace, and as it turns out, the completed wing is plenty strong . . . trust me!

Now the 1/8 x 1/4 balsa leading edge is glued to the sheeting, again with Hot Stuff. In fact, the whole wing was built with Hot Stuff, it's fit 'n glue, fit 'n glue, just as fast as you can go!

Now's the time to mark off the positions of all the ribs. Double-check these positions, of course.

On my first wing, I tried to cut each rib to shape. This turned out to be more work than necessary, and not very accurate, besides. On the next wing, I simply cut a whole bunch of 5/16 wide strips from 1/8 sheet balsa. These strips were cut to length and then glued in place.

Next, the only pieces of spruce in the whole wing, the 1/8 sq. pieces in the center and at the front and rear of the crank compartment were glued in place. Be sure to allow enough clearance for

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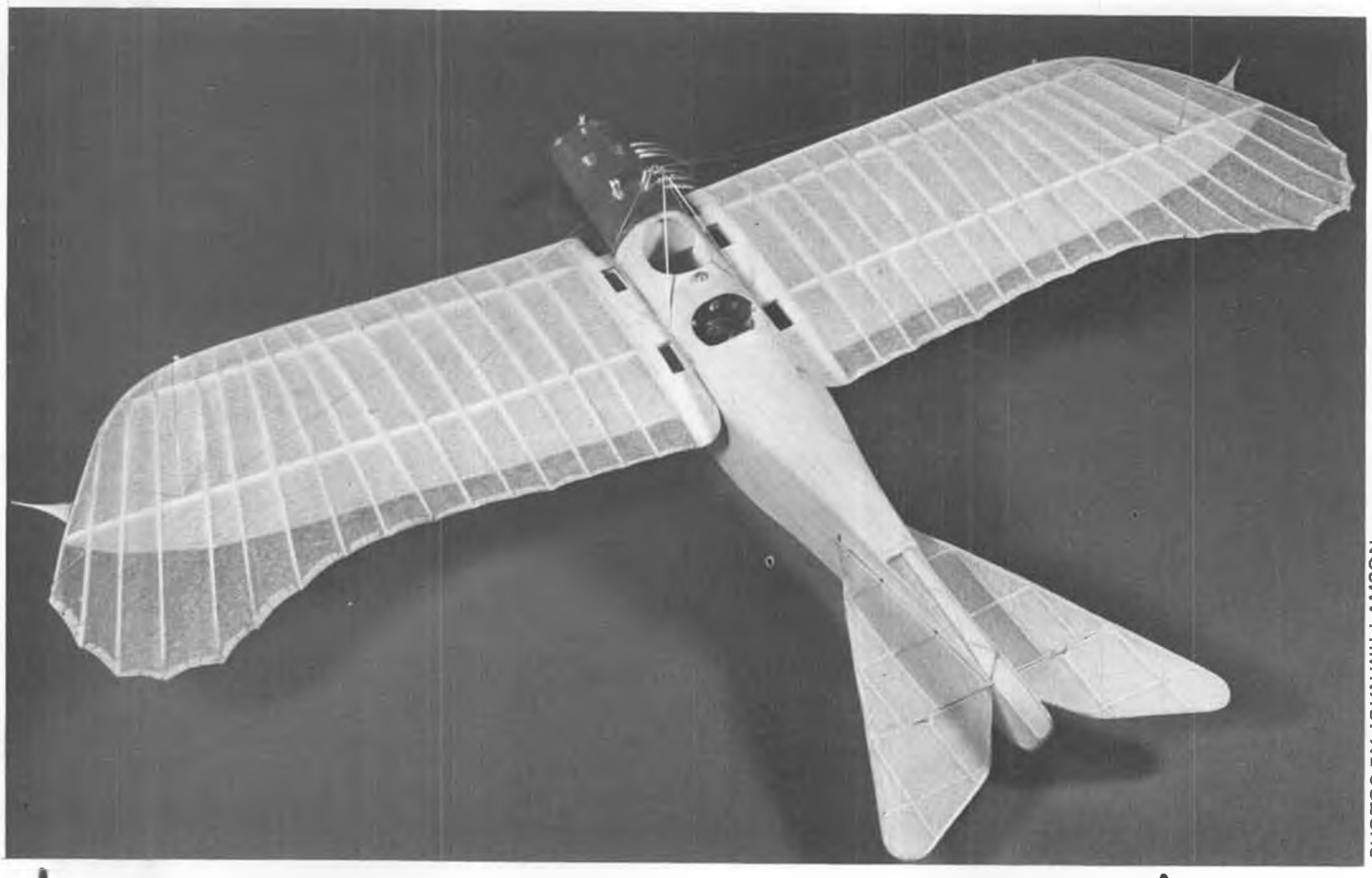


PHOTOS BY JOHN WILLAMSON

GOTHA TAUBE

By BILL STROMAN . . . Winner of Free Flight Scale at the recent Flightmasters' all-electric contest, this model illustrates the fact that electric power for model airplanes has completely arrived.

• While looking through the advertisements in the back of a model magazine last year, I came across a drawing of a Taube. As this was a pretty good drawing, and the ad promised more of these, I wrote for the catalog. Much to my surprise, Mr. Zasadney had Taubes listed that I had never heard of! Well, in less time than it takes to say, "Gothaer Waggonfabrik A.G.," I mailed away for about twelve of his 1/72 scale drawings. These drawings come in two scales, 1/72 and 1/24, and you also get a written description of the aircraft and, if known, the dimensions. This is my first model made from Zasadney's drawings, but I'm sure it won't be my last!

I chose this Taube because of its clean (for a Taube, that is) lines, and its character. It has a little more wing area than Astro Flight recommends for it's 02 Electric power unit, however, it's lighter than the 12 ounce maximum that they set. This is my third electric subject, and I do like this mode of power. First, it's clean . . . no fuel to soak plane, rigging, and modeller. Second, it's fun to just flip a toggle switch to start it . . . no cut fingers from the props, no flooding, no priming, and no adjusting a needle valve just behind a 20,000 R.P.M. propeller. Third, it's quiet . . . one can fly this in the city without annoying the residents nearby. All in all, there's a lot going for electric-powered free flight scale.

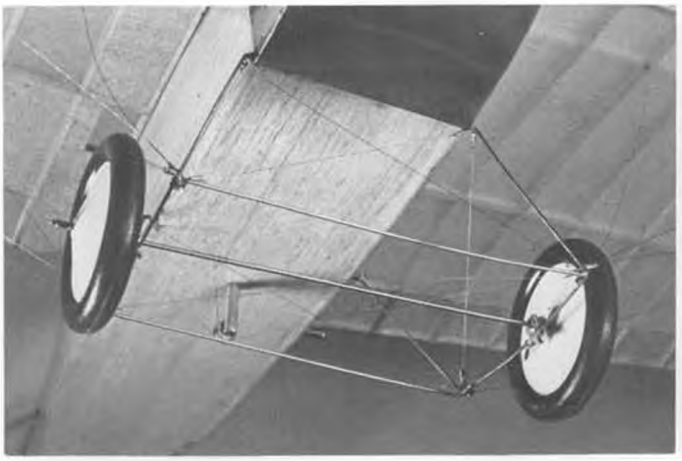
Although this model may look hard to build, it really isn't. I drew the plans, built the model, and traced the plans for the magazine in about 25 evenings. Let's start building by beginning with the fuselage as everything else must attach to this anyway.

FUSELAGE:

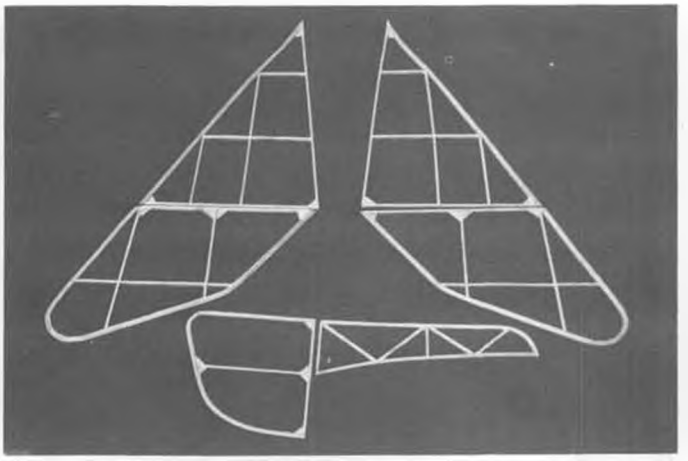
Trace and cut the 1/16 sheet sides from the side view on the plans. These go from the tailpost to under the radiator shell. Now trace and cut the bottom sheet from the top view on the plan. Cut out all the formers and the fire wall. Before installing these, you should finish off the instrument panel. Stain the balsa with a water based wood stain. When dry, add three or more coats of clear dope to get a high gloss finish. Now, drill the four holes for the instruments. Use these holes as a guide to draw four circles on a piece of white paper. Using black ink, mark some numerals and needles on each dial face. Now, glue some cellophane to the back of the instrument panel, then your marked paper behind this. Cut some 3/8 diameter brass tubing to act as rims, polish them, insert into holes to act as rims. Makes a nice looking panel doesn't it? Cut a small piece of tubing from a Hot Stuff bottle and glue on as a turn-and-bank indicator.

Now glue the back of the two sides together and insert the bottom between them. Insert the rearmost former between the sides and glue the bottom piece up to that point, continue until all formers are in. Cut and glue the firewall in place, then the 1/4 x 3/4 vertical blocks that go in front of it. Now glue in place the horizontal shelf that the motor sits on. Cut and glue the 1/8 ply wing mounting boards to the inside of the fuselage, as shown, also fit the battery in place, glue in the braces, then, when dry, remove the battery. Measure and cut the brass tubing for the undercarriage mounts and glue or epoxy in place.

Cut the top decking for the flat rear section (the grain of the wood should be crossways for easier bending) and glue this in place. Follow this with the rounded decking up to the rear cockpit. Now, butt join a sheet to this one (Hot Stuff is great for this type of joint, but



Detail photo of undercarriage rigging. Braided control line wire, .012 diameter, with flattened aluminum tube "turnbuckles."



Tail surface construction is exercise in laminated outline technique. The secret is in keeping tension as the pieces are bent around form.

be VERY careful as the drying time will not allow you to realign the sheet) and continue to the front of the forward cockpit. Cut out the holes for the front and rear cockpits, and sand everything smooth. Glue 1/4 x 3/8 balsa blocks from "B" to "C" flush with the former, just where the top of the hood will meet the screen on the sides, as additional support for the nose.

MOTOR INSTALLATION:

Mount the motor on the shelf with an aluminum clamp, being sure that the shaft will clear the radiator shell. Solder lead wires from the motor and bring them back to the forward cockpit. Following the wiring diagram in the Astro Flight box, complete the wiring and install the switch, charge receptacle, and battery. Charge the unit and test run it to see if you did everything right. Powerful little devil, isn't it?

Install 1/16 decking from forward cockpit to the end of the 1/4 x 3/4 blocks on the firewall. This will be a butt joint again, to the decking behind it. Dope all surfaces with at least three coats of clear dope. Dope inside of motor compartment black.

SHEET METAL WORK:

I obtained my aluminum sheet from a print shop. These are used on drums for printing and usually have some printing on them. I was able to get six of these used sheets just for the asking, however, the print shop owner was an ex-modeller and others may charge a small fee. The printing is easily sanded off with a 320 grit paper, then finish sanded with a 400 grit paper. Some polishing compound can be used after this to obtain a good bright finish.

Make the side pieces first by laying the sheet next to the fuselage and scribing the outline on the metal. Cut the piece out with old scissors or small snips. Lay out the six louvers and cut the slots for them with an old X-acto blade. Using a stylus or rounded piece of wood, form each louver. Lay the sheet against the fuselage and mark where the holes for the louvers are on the wood, remove the sheet and paint this area black. Now, carefully line up the panel and hot-glue it to the wood. Repeat on the other side.

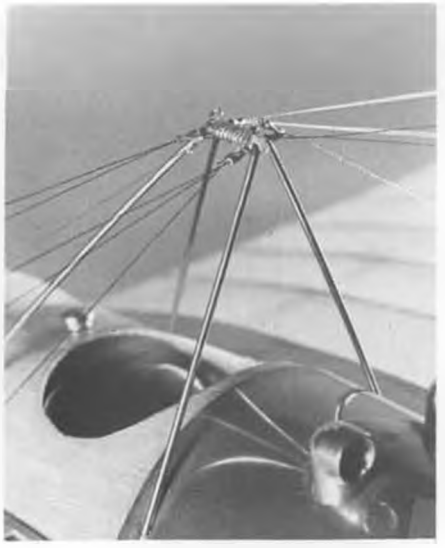
Mark the bottom panel the same way as the sides, but leave about 1/16 overlap on both side edges. Glue to bottom and fold overlap onto sides with a burnishing tool (any hard, smooth object will do). Cut a small piece that goes between the side and the hood at the front, leave a 1/16 overlap at the rear of this and fold it inward to make a neat seam.

Make the hood panel with 1/16 overlap on both sides and install. Cut the forward air scoops from sheet, form them by rolling a dowel over the sheet until enough curve is made and glue to the hood.

The ship-type vents at the rear of the hood are sort of a problem. Mine were made of aluminum. One end of a 1/2 inch square stock was turned on my small lathe to a 3/8 diameter. Then the opposite end was hand-filed to shape. To improve the looks, and also to lighten it, 1/4 inch holes were drilled from both ends, and the outside was polished. The hood then had two 3/8 diameter holes drilled in it, and the vents glued in place. If this seems like a lot of work, or you don't have a small lathe, make the vents of balsa or pine, seal and paint them silver, and they will still look great.

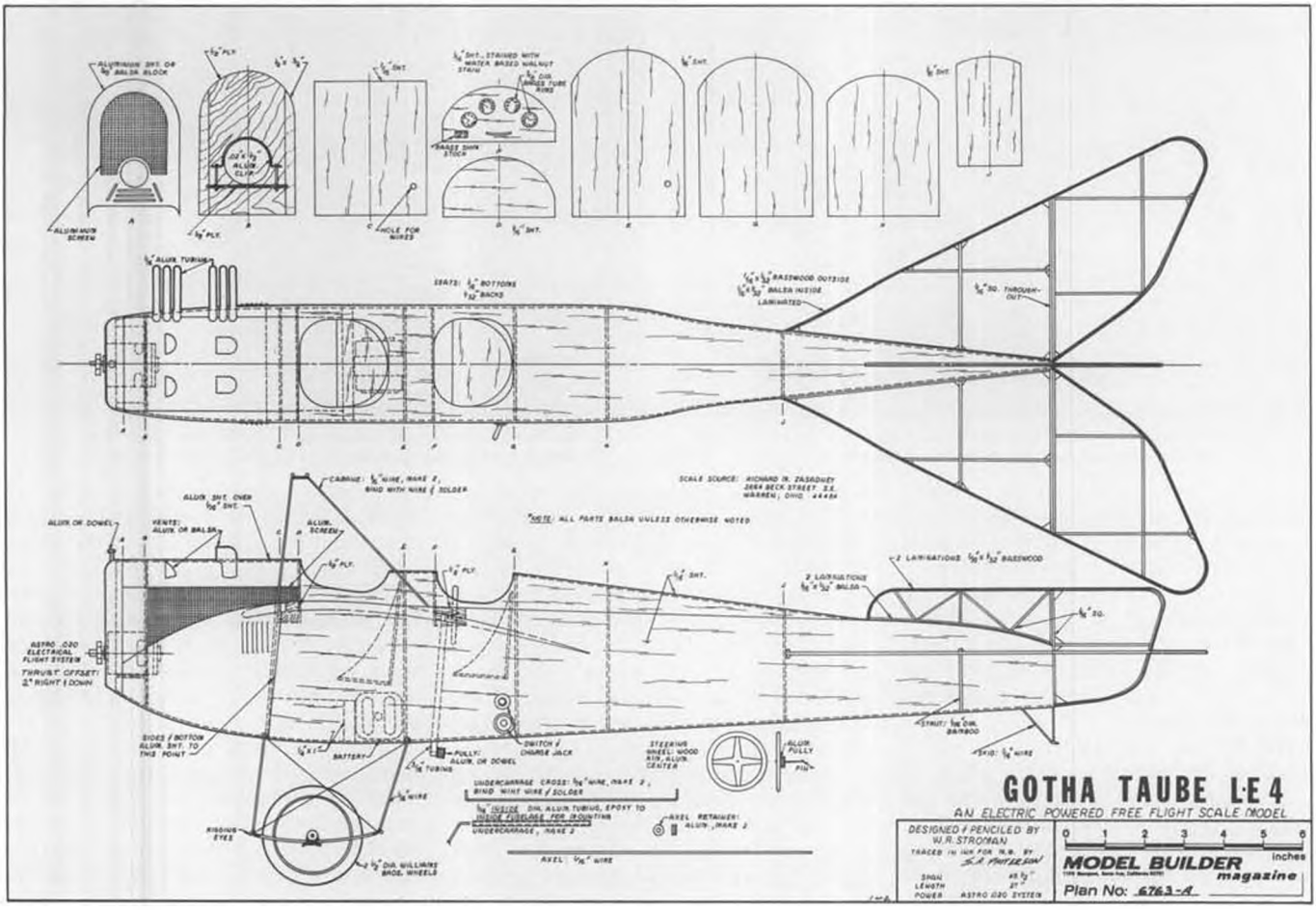
The radiator sheel is something rather different from most models. It can be made from a block of balsa, sanded, and painted. The one on the original model was made from .02 aluminum sheet, and wasn't as hard to make

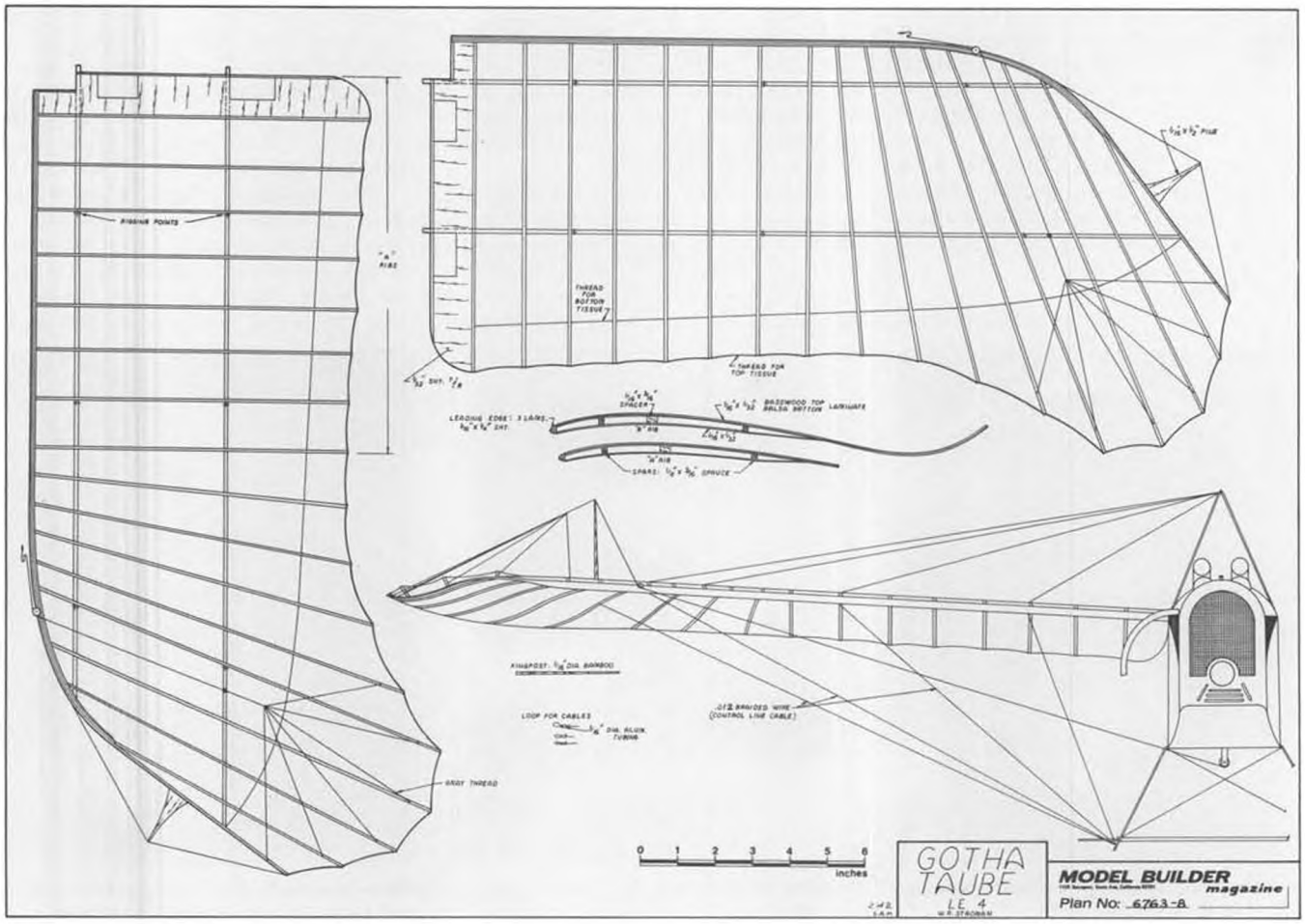
The Astro Flight 020 electric motor is simply strapped to the mounting plate.

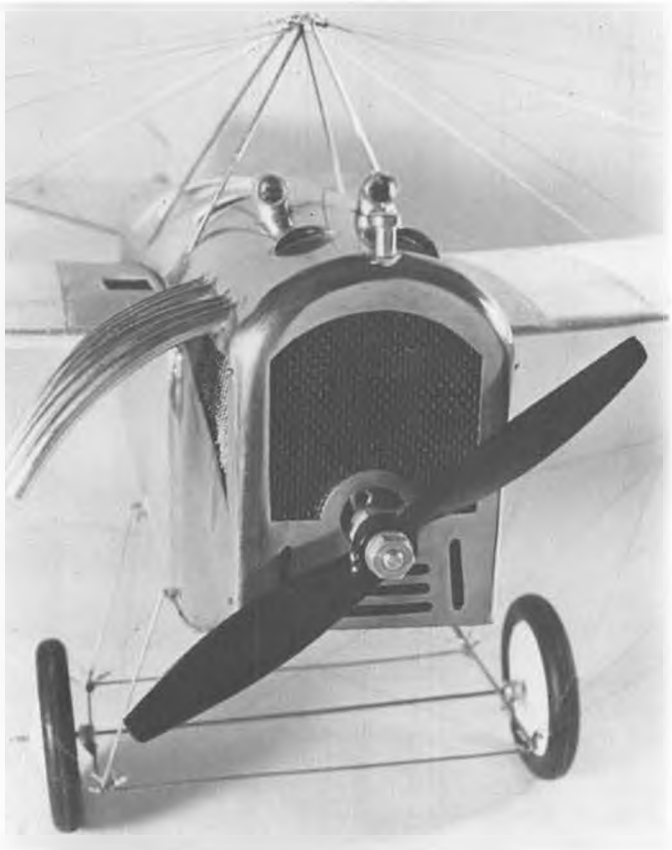


The local meeting place for all the rigging is right above the pilot. Keeps it all in sight!

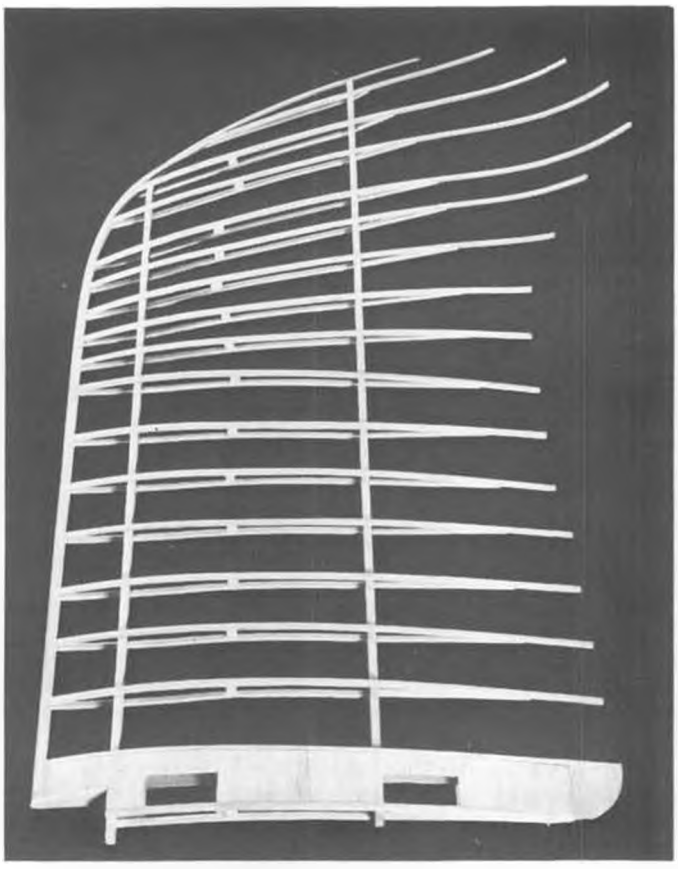
Close-up shows how axle is laced to runner with rubber strand, for shock absorbing.


GOTHA TAUBE LE 4
AN ELECTRIC POWERED FREE FLIGHT SCALE MODEL
DESIGNED & PENCILED BY W.R. STROMAN
MODEL BUILDER magazine
Plan No: 676.3-A
SCALE SOURCE: RICHARD H. ZASADNEY 2884 BECK STREET, S.E. WARREN, OHIO 44484
NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED
ASTRO .020 ELECTRICAL FLIGHT SYSTEM
THRUST: OFFSET: 2° RIGHT & DOWN
SEATS: 1/16" BOTTOMS 1/32" BACKS
2 LAMINATIONS 1/16" x 1/32" BASSWOOD
2 LAMINATIONS 1/16" x 1/32" BALSA
1/16" SQ. THROUGHOUT
STRUT: 1/16" DIA. BAMBOO
SKID: 1/16" WIRE
CABANE: 1/16" WIRE, MAKE 2, BIND WITH WIRE & SOLDER
ALUM. OR DOWEL
VENTS: ALUM. OR BALSA
ALUM. SHT. OVER 1/16" SHT.
ALUM. SCREEN
1/16" PLY.
1/16" SHT.
BATTERY
PULLY: ALUM. OR DOWEL
1/16" TUBING
SWITCH & CHARGE JACK
STEERING WHEEL: WOOD HUB, ALUM. CENTER
ALUM. PULLY
PIN
SIDES & BOTTOM ALUM. SHT. TO THIS POINT
RIGGING EYES
1/16" WIRE
1/16" DIA. WILLIAMS BROS. WHEELS
UNDERCARRIAGE CROSS: 1/16" WIRE, MAKE 2, BIND WITH WIRE & SOLDER
INSIDE DIA. ALUM. TUBING, EPOXY TO INSIDE FUSELAGE FOR MOUNTING UNDERCARRIAGE, MAKE 2
AXEL RETAINER: ALUM., MAKE 2
AXEL: 1/16" WIRE
SPAN 45 1/2"
LENGTH 27"
POWER ASTRO .020 SYSTEM
0 1 2 3 4 5 6 inches


RIGGING POINTS
"A" RIBS
THREAD FOR BOTTOM TISSUE
THREAD FOR TOP TISSUE
1/16" SHT. 1/8
1/16" x 3/16" SPACER
BASSWOOD TOP BALSA BOTTOM LAMINATE
LEADING EDGE: 3 LAMS. 1/16" x 1/4" SHT.
"B" RIB
SPARS: 1/16" x 3/16" SPRUCE
1/16" x 1/16" PILR
KINGPOST: 1/16" DIA. BAMBOO
LOOP FOR CABLES
1/16" DIA. ALUM. TUBING
.012 BRAIDED WIRE (CONTROL LINE CABLE)
GRAY THREAD
0 1 2 3 4 5 6 inches
GOTHA TAUBE LE 4 W.R. STROMAN
MODEL BUILDER magazine
Plan No: 676.3-B



Front end with all the metal work in place. Radiator shell is banged out in hardwood form. Cowl is sheet aluminum from print shop.



"Boy, the cats sure picked that fish clean!" Don't worry, it's not as tough to build as it looks. Read about how it's done.

as I thought it would be. I used the firewall as a template and drew an outline on a 2 inch thick piece of fairly hard wood. Then I cut a recess in the wood using a gouge and chisel to half inch depth.

Buy a sheet of annealed .02 aluminum at your hobby shop and lay it over the block. Start forming the sheet in the recess with a small ballhammer. Do this with light taps and every now and again hold it over an open flame (stove burner is good) to anneal the metal that has work-hardened from the forming. If this is not done, the metal will crack, and if you're almost done, so will you. After the sheet is formed in the block, remove it and sand and file the outer surface smooth. Lay out the openings on the front and carefully drill holes, then file these to shape. After all the openings are finished, polish the piece with polishing compound or a buffing wheel.

The screening at the sides and front is aluminum window screen. A nickle bought enough for three of these models! Cut it slightly oversize and press into the sides and hot glue. Put the screen behind the radiator shell and glue it in place. The original model had the screen painted black *before* putting it in... seemed to improve the looks of it.

CABANE PYLON AND UNDERCARRIAGE

Make two pylon wires from the side view of the plans. Bind them together at the top with annealed iron wire, form a loop at each end as a guide for the front and back wing rigging wires. Place the pylon over the fuselage to obtain the proper spacing, and solder it. Use epoxy or Hot Stuff to hold pylon in place on fuselage.

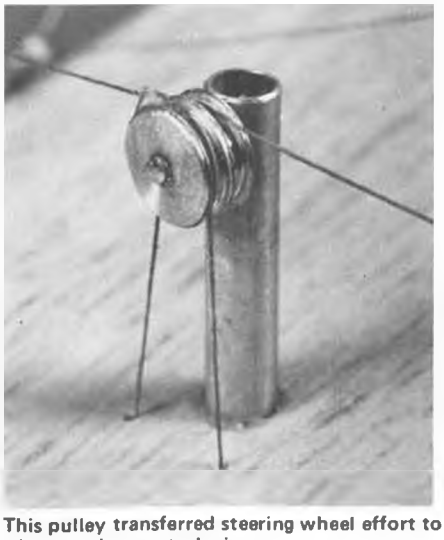
Bend the side wires for the undercarriage from the side view, be sure to bend the ends to that they will fit in the tubing in the fuselage. Place wires in fuselage and bend cross wires, bind to side wires with annealed wire (once again make loops to guide flying wires), and solder. Bend small 1/16 wires that hold rubberbands to axle, and bind and solder in place. The small aluminum pulley-shaped guides shown were turned on a lathe, and help index the rubberbands when they are slipped on the axle. These are not necessary, but do make a more workmanship job of it.

TAIL FEATHERS:

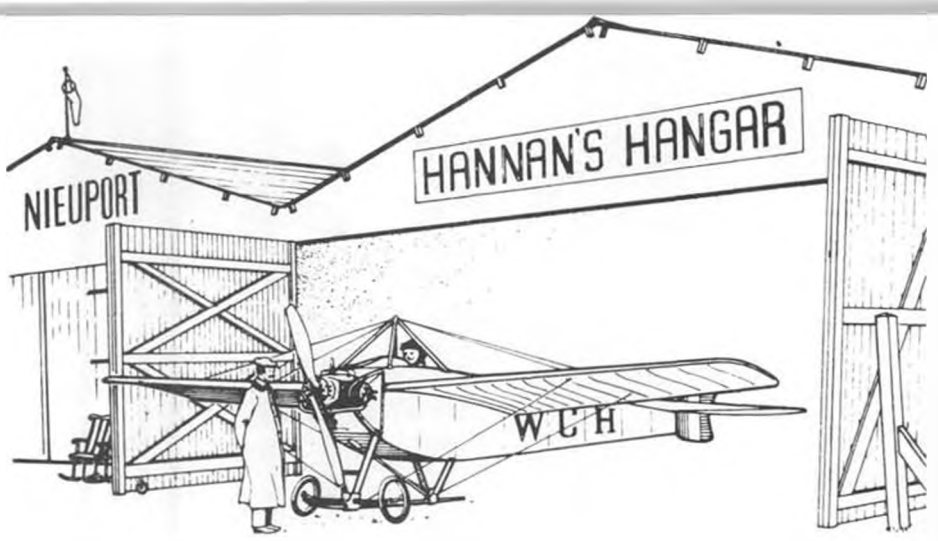
The outlines of each of these surfaces is traced on a piece of cardboard. This is cut and used as a laminating template. It is best to soak the pieces to be laminated in warm water for about 5 minutes prior to laminating. This makes the wood more bendable and the chance of breakage is reduced. I used white glue, as the set up time is longer, thus giving more time to pull the wood around the curves. By the way, that's the secret of laminating, keep an even tension on the

Continued on page 72

A little easier to understand than the cockpit of a DC-10! Not even a clock.



This pulley transferred steering wheel effort to wing warping control wires.



"New solutions bring new problems."

. . . Or so it seems in the model aircraft sport/hobby, especially when it comes to the subject of competition rules!

AVIATION PHILATELISTS

• A surprisingly large number of model enthusiasts also collect aviation theme postage stamps, and they should certainly be pleased with the latest U.S. release which features "COMMERCIAL AIRPLANES." Designed by Robert Cunningham, of Texas, the stamp portrays two relatively obscure subjects, the Ford/Stout "Pullman", and the Laird Swallow. In contrast to some previous postal offerings, the craft appear to be well researched and accurately executed.

QUESTIONS DEPARTMENT

Bill Dahlgren wrote in asking how condenser paper may be affixed to model frameworks. Ask ten builders and you'll probably get ten answers, Bill, but Micro-X-Products (see mention later on) markets a special slow-drying glue just for the purpose, as well as the paper itself. Some people prefer to use water-thinned white glue or Titebond, while others prefer thick clear dope. Incidentally, although condenser paper can be water-shrunk like tissue, it has a powerful contracting action, which can distort delicate frameworks. Thus it is often left in a relatively slack state, in spite of the somewhat baggy appearance.

HANDY HINTS

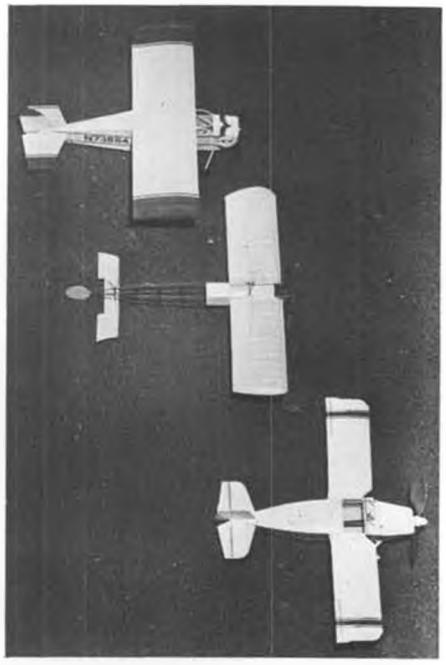
Dave Gibson, Ozaukee County 4-H Aeronautics Project advisor, favors us with the following agriculturally oriented tips:

1. Vegetable garden corn stalks which are cut and left on the ground to "winter over", are then picked up in the soggy dew of spring, *sometimes* can be cleaned out to leave a shell that can be sliced up for what passes as "home grown" bamboo. Sections are shorter than the real stuff, but are useable.

2. Sunflower stalks prepared the same way often produce (but not always) a pith in the center of the stalk, that is identical in characteristics to VERY LIGHT balsa. If you dig out the stalks while the outer casing is still soft and wet, you can remove the pith easily. Glues up just like balsa, and is great for super-light details.

TWO "N's" AND TWO "S's"

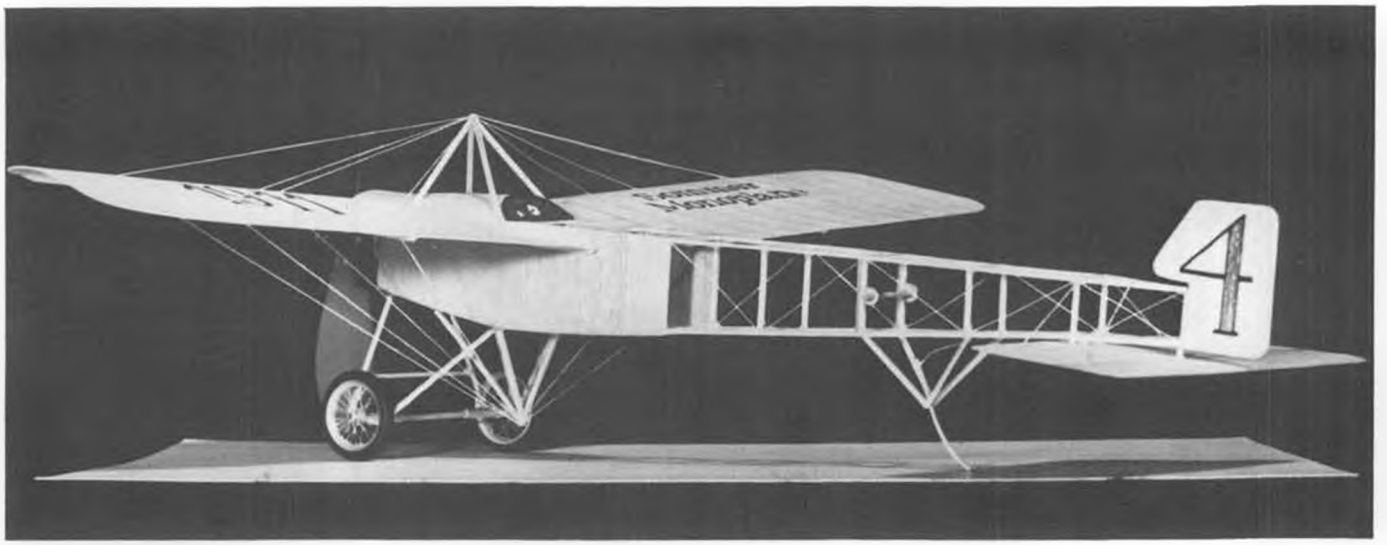
William Fleming of Passaic, New Jersey, took us to task for omitting an "n" from the Glenn Curtiss name recently, and included an interesting story as well: It seems that Glenn was named after Hammondsport Glen, where his parents used to court before being mar-



Butch Hadland, England, built Lacey, 1911 Cessna, Wittman Tailwind. Ron Moulton pic.

Photographer/modeler Warren Shipp, with his twin camera aircraft documentation set-up. F6F is at Miramar Naval Air Station.

From this simple setting . . . Bill Hannan's desk once belonged to Betty Crocker, chair by Eames, typewriter by Hermes, Scotts giro.



Rubber driven all-balsa French Sommer monoplane by Milan Kacha, one MB's and Hannan's regular correspondents from Czechoslovakia. Wheels are by Fulton Hungerford.

ried, and where the family held picnics later. His mother liked the place so much she decided to name the baby after it. Hence, "Glenn Hammond Curtiss".

And for scale enthusiasts, Fleming offers these items: Clarence Chamberlain's Atlantic-crossing Bellanca was NOT named "Columbia", nor "Miss Columbia", as some have implied. "Columbia" was the name of the sales organization which represented Bellanca in New York. At no time was "Miss Columbia" or even "Columbia" painted on the aircraft as a name. The emblem on the tail was the corporate logo of Columbia Aircraft, and "Columbia" appeared only on the fin in small letters.

According to Fleming, the machine was all silver except the wings, which were clear doped. By 1934, the wings had been doped silver and the dark brown painted ring cowling had been installed. Fleming is interested in locating someone who knows the colors of the Columbia logo, which so far have eluded him.

For builders of the General Aristocrat, in either Peck-Polymer Peanut form, or the recent Flyline kit release, Bill Fleming recalls seeing a fleet of 8 in Newark, when they were new. Belonging to General Tire & Rubber Company, which was not in any way affiliated with the General Airplanes Corporation, the ships featured a uniform orange and black color scheme.

PRODUCTS-A-PLENTY DEPT.

This month's mail brought an unusually bountiful harvest of interesting new items. So, at the risk of sounding like the Johnny Carson Show, we herewith note the availability of the following new offerings:

CATALOGUES: Two 1976 listings featuring kits and model building supplies are well worth obtaining. OLD-TIMER MODELS, P.O. Box 18002, Milwaukee, Wi. 53218, offers rubber, balsa, kits, plans, nitrate dope, condenser paper, Japanese tissue, bamboo paper, goldbeater's skin, ball thrust bearings, and other hard-to-find items. Sprinkled through the catalogue are historical findings, such as drawings of the Lanchester "Aerodyne" model, flown during 1894. Send proprietor Jim Noonan 25c for a copy, and tell him and all the other new-products manufacturers that you read about it in MODEL BUILDER!

Gerald A. Skrjanc specializes in indoor model supplies, including kits, wood, microfilm, condenser paper, glue, rubber and accessories. Additionally, he offers a line of model construction plans, including Peanuts. For a copy of his catalogue, send 50c to: Micro-X-Products, P.O. Box 1063, Lorain, Ohio 44055.

LOST YOUR BEARINGS? Peck-Polymers has released a new, larger size of its popular nylon propeller shaft thrust bearing. The new style provides a free-running precision fit for .047 diameter prop shafts, and is priced at 60c per package of four. Available from better hobby shops or directly from the factory. Also new from Peck-Polymers is a Peanut plan for the rare 1911 Farman monoplane. Designed by Benno G. Sabel, of Germany, a model constructed from these plans participated in last years MODEL BUILDER Proxy Postal Peanut meet, and drew admiration for its intricate detail and steady flying qualities. The plans are priced at $1.25, and a proof-of-scale judging 3-view for the aircraft is also offered, at 60c. Additionally, a vacuum-formed cowling may be obtained for 60c. Peck-Polymers, Box 2498, La Mesa, California, 92041. Direct orders should include 15% for postage and handling.

AERO ERA PLANS: Tom Houle is offering a series of model plans encompassing Peanut, Walnut, Sport, and Jumbo categories. Subjects include the Gere Sport, DH-4, Helio Courier, Super Aero Sport, Gee Bee R-1, Fokker D-VIII, and more. A stamped, addressed envelope will bring you a complete, illustrated list: Aero Era, c/o Tom Houle, 11333 Lake Shore Drive, Mequon, Wi. 53092.

Continued on page 66

Rubber-powered DH "Otter" in Ghana Air Force markings, by Pres Bruning. Span is 21 inches. Photo by Bob Mosher.

PHOTOS BY FUDO TAKAGI

Peanut *HERGT Monoplane*

By WALT MOONEY . . . Over 60 years ago, Mr. Hergt and Mr. Fokker must have gotten together and cooked this one up just to see if some future nutty modeler would fall for it. They hooked the Peanutiest of them all!

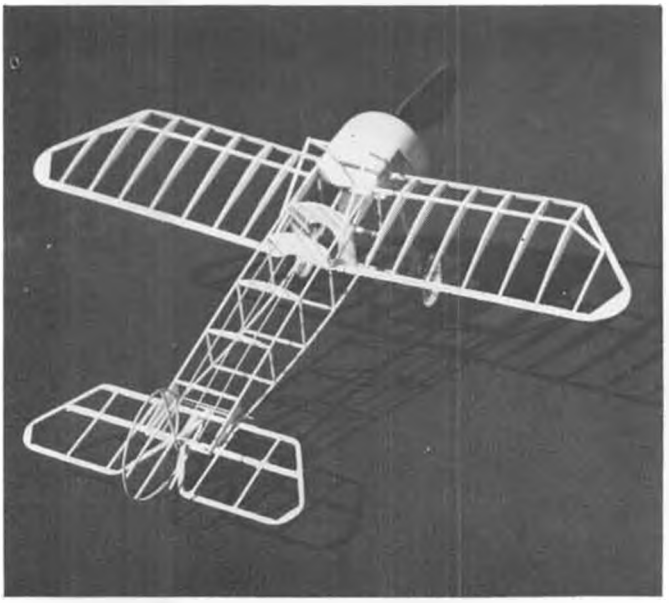
• The Hergt Monoplane is a rather obscure WW I airplane. Only one was built. With a wingspan of 6 meters and a length of 5.2 meters, it was rather small and probably wouldn't have been much good as a military airplane. It was not equipped with anything in the way of armament and its speed was only about 78 mph.

However, it does look a bit like the Fokker E1, and in fact its configuration is about what a model builder would do to the E1 to make it into the ideal WW I Peanut. It was built with a plywood skinned fuselage and plywood covered cantilever wings. Therefore there is no wire bracing to be modeled. It had pronounced washout in the wings . . . note the wing twist shown on the plans.

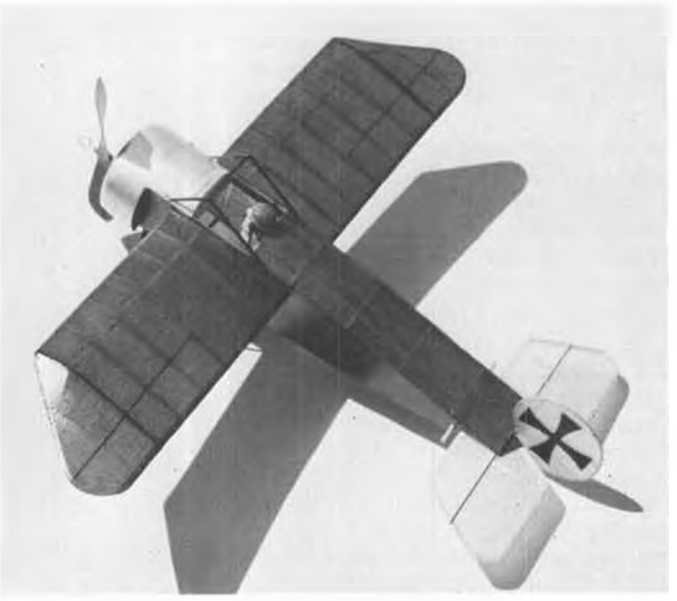
The tail looks like it was made of parts taken from an E1, and these surfaces are therefore proportionately larger when used on this small aircraft. This also would explain the fact that there was a cross on the vertical tail, but none in evidence elsewhere, on the airplane in the photo that is available in "German Aircraft of the First World War" by Peter Gray and Owen Thetford. Mr. F. D. Hergt also used wheels that were easily available and therefore look large on this small aircraft.

Since the wing and fuselage were plywood covered, internal structure is not easily determined. The model was made of standard, built-up, tissue-covered structure to keep it as light as possible. It uses some materials that are not really standard, so this article makes some comments about structural concepts, and lists sources where these materials can be purchased.

Note that the wings are attached to the fuselage sides about a quarter of the way down from the top longerons. In this location, both the leading and trailing edge of the wing can apply loads into or out of the fuselage structure. Because balsa can take so much more force axially (along its length) than it can transversely (in bending),



The popular term "straight forward" really applies to this fuselage! It is straight forward and straight backward!



The Hergt is an ideal Peanut Scale subject, with its low aspect ratio wings. Really obscure, only one was ever built.

even a minor impact can break the upright where the trailing edge is attached or where the front of the wing contacts the fuselage. To prevent this, since as model flyers we are unable to prevent impacts, we need to install some structure to carry the wing spanwise loads through the fuselage. To do this, parts "H", "I", "J" and "K" are built into the fuselage structure. Part "J" also provides some additional strength to pick up landing gear loads and additionally insures that the basic fuselage structure is square.

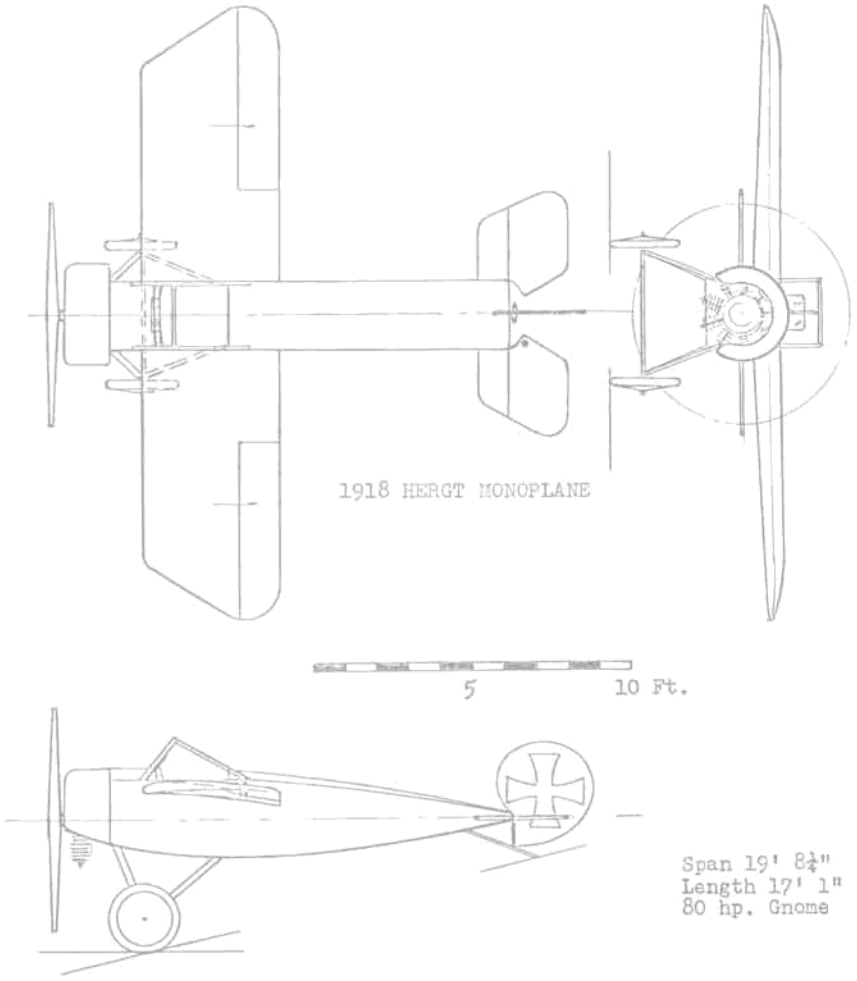
Note that the horizontal tail deviates from the scale outline. This is also in the interest of strength. To simulate the area of the tail that doesn't exist in the real airplane, cover the hatched area with black tissue in the shape shown.

The grain of the wood, in almost every case, should be lengthwise of the piece. However, in the case of part "J", it goes crosswise of the part, and of the fuselage, because the largest loads on this piece are the handling loads provided, when holding and launching the model, by your thumb and forefinger.

The vertical tail outline is made by laminating 3 pieces of basswood over the plan. Basswood is also used for the thin stringers and the landing gear struts. This material is available in the required sizes from Peck-Polymers, P.O. Box 2498, La Mesa, California 92041. The catalog costs 50 cents and covers lots of other items, including the plastic thrust bearings used to simulate the cylinder heads which are outside the cowl.

The propeller thrust bearing, which fits in the balsa block crankcase, in the square hole, and the cylinders, are plastic items available from Williams Bros., 181 Pawnee St., San Marcos, California 92069. The cylinders are 1/2 inch scale cylinders. Williams Bros. catalog will cost you 25 cents and also covers many other items.

The propeller used on the model was cut down from a Tern plastic propeller. This is a very nice, wide bladed, efficient propeller, and is available from Vintage Aero, 1 the Glen, Tenafly, New Jersey 07670.



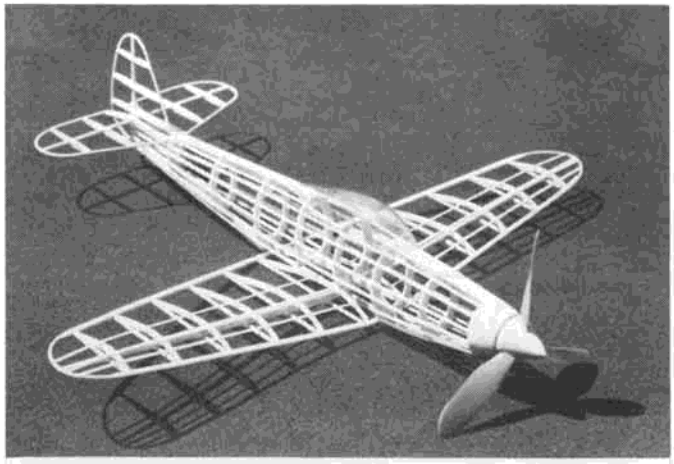
The wheels that look so good on the model are made by Fulton Hungerford. To be exactly scale they should be covered with tissue to simulate the fabric cover on the real wheels, but it's a shame to hide those beautiful spokes. These wheels are available from F.H. Wheels, 1770 Lilac Circle, Titusville, Florida 32780. They are not cheap, but they are beautiful, strong, and very durable. A set will outlast several Peanuts.

And last, but not least, most of the model is made of balsa. Mike Taibi, of Superior Balsa, is cutting wood for the Peanut enthusiast. Write Superior, P.O. Box 8082, Long Beach, California 90808.

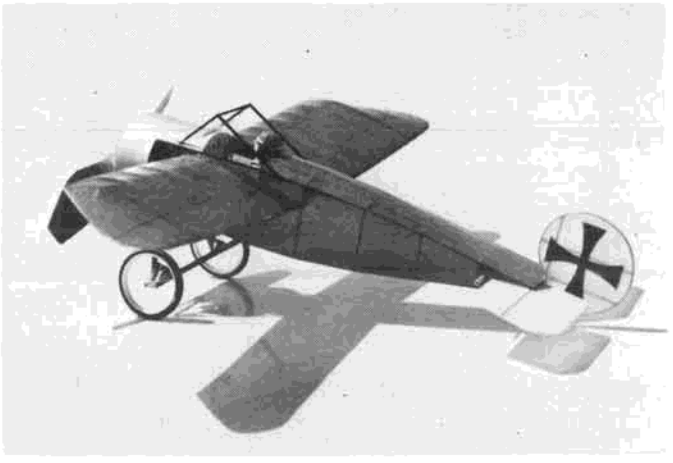
The firms I've listed carry many other items useful to model builders. There are many other firms that can supply your needs and advertise in MODEL BUILDER. Spend some time reading the ads. They can be a lot of help.

The color scheme of the model

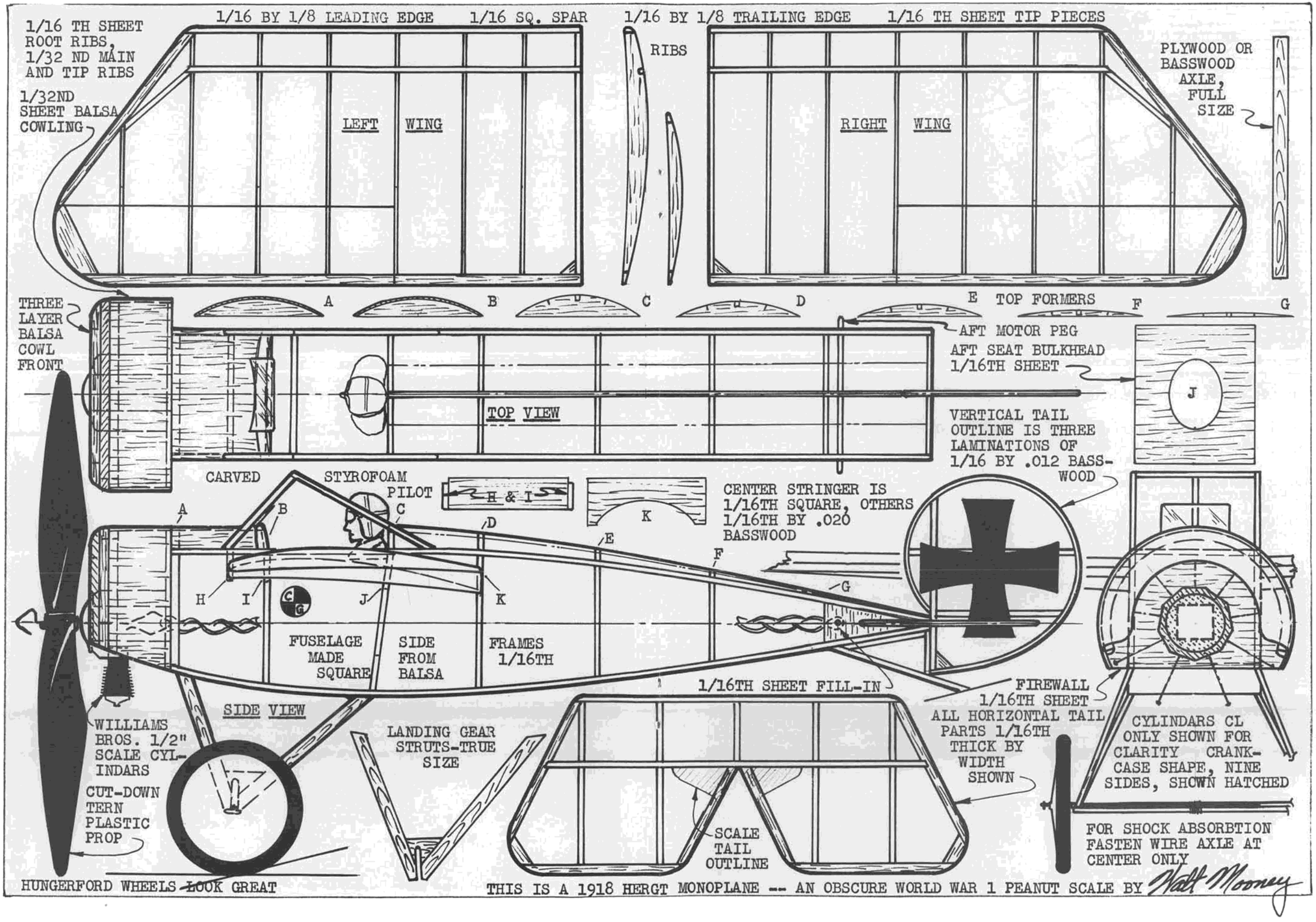
Continued on page 90

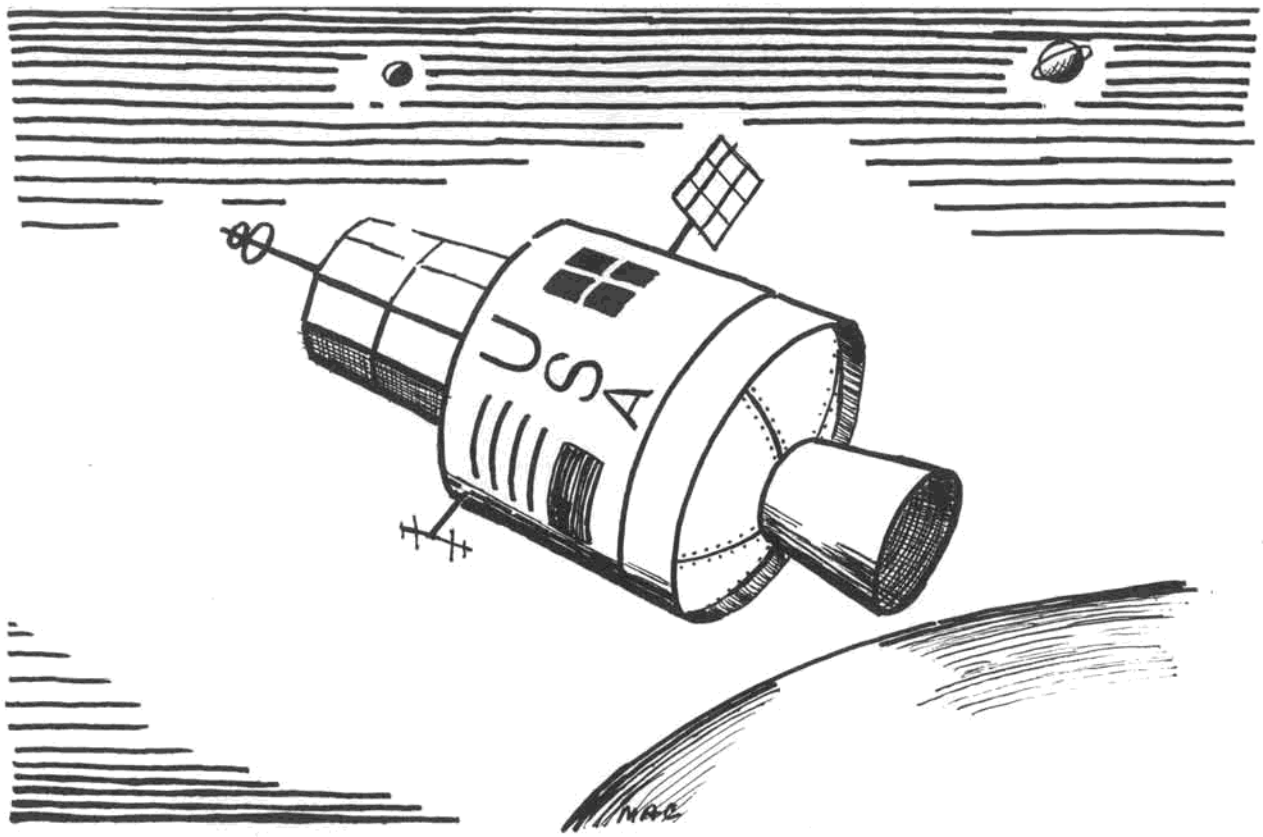


A beautiful subject in any modeling medium, the Bell Airabonita was the Navy version (XFL-1) of the famous P-39. Coming soon.



Another view of the Hergt confirms that the tail surfaces were probably "borrowed" from a Fokker E1. Note big Hungerford wheels.


1/16 TH SHEET ROOT RIBS, 1/32 ND MAIN AND TIP RIBS
1/32ND SHEET BALSA COWLING
1/16 BY 1/8 LEADING EDGE
1/16 SQ. SPAR
1/16 BY 1/8 TRAILING EDGE
1/16 TH SHEET TIP PIECES
RIBS
LEFT WING
RIGHT WING
PLYWOOD OR BASSWOOD AXLE, FULL SIZE
THREE LAYER BALSA COWL FRONT
A
B
C
D
E TOP FORMERS
F
G
AFT MOTOR PEG
AFT SEAT BULKHEAD 1/16TH SHEET
J
TOP VIEW
VERTICAL TAIL OUTLINE IS THREE LAMINATIONS OF 1/16 BY .012 BASS-WOOD
CARVED
STYROFOAM PILOT
H & I
K
CENTER STRINGER IS 1/16TH SQUARE, OTHERS 1/16TH BY .020 BASSWOOD
H
I
J
K
FUSELAGE MADE SQUARE
SIDE FROM BALSA
FRAMES 1/16TH
1/16TH SHEET FILL-IN
FIREWALL 1/16TH SHEET
ALL HORIZONTAL TAIL PARTS 1/16TH THICK BY WIDTH SHOWN
CYLINDARS CL ONLY SHOWN FOR CLARITY CRANK-CASE SHAPE, NINE SIDES, SHOWN HATCHED
SIDE VIEW
WILLIAMS BROS. 1/2" SCALE CYL-INDARS
CUT-DOWN TERN PLASTIC PROP
LANDING GEAR STRUTS-TRUE SIZE
SCALE TAIL OUTLINE
FOR SHOCK ABSORBTION FASTEN WIRE AXLE AT CENTER ONLY
HUNGERFORD WHEELS LOOK GREAT
THIS IS A 1918 HERGT MONOPLANE -- AN OBSCURE WORLD WAR 1 PEANUT SCALE BY Walt Mooney



"Houston says, 'A-OK.' the President sends congratulations, and a kid in Omaha wants us to watch for a red and yellow Nordic on our next pass."

FREE FLIGHT

By BOB STALICK

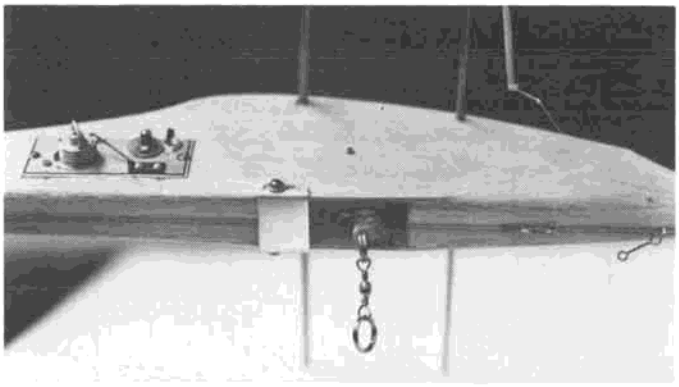
• Last February at the Annual Misery Meet, sponsored by the Kent (Washington) Strat-O-Bats (S.O.B.), the Northwest A/2 fliers and other hangers-on gathered for the first, and perhaps last, annual circle tow conference and liar's contest. This conference, held the night before the meet, was in conjunction with one of the annual District XI meetings. Featured were slides and narrative of the recent World Championships, conducted by Jim Walters. Following this, the circle tow folks . . . most of them . . . displayed their hardware on the dinner tables and spent some time discussing the various features of each.

Of interest to everyone was the variety of devices which can be made to achieve the same circle-two end. For example: Ron Davis has a home-made unit which uses heavy copper tubing as a main body in his Czech-style hook. Guntis Sietens uses the popular-in-the-Northwest Bat-Hook, which is fabricated by him and Steve Helmick. Guntis mounted his unit in an old straight-tow model, so much of the line hardware is outside the fuselage. The model is Helmick's Seeligull. John Lenderman displayed his Lenderman-Stalick circle tow twang hook system, which got its baptism the next day at the meet (this system was featured in this column in the December, 1975 issue). Jim Walters' ships all featured the Hatschek style hook. All worked as they were supposed to when the contest rolled around the next day . . . which was a calm and cool day with few thermals, but offering excellent conditions to practice the techniques of circle tow.

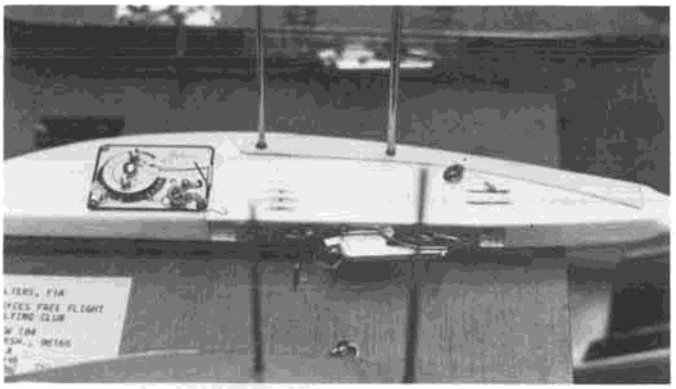
The idea of having the conference was hatched by Steve Helmick, and really was a hit with those people who stayed after the dinner portion of the meeting. If you haven't considered such an activity as a before-the-contest kind of event, you should give it some thought. Sharing and learning is as much of the purpose of these get-togethers as trying to beat the pants off of your competition the next day. Lets you know that he's a human being, too.

JUNE 3-VIEW. THE 1/2A MINI-BOMB

In the early 1970's, Ron Evans used to write an excellent newsletter covering



John Lenderman's twang-hook equipped circle-tow glider. See MB Dec. '75 for details. Simple device, but doesn't allow zoom launch.



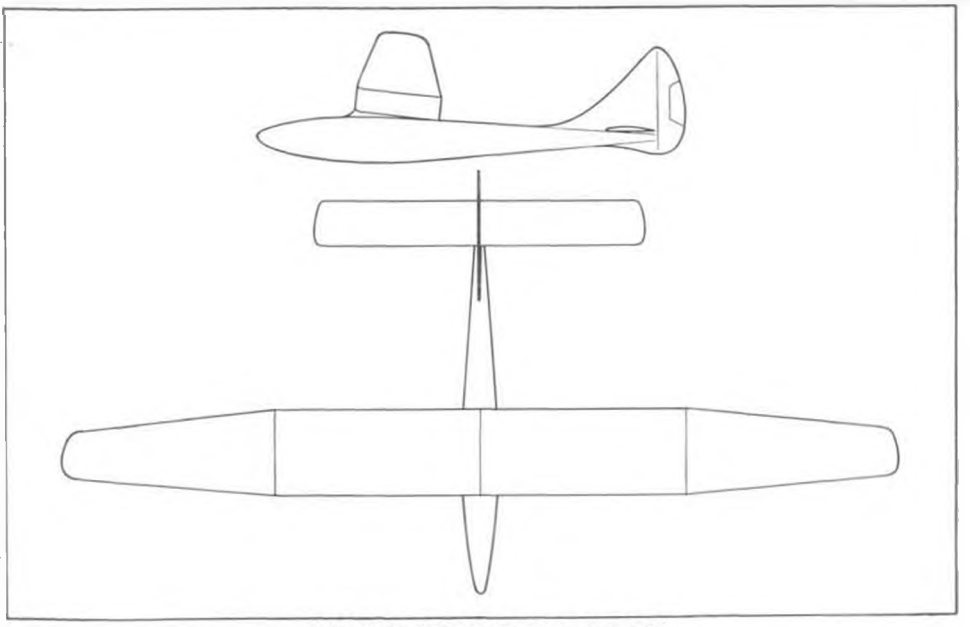
The gliders in Jim Walters' model box. All are equipped with Hatschek style hooks and Tatone timers.

the goings-on of the Southern Connecticut Aero Modelers Assn. (SCAMA). Ron has since moved and gone on to other things, but while he was active, he produced one of the best newsletters for free flighters that I have ever seen. This model is from the third issue of Conn-Tact.

"It was determined in the beginning that this model would not sacrifice strength for weight; we didn't need a 4.5 oz. hard-to-build, easy-to-break airplane. The Mini's I've built have weighed between 5.25 and 5.75 ounces. Mine all had Hobbypoxy clear on Japanese tissue. Since most of our contests featured 7 second engine runs and 2 minute maxes, a big ship was at a disadvantage. The availability of the Seelig Mini-Combo (hence the model's name) made feasible the possibility of auto-rudder, auto-stab, cut-off and D.T. by timer.

"About the trim, the model is not overly sensitive to rudder adjustment, and will fly with the rudder in 'glide' position . . . it just won't climb, flight is more like a 1/2A proto than 1/2A gas. I've flown with and without washin, and like it better with a small amount (1/16) anyway. If the wings come out without any, put in about 3 degrees left thrust, this will keep things safe until the rudder becomes effective. A bit of left rudder tab is desirable for the power phase. Glide trim is easy . . . about 3/32 right rudder and about 1/8 upstab.

"One thing which makes a big difference while trimming is the prop; the model is very sensitive to diameter changes. I trimmed it with a nylon 5-1/4 x 3 Top Flite and then switched to a 5-1/2 x 4 (cut down from a 6 x 4) Cox grey for ultimate performance. What I got was almost the ultimate headache. The ship lost all semblance of right turn, and did a screeching left hand looping roll, zeroing in at launch site with uncanny accuracy: auto-stab and tick-off allowed me to write about this. A hasty prop switch: 5 x 3 Cox grey. Back in the groove, a little left rudder was required, the right turn was slightly tight . . . 1-1/2 turns in 7 seconds, rather than 1. This became the Number One prop, but an even better climb is possible with the Rev-Up 5-1/4 x 3.



JUNE'S MYSTERY MODEL

"I don't think any construction notes are needed, most of the details are within the scope of an experienced gas flier. All the Minis so far have been covered with Japanese tissue, although this does not mean that we're 100% satisfied with it. Solarfilm could be used, but with a weight penalty. One final note: don't try to save weight by omitting any bracing, or using thinner wood than the sizes shown. This is a very fast climbing model." 'Nuff said.

DARNED GOOD AIRFOILS . . .
LO 234-830 and Pladuska

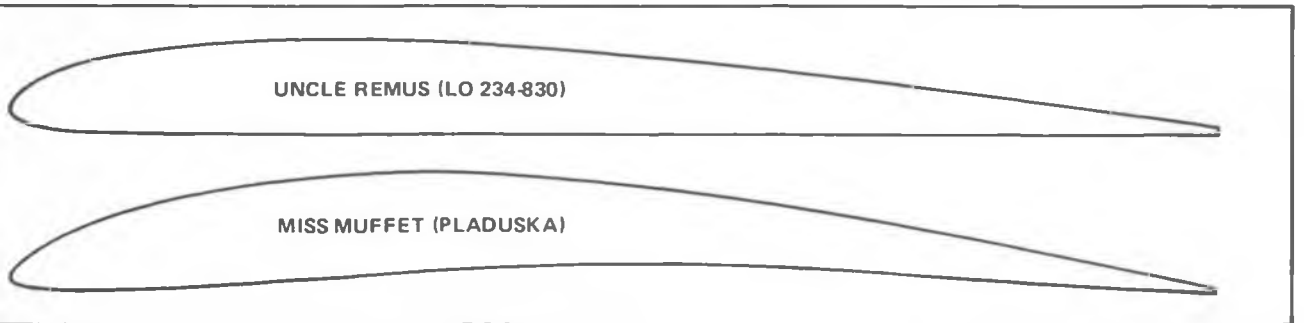
These two foils were used by FIC (FAI Power) winner at the 1975 World Champs, Lars Olofson. The models so equipped were both flown in the normal rounds as well as the flyoff rounds. There should be little need to expound on their capabilities since winning the World Champs would seem to speak for itself. The LO 234-830 is an original type foil developed by Mr. Olofson and although very similar to the Neelmeyer (featured in a previous issue of MODEL BUILDER) is very thin at 7.7%. The Pladuska has been around for awhile, as I recall running across it in some old magazines from the 1950's or early 60's. The Pladuska would appear to be a somewhat more critical airfoil to trim . . . with the pointed nose entry, but would fly slower and provide a better glide.

Give 'em a try on your next power model.

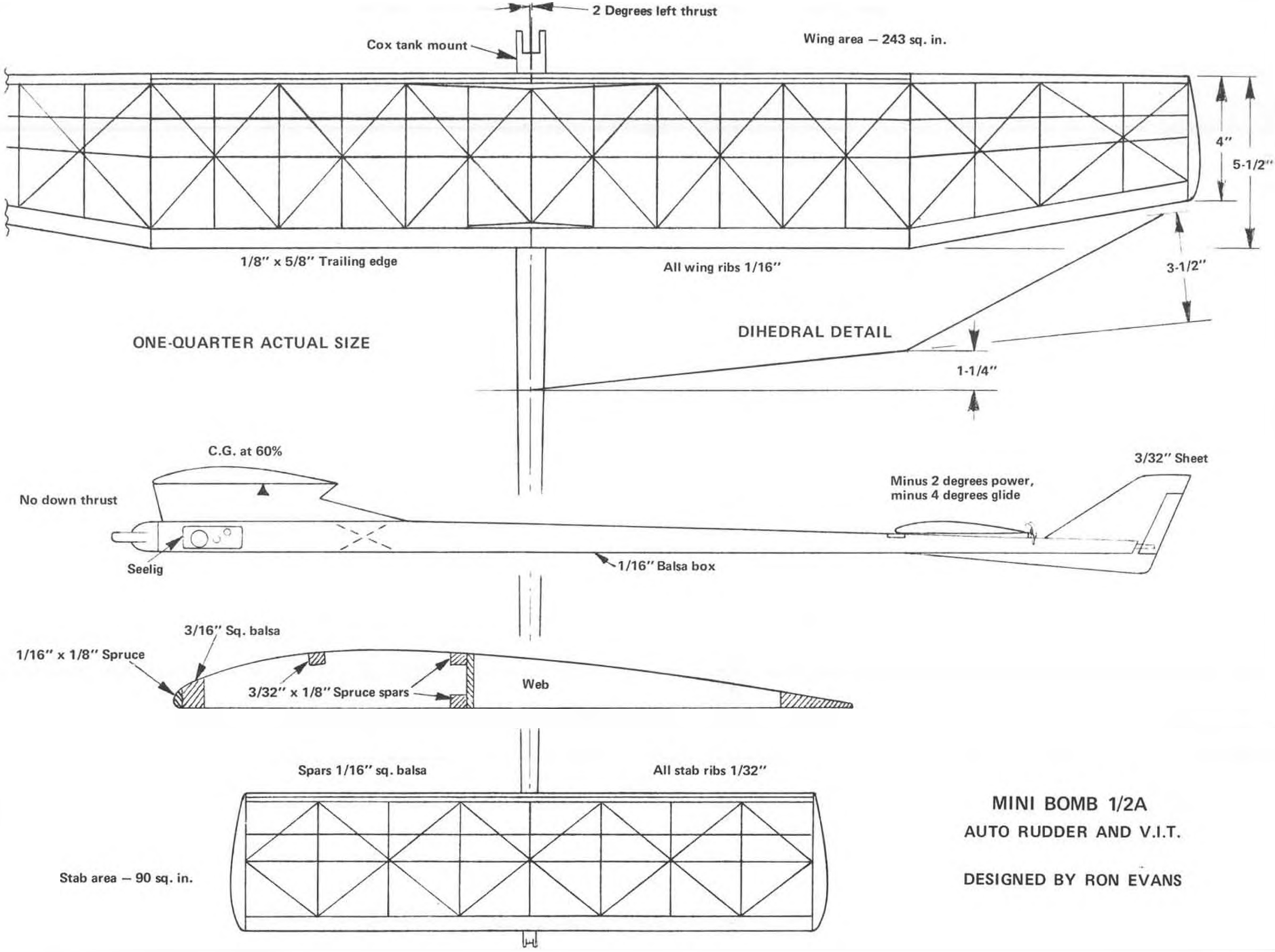
JUNE MYSTERY MODEL

While on the subject of gliders, I was doing some digging into old magazines and came across this one. Originally designed and kitted in 1942, it was immensely popular as a kit after WW II, when kits became available to the public once more. No auto surfaces or even

DARNED GOOD AIRFOILS – UNCLE REMUS (LO 234-830) and MISS MUFFET (PLADUSKA)



STATION	0	1.25	2.5	5	10	15	20	30	40	50	60	70	80	90	100
UPPER	1.7	3.3	4.2	5.2	6.4	-	7.6	7.7	7.4	6.7	5.8	4.5	3.2	1.8	0.6
LOWER	1.7	0.6	0.25	0.05	0	-	0	0	0	0	0	0	0	0	0
UPPER	0.8	-	3.15	4.5	6.4	7.8	8.8	9.7	9.6	8.8	7.6	6.0	4.4	2.4	0
LOWER	0.8	-	0.1	0	0.1	0.4	0.7	1.4	2.0	2.2	2.0	1.7	1.1	0.55	0



MINI BOMB 1/2A

AUTO RUDDER AND V.I.T.

DESIGNED BY RON EVANS

Jim Walters shows off his gliders, and his model box, including the A/2 wing which had the signatures of many of the World Champs competitos written on it.

dethermalizers were used in those days, in fact, the position of the stabilizer being what it was, the possibilities of adding a d.t. system were indeed remote, but many, many were built and flown . . . and lost.

If you know the name of the design, drop Bill a line . . . he'll send you a reward, if you're first in line.

NEW PRODUCTS FOR FREE FLIGHTERS

Last month, I extolled the virtues of the Japanese tissue I had received from Blue Ridge Models (P.O. Box 9188, Asheville, N.C. 28805), and this month I'd like to mention a few kind words about their kit of the Coupe de Ville, a combination Coupe-Unlimited model. This is a complete kit, with pre-formed prop blades, including hub tubes; machine cut and sanded ribs; complete plans, with an explanatory instruction booklet which takes you from A through Z with the model. We have the kit prepared for construction and I hope to have a builders/fliers report on the model in the near future. The cost is $12.50 post paid. A good price for the product . . . well worth it.

Zaic Yearbooks: I know, they've been around for years, but have you read them or do you have them? AMA is offering reprints of some of the older ones, and I recently received my set from them. The problem is that there is so much interesting information and history included in them that it is difficult to put them down, so the building and flying suffers. The cost per book begins at $1.50 and goes up to around $3.50 or so. A bargain at twice the price.

Cox Conquest .15: This is a beautiful engine. I received mine just last week direct from Cox and I am impressed. Not only does it look good, it performs

Ron Davis shows how his system works. "You pull the middle string down, and the Nordic goes 'round and 'round . . ."

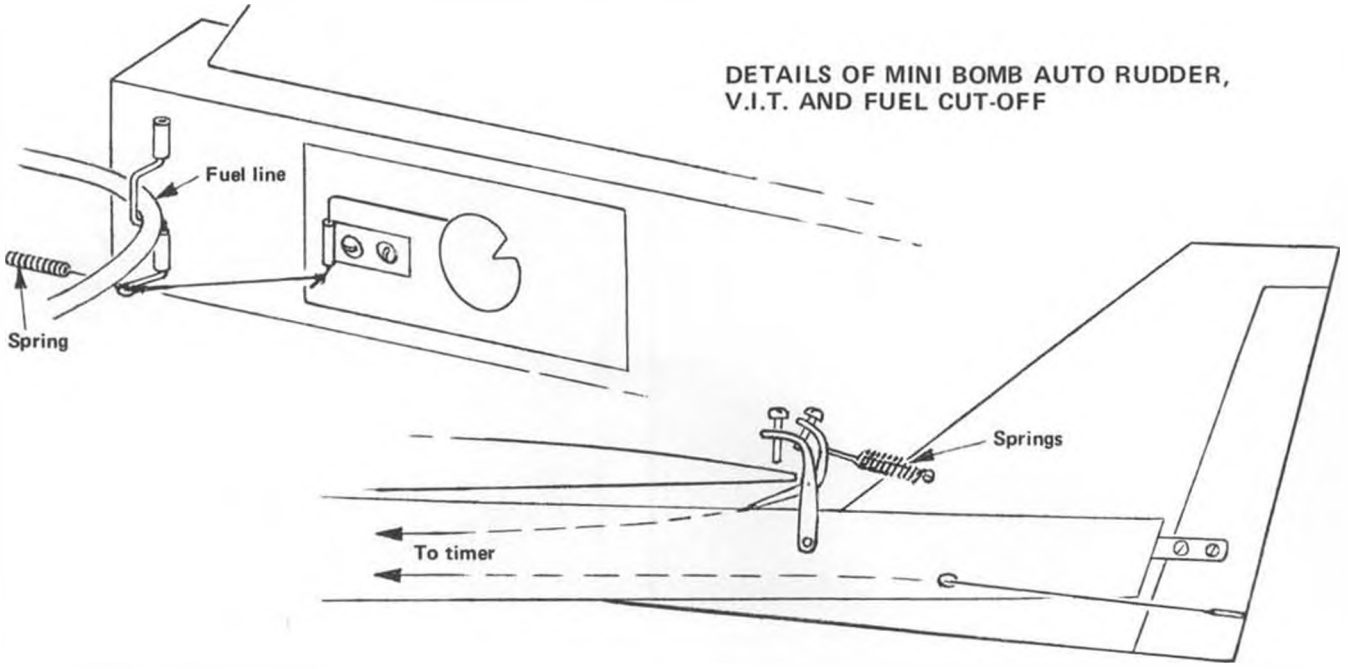
well . . . equal to the Rossi, in my opinion . . . and appears to be less sensitive to all of the little changes in atmosphere that has plagued my Rossis. I haven't yet figured out how to attach my Kerr engine brake, but someone will, I'm sure, and then maybe I can get back to flying what was once my most favorite event. The engine is well worth the price . . . buy it, you won't be dissatisfied.

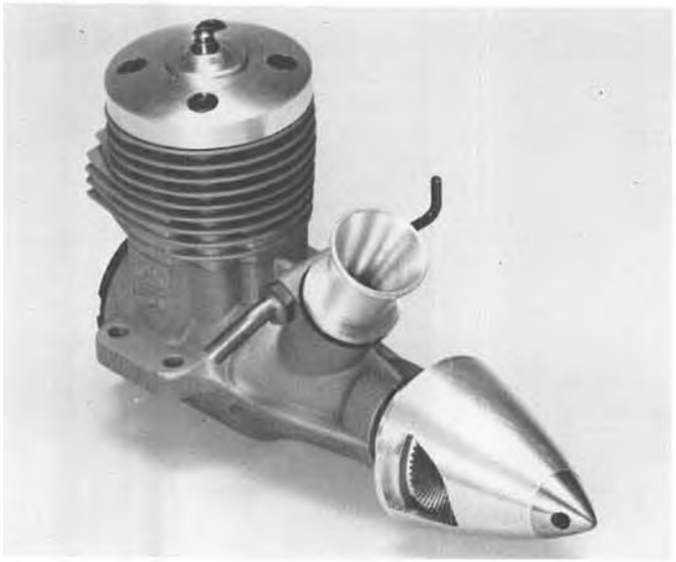
CHANGE IN FAI WORLD CHAMPIONSHIPS CYCLE

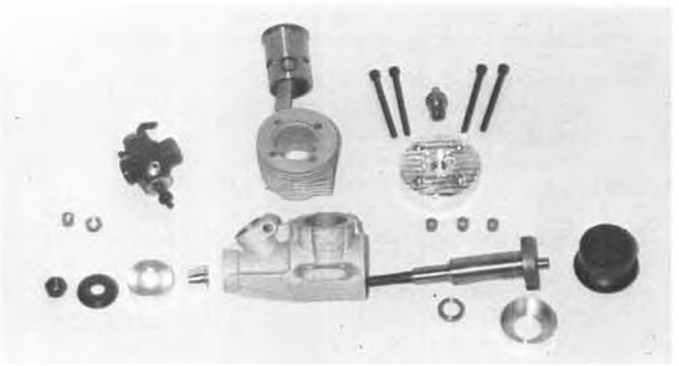
I just received word yesterday that the W/C will be going to a 3 year cycle, instead of the current every other year. What this means is that FAI F.F. World Championships will not be held until

Continued on page 71

DETAILS OF MINI BOMB AUTO RUDDER, V.I.T. AND FUEL CUT-OFF







The Cox .15 F/F-C/L and R/C versions, shown assembled and disassembled. Both will be seen a lot on the competition trails this summer.

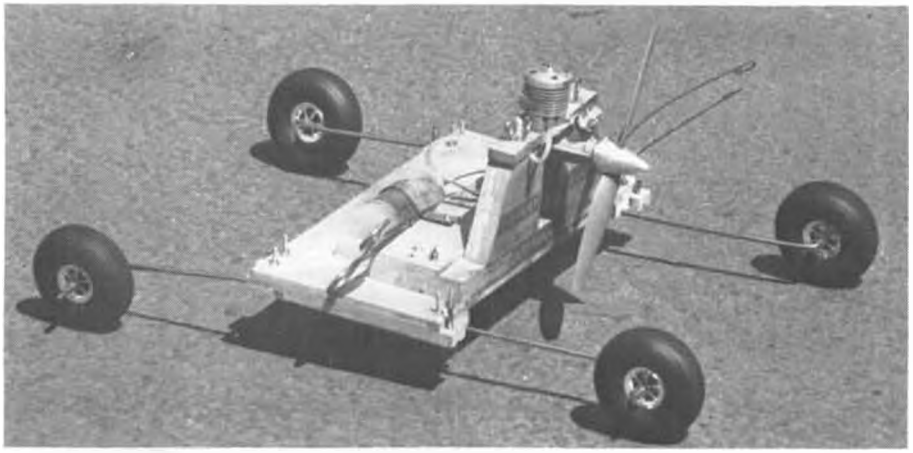
PRODUCT$ IN U$E

A report on the anxiously awaited COX .15, done in a slightly different way than most engine reviews . . . by JEAN ANDREWS.

• (Note: The following is the translation of a scroll found written on .0015 brass shim stock during an archeological dig near what is now the "Kitty Litter" factory in Taft, Calif. The scroll is believed to be the work of a scribe Thermalia, of the tribe known from other sources as Faiimites. Their king, Dustdevilia, and his queen, Bongfield, led his tribe through this inhospitable area for many summers, for certain mysterious rites of which we still know little. Some followers of this mystic cult survive into modern times, but investigative questioning of these cultists reveals little; the subjects of the questioning seemingly intent on alternatively staring into the blazing summer sky, or hurling small noisy colorful machines into the air and then pursuing them across the desert, exhorting the machine to remain aloft.)

"Hearken ye who venture into areas far from things which comfort man! Hail ye who scorn trees, and grass, and cooling breezes, and procelain toilets! Take heart! Though the Mighty Santaana engine has fallen before the wrath of the Romans, and though thy events be taken over by motori from across the sea, brought to your land of heat and blistered tongues, and though the heads of the faithful bow before this onslaught and suffer abominations of broken parts and burst fuel lines; Yet I say unto you, as night follows day, as lift follows downer, as motorcycle follows airplane; There will come out of the village of Santaana a New Motor, conceived of all things which are new, and made of such a metal that the Mighty tribes of Rossivites and Supertigerians will flee before it as rabbits before the coyote. Hail the New! Hail the Mighty! Smite the false prophets of the imported engine, and let the Coors runneth over: Yea, verily, the artisans of the village of Santaana will be Greatly Honored, and great will be the songs of praise, and many will be the points of the followers of this new Thing which they have wrought."

Continued on page 62



Jean Andrews' version of a very mobile engine test stand. Not a bad idea for checking various fuel, prop, and plug combinations. Just make sure it is well staked down!

Doug Joyce and his 1/2A Li' Lightning at the 1975 Nationals in Lake Charles.

Li' Lightning

By DOUG JOYCE

This is an "it went thattaway" design that is a top competition machine. It has been built in many sizes, and is well tested and refined.

Li' Lightning was designed primarily as a simple-to-build plane to introduce modelers to a fully-developed canard arrangement. This is not an experimental, one-of-a-kind canard, but a fully-developed plane capable of competition, with innovations in aerodynamics, fuel system, and V.I.T. The design is simple and lightweight, the original being constructed in about one week and weighing in at 7 ounces, ready to fly.

Why is the Li' Lightning different from other canards? First, it is aerodynamically refined, particularly the matching of the two wings with respect to airfoil and aspect ratio. The front wing has greater camber and a higher aspect ratio than the main wing, and incorporates an efficient turbulator to give good performance in the subcritical Reynolds number range in which it operates. The front wing will usually limit the glide, since it is smaller and more heavily loaded. The rear wing, being four times as large as the front wing, has the greater influence on the climb, and was designed accordingly. To minimize drag during the climb, the airfoil is thinner and has no undercamber.

Secondly, Li' Lightning was designed for competition, not as an experiment like most of my previously published designs. This plane was not intended to be different, but rather, to win meets.

The third and most important feature of Li' Lightning is its performance edge. It climbs like a plane with 290 square inches, and glides like one with 380 square inches. The unique zig-zag turbulator on the front wing was developed from the triangular turbulator design reported in Frank Pearce's article in Zaic's book (1959-60). The performance improvement provided by this turbulator is remarkable, as it not only improves the glide performance, but also greatly aids consistency of the glide trim. Once set, it is not necessary to retrim the glide, except to open or close the turn, depending on the field and the wind conditions. In addition to the practicality of this turbulator, it is also easily installed with the aid of a simple template.

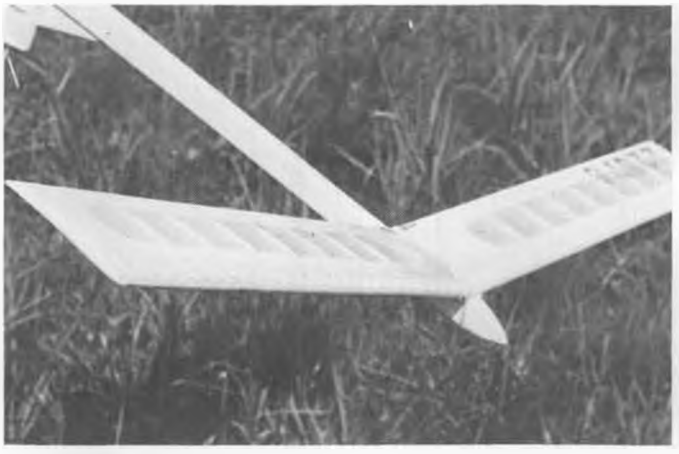
The superiority of the pen-bladder tank is unquestionable with regard to the way the engine runs. However, its use does present some unpleasant drawbacks; such as the squirt in the eye and the cramped fingers when filling the tank and getting the engine started. Also, the mess the flood-off makes of the plane as it dumps, not to mention the flooded engine for the next start, are other problems of this design.

The design of the Li' Lightning canard provides a simple solution to one of these problems. The solution is to dump the fuel overboard, rather than into the engine. This operation is just as positive as a flood-off, and the fuel is thrown clear of the plane. Also, the cut-off is much cleaner than that obtained with a pinch-off.

A conventional flood-off timer is used in this design. A second line from the tank is routed through the timer, but instead of the line going to the Venturi as per usual, it is routed downward. When the timer is actuated, the pen bladder is emptied very quickly and the engine stops. This innovation was a necessity for Li' Lightning since it was being ruined by the dousing of raw fuel on the wing and wing mounts during each flight.

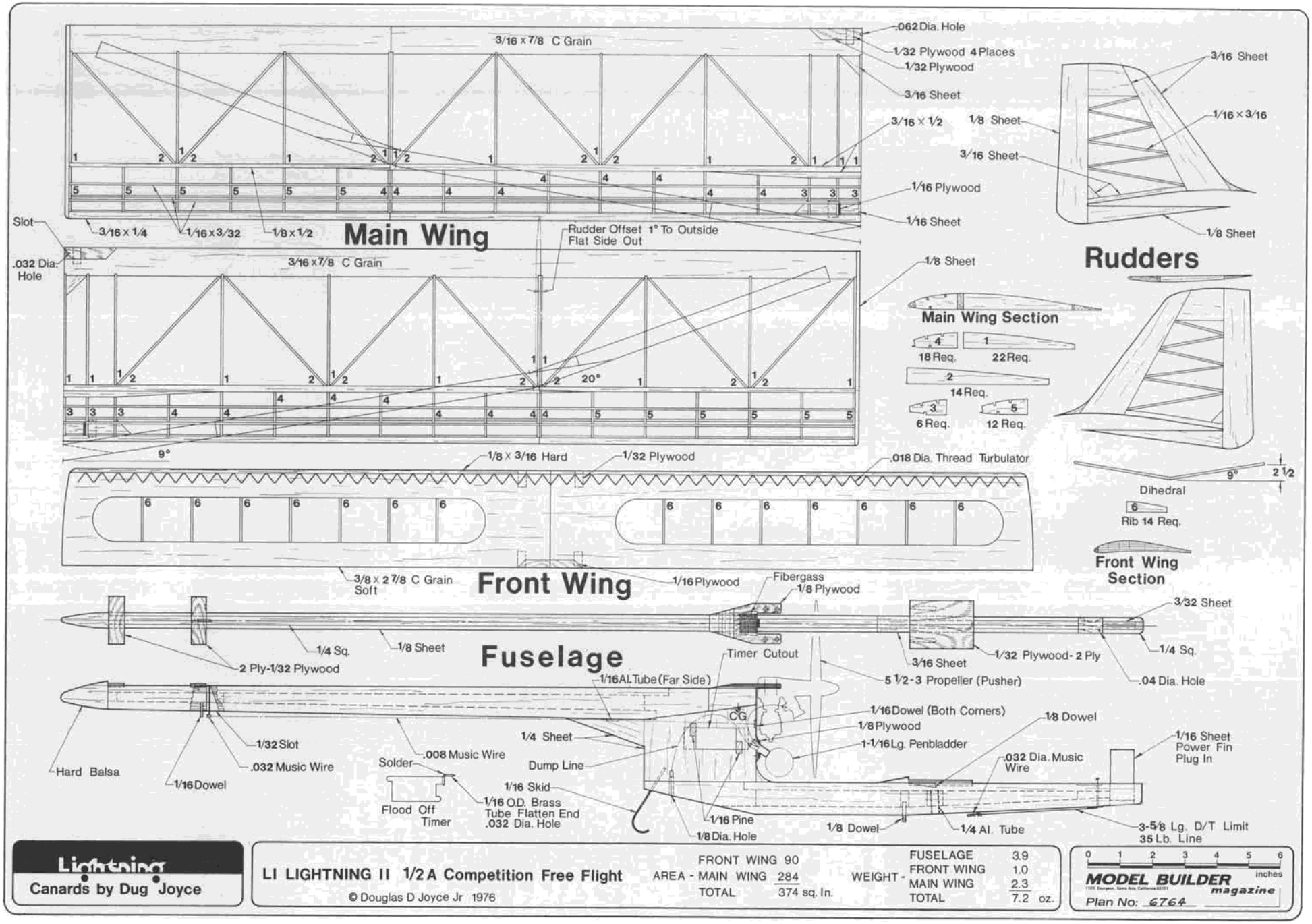
WINGS

The construction of the wings has a



Turbulator on the front wing works well in the subcritical Reynolds number range in which it operates. Note high aspect ratio.

To cut down on messiness, fuel is dumped for cut-off, rather than flooding. Hand carved prop is best, but it lasts forever.



Lightning
Canards by Dug Joyce

LI LIGHTNING II 1/2 A Competition Free Flight

AREA - FRONT WING 90, MAIN WING 284, TOTAL 374 sq. In.

WEIGHT - FUSELAGE 3.9, FRONT WING 1.0, MAIN WING 2.3, TOTAL 7.2 oz.

0 1 2 3 4 5 6 inches

MODEL BUILDER magazine

Plan No: 6764

Doug "javelins" the FAI version of his canard design at the '75 Nats. Interested (interes - TING) female spectators are his daughters.

Doug Joyce and his FAI Lightning about to make a connection. The climb is as straight up as the DT is straight down.

new twist. Namely, the main full-depth spar is built up first. In this manner, each joint may be fitted exactly with the overlapping tapered splices, thereby making the usual dihedral joint doublers unnecessary. Most of the usual stress concentrations are also eliminated, and the amount of dihedral is accurate, which is most important for a canard.

The panels of the wings are built one at a time, using Titebond in the usual manner. A simple way of making the ribs is to strip the 1/16 inch C-grained sheet to the depth of the wing spar (i.e., 1/2 inch). The rib can then be accurately cut to length and fitted, and then cut to shape.

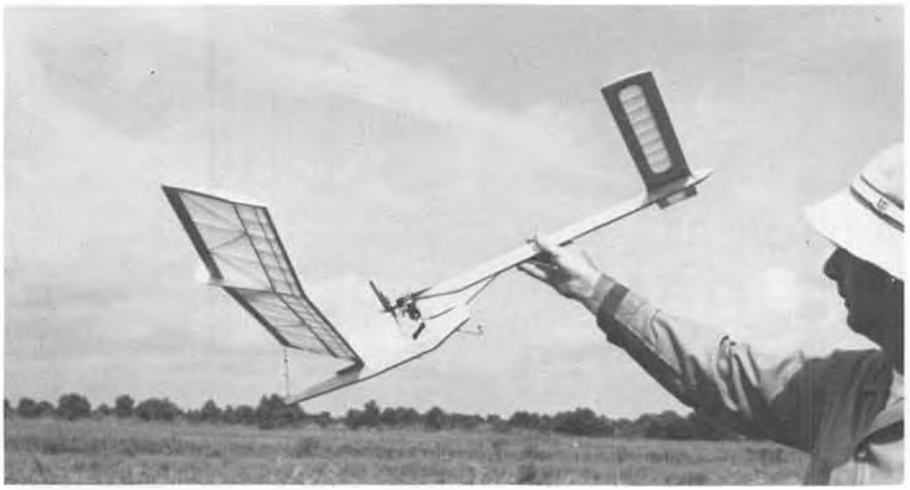
A simple trick to try when constructing the wing is to reglue each joint with Hot Stuff. This will harden the balsa around the joint, thereby increasing its strength and also waterproofing the Titebond.

RUDDER

Build the rudders of light balsa. Assemble the outlines using Hot Stuff. Add the diagonal rib unshaped, but carefully cut to length, starting at the top. When shaping the rudders, remember that they are flat on one side and must be shaped both right and left-handed. Before shaping, Hot Stuff all joints on the plan side. Shape the airfoil with a large sanding block, giving the rudder a slight taper toward the tip. Cover and dope the airfoil, and glue it to the wing upon completion. Set the rudder with the leading edge outward at 1^{o}, with the flat side to the outside. The sub-rudders should be straight.

FRONT WING

For the front wing, select very light C-grain wood (less than 2-1/2 ounces for a 3/8 x 3 x 36 inch piece). Trim the wood to the proper width, squaring both edges. Glue on the hard balsa leading edge. Carve the airfoil, using a template for the leading 7/8 inch. Now remove the two cut-out sections and add the ribs. Cut the wing at the dihedral break, and sand the joint to a 9^{o} angle. Apply three coats of Titebond to the joint. Make certain that the dihedral is as shown on the plan, as it affects the directional stability of the plane. The turbulator is then added after the covering and doping are completed.



That's right, it's the main wing that pops up for the DT. The twin .010 Tee Dee version took first in Cargo.

For the turbulator, construct a template from a 15 inch piece of 1/8 x 1/4 hard balsa. Mark the balsa strip in 1/4 inch increments with a ball point pen. Pin the template to the upper surface of the front wing so that it is 5/32 of an inch back from the leading edge. Place a diagonal pattern of pins on the wing. Remove the template and repeat the procedure on the other wing panel. Zig-zag heavy button thread, starting at the tip. Apply four coats of dope to the thread immediately. Remove the pins just before the final coat dries.

FUSELAGE

Construction of the fuselage begins with the center ply. The filler pieces of 3/32 sheet for the power fin slot will be added after the 1/8 inch sheet sides are epoxied to the center ply.

The wing platforms can be made using either two laminates of 1/32 plywood or 1/16 plywood joined at the center. The laminate is better, and can easily be made with a pine form. However, either choice should be acceptable.

The form must be the exact size of the platform, i.e., 3 x 1-1/2. This enables the laminates, which are also this same size, to be centered as the clamps are tightened.

After drying overnight, cut the laminates into three sections and glue them to the fuselage. Be sure to reglue the platforms with Hot Stuff.

ADJUSTING PROCEDURES

The climb pattern and launch of the Li' Lightning should be very steep, with just a slight turn to give a good transition. The glide circle can be to the operator's liking, from very tight to loose, since the plane's performance is not sensitive to the glide speed. The climb angle can be adjusted with incidence, and the climb pattern with the power fin. Adjust the glide trim with ballast, and the turn with front wing tilt. No warp in either wing is necessary.

The climbing pattern of Li' Lightning, however, is sensitive to incidence. Therefore, use IBM cards for rough adjustment and paper for the final trim. Glue the shims on the seat of the rear wing. After final adjustments are made,

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A LOOK AT MODEL ROCKETRY

By DOUGLAS PRATT . . .

• Many spectators attending their first model rocket meet are very surprised to see an offical walking around the field with several cartons of eggs, distributing them to the contestants. What, they wonder, is going on? Perhaps the farmer who has lent them the flying field is also providing lunch?

Actually, it's part of a very popular rocketry competition event: egglofting. The idea of the event is to fly an egg (or two) as a totally-enclosed payload. The model that achieves the greatest altitude without breaking the egg is the winner. Now before you laugh, let me explain that the egg is intended to simulate a delicate biological payload, like a mouse or an astronaut. Using eggs is much cheaper and more humane. But it still isn't easy!

To begin with, a rocket expressly designed for altitude is going to be long and thin, and not only is it difficult to figure out how to get the egg into such a model, it's also difficult to get the parachute out. On the other hand, a big, fat rocket won't get much altitude. So, as in most other events, a trade-off is involved; the ideal design lies between the two extremes.

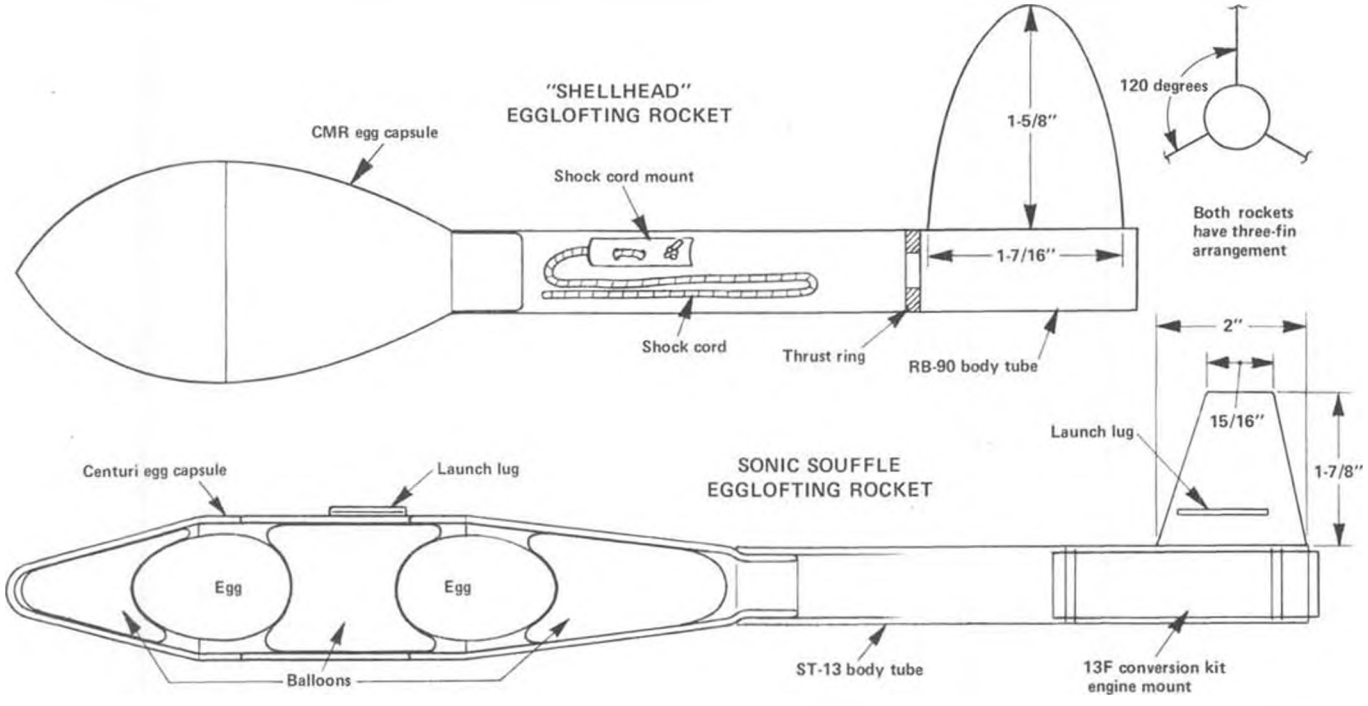
The egg is larger in diameter than most commonly-used body tubes. Two approaches suggest themselve; a large-diameter payload section at the front with a reverse transition down to a smaller tube, and a constant-diameter rocket shaped something like a teardrop, with a boat-tail at the engine end. The payload section idea is the standard, but controversy persists, especially since a design of the second type just broke a national record in Mercury Dual Eggloft.

According to the rules, the egg must be a Grade A Medium hen's egg (No fair sneaking in the hummingbirds.). The rockets may be staged or powered by a cluster of engines, as long as the total power of all engines does not exceed the limits of the competition class. The classes established in egglofting are coded with names that indicate the size of engine (see Fig. 1).

Any rocket enclosing an egg is going to be heavier than normal. This means that the engine or engine stack selected must be able to lift the whole thing, and get it going fast enough for its air surfaces to stabilize the flight. For example, an FSI D20 is ideal for Pigeon (or for a booster stage in Pigeon or Ostrich), where a D4 or D6 wouldn't be capable of sustaining a vertical flight. In fact, the last time I saw a D6 used in eggloft (as a single stage, that is) the bird seemed to have been inspired by an ICBM; it arced over and pranged into my tool box! I can still smell it on wet days.

Since two-stage designs are allowed, you have the chance to optimize the thrust programming of the motor stack. The ideal programming is a quick kick at liftoff to get the model moving, and a relatively long "sustainer" thrust to build up momentum. One winning flight I saw not long ago used a D20-0 staged to a B6-6. Since the D20 has a total impulse of 15 Newton/seconds and the B6 has a 5 nt/sec., the total impulse of the motor stack allowed the model to fly in Pigeon classes. At ignition, the D20 deliverd about 10 lbs of thrust, and the model accelerated quickly. The D20 was burned out at about 80 feet, and the B6 cut in. The long sustainer thrust (2.4 seconds) of the B6 carried the model up to 150 feet, and the model's momentum carried it up the rest of the way. Parachute ejection was at 300 feet, after the B6's 6-second delay train had performed.

The parachute should ideally eject at the top of the flight; in any case, it must eject when the model is moving slowly. This lessens the shock of opening and reduces the chance of shredding the chute. You are forbidden to catch the model . . . sorry, it has to hit the



ground. There seems to be some sort of magnetic attraction between payload capsules and paved driveways.

Cloth parachutes are much stronger than plastic, and should always be used in large models. Their drawbacks are that they are heavier than plastic parachutes, and that they cannot be fitted into smaller body tubes. If you use plastic, here's a tip to strengthen the chute at the weak point . . . the connection between the plastic canopy and the shroud lines. Take the adhesive tape strip supplied with the chute, and stick it to a corner of the canopy. Using a *1/8 inch or smaller* hole punch, punch a hole in the center of the strip, through the canopy. Thread the shroud line through it and tie the line. A shroud line attached this way has to tear out a hunk of the plastic to break free, rather than just pulling out from underneath the adhesive tape strip.

When packing the chute in the model, use plenty of recovery wadding. A chute that gets a hole melted in it by the ejection charge will result in an embarrassing and sticky failure.

Two companies have excellent payload capsules on the market designed especially for egglofting. Centuri Engineering sells the one used in the "Sonic Souffle" design. It's tough, lightweight plastic with a long, smooth transition that fits their ST-13 tube. You can increase the size of the payload compartment by adding more tube between the transistion and the nose cone.

Competition Model Rockets sells a series of super-deluxe egg capsules, one of which is shown on the "Shellhead" design. They are an efficient teardrop shape, and come in sizes to fit all CMR tubes, as well as sizes for Single or Dual events. They fit the egg like a glove, and seem to render it practically indestructable.

The two designs shown just about cover the range of engines used in eggloft. Some variations are possible; it's easy to construct a booster stage for one or the other to permit a different motor stack. In fact, that's the best way to optimize the "Shellhead;" the US record is held by a similar 2-stage model, which used a D20-0 staged to a B14-7 in Pigeon class.

"Shellhead" is shown with parts for FSI D20 engines. If smaller-diameter engines are to be used, use CMR RB-77 tube for the main body and order an egg capsule to fit this tube. Cut the fins from 1/16 plywood and round the edges. Sand them until they are very smooth. Mark the body tube with lines in each fin position. Run a line of white glue along the root edge of each fin. Press the fin along the alignment line, checking to be certain that it is perpendicular to the body tube and straight. Remove the fin, leaving a line of glue on the tube in the correct position. Let this dry for about 10 minutes, then spread a very light line of glue along the fin root edge. Press the fin in place. This technique, called "double-gluing," forms a much stronger bond between the fin and the body; another advantage is the fact that the glue sets the fin in place more quickly, so you don't have to hold it as long. Once the tack layer of glue is completely dry on all three fins, form a fillet along the root edges of the fins by running glue along the fin-body joint and wiping it with your finger.

Mark an engine casing of the size you plan to use 1/4 inch from the nozzle end. Spread a light line of glue around the inside of the back end of the main body tube. Using the engine casing, push the thrust ring into the tube until a 1/4 inch of the casing protrudes.

Thread a shock cord mount with a 4 foot length of FSI shock cord, and knot the end as shown. Glue this down inside the top end of the body tube, far enough so that it doesn't obstruct the nose cone when it is inserted.

Sand the entire model lightly, and apply a coat of sanding sealer. Sand this coat and repeat. Spray one or two light coats of flat white, and follow with a coat of a good, bright flourescent paint. Assemble the payload capsule according to the instructions included; do the same thing with the "pop" launch lug.

All parts for the Shellhead can be ordered from Competition Model Rockets, Box 7022, Alexandria, Virginia 22307, and Flight Systems, Inc., 9300 East 68th St., Raytown, MO 64133.

The "Sonic Souffle" is designed for Ostrich and Roc eggloft, and can easily be set up for either Mercury or Gemini Dual Eggloft. It is designed for either E60 or F100 engines. To use E60s, pick up the EMA-60 adapter from FSI; it's lightweight and slips in and out with no trouble.

Assemble the payload capsule as shown in its instructions. Mount the shock cord in the same way as with the

Shellhead, but use at least 4 feet of shock cord. Assemble the 13F Conversion kit according to its instructions, and mount it in the rear of the main body tube.

Cut three fins from 1/8 in. plywood. Sand the edges round, and lightly sand the entire fin unitl it is smooth to the touch. Mount the fins, using the "double-gluing" method described earlier. Once they have dried, fillet them in the same manner, but do it at least twice to form a really strong fillet. Note that the launch lug is attached partly out on one fin; this is so that it can match up with the lug on the payload capsule. Sight along the tube to be sure that the lugs are aligned with each other, and fillet them, too. Quarter inch launch lugs are recommended, and so is an LP-2B Heavy Duty Launcher; those little 1/8 in. rods can sway a lot with a heavy model!

The Sonic Souffle can easily take a 24 inch nylon parachute, and if the eggs are cushioned with partly-inflated ballons as shown, you'll find that you never have a sticky mess on your hands. Just to be sure, though, stick each egg in a small plastic bag before inserting into the payload capsule. All parts for the model can be obtained either from FSI or from Centuri Engineering, Box 1988, Phoenix, AZ 85001.

The logical next step is to take them out and fly them in a contest. Get in touch with the National Association of Rocketry, Box 275, New Providence, New Jersey 07974. They'll send you a copy of the *Model Rocketeer*, their monthly magazine, with complete information and a calendar of events; they can also send you names and addresses of rocket clubs in your area. Good luck, and I hope to see you someday as a part of the legion of model rocketeers that go around the country, gleefully spattering egg yolks across the landscape.

EGGLOFTING
COMPETITION CLASSES

Class	Power Limit
Single eggloft (one egg as payload)	
Robin	10 newton/seconds (C engine)
Pigeon	20 newton/seconds (D engine)
Ostrich	40 newton/seconds (E engine)
Roc	80 newton/seconds (F engine)
Dual egglofting (two eggs as payload)	
Mercury	40 newton/seconds (E engine)
Gemini	80 newton/seconds (F engine)

"Shellhead" PARTS LIST
1 RB-90 9" length (CMR)
1 RB-90 size Egg Capsule (CMR)
1 RB-90 thrust ring (CMR)
1 SCM-6 shock cord mount (FSI)
3' SC-1 Shock Cord (FSI)
plywood for fins (CMR)
1 36" plastic parachute kit (CMR)
1 "Pop" launch lug kit with standoff (CMR)

"Sonic Souffle" PARTS LIST
1 12" length ST-13 body tube (Centuri)
Egg Capsule (Centuri)
1 SCM-6 Shock Cord Mount (FSI)
1 13F Conversion Kit (FSI)
4' Shock Cord (FSI)
1 NP-24 nylon parachute (FSI) •

Choppers .... *Continued from page 27*

of his workshop!

We played around with it for awhile and made a few corrections here and there, but there was absolutely no doubt that the electric chopper is a practical possibility. Of course, much work remains, particularly in matching the tail rotor speed control to the torque of the main rotor blades through mixing levers and speed control pots. The next steps are to increase cyclic sensitivity with lighter stabilizer paddles, and perhaps going to more conventional solid rotor blades with higher aspect ratios. The main drive will probably be changed back to a gear drive, since the timing belts take too much energy. Here are a few of the "new" specs: Overall weight is 4-1/2 lbs. Main rotor diameter is 48 inches, and it is driven at 1000 rpm by 14:1 ratio of motor to blades. The fuselage was redesigned to reduce total plywood weight and to provide better access to components. Tail rotor spins at approximately 10,000 rpm with plastic 6-3 prop. Control data can be seen in the photos. More later!

VIBRATION PROBLEMS?

Lately, I've been getting lots of calls

from modellers who are plagued with vibration problems in their choppers, so I'll put a few words together on that subject. I don't suppose there are many experts in this area, and I certainly am not one of them, however, we did turn-over a few rocks and discovered several common problems which are easy to solve.

To begin, vibration can be caused by any part on the helicopter that pulses back and forth (like the piston in the engine) or rotates (like the rotor blades). The vibration can be a very minor annoyance or one which creates disturbing control problems. *Any* vibration will subject all components, especially the radios, to the possibility of fatique and/or ultimate failure, and must be minimized to increase your safety factor.

Usually vibration shows up as a visible oscillation of the main landing gear struts or skids. Since the gear is shock mounted and extends outward a considerable distance, it will pick up the smallest vibration and amplify it to the point of being visibly recognizable. Another visible effect of vibration is "tail-bounce," where the tail boom is seen vibrating up and down at a rapid rate. If either of these two conditions exist, then you should investigate further to see if you can reduce it to a milder action.

Bear in mind, when troubleshooting vibration, that every component in the craft has a natural resonant frequency of its own. This characteristic is better demonstrated by realizing that musical tones are produced by "plucking" the various sized strings of a guitar or piano . . . the small strings vibrate at very high frequencies, while the larger strings vibrate at lower frequencies. If any helicopter component is subjected to a repetitive vibration which is the same as its natural resonant frequency, the component will vibrate like crazy!! The landing gear is a likely candidate for this type of vibration. Many times, the gear will vibrate excessively until the modeller changes the gear weight, size, or method of attachment to the fuselage.

Perhaps the best way to begin is to locate the primary source of vibration, then minimize or eliminate the cause. Following is a list of components that are the most likely to be the primary source, and they are listed in approximate order of priority:

1. Main rotor blade balance.
2. Tail rotor blade balance.
3. Main rotor shaft bent.
4. Tail rotor shaft bent
5. Tail rotor drive shaft not running true
6. Clutch out of balance.
7. Engine out of balance.
8. Misc., such as airfoil differences, unequal distribution of rotating push-rods to main rotor head, stabilizer bars, rotor head stops, etc.

Usually, an extreme condition can easily be detected on the ground and that's where we start. With engine running at just below lift-off speed, check where you can best "see" the effect of vibration . . . as you make changes or adjust different components, you should refer back to this point and notice if any change in the vibration occurs. When and if it ceases or definitely diminishes, you have found the troublesome area and should examine that component carefully.

The easiest first step is to check the tail rotor balance by removing the tail rotor blades and running the engine up to lift-off rpm. Be sure to hold the tail boom to prevent rotation of the chopper! Did the vibration diminish or stop? If so, your tail blades are probably out of balance and must be more carefully balanced. Perhaps the tail blade holders are improperly set, or warped so that one blade has a greater angle of attack than the other. If the vibration didn't change one bit, then proceed with the next step.

Next, remove the tail rotor drive shaft and repeat the above procedure. If the vibration is less than before, you had better check the drive shaft for straightness or bends. Roll it on a smooth table to see if it is true. Make sure the attach fittings on both ends of the shaft clamp it true. Does the shaft run in a straight line between the main

transmission and tail rotor transmission? Is the shaft supported adequately in the tail boom? Is it possible the tail drive shaft is oscillating (with natural resonant frequency) because of inadaquate support mid-way down the shaft? Carefully check the tail rotor main shaft for accuracy . . . use a fixed pointer or "finder" near the end while you rotate the shaft. If all this does not produce good results, let's keep disconnecting parts and continue the search.

The next area of investigation should be the main rotor head and blades. Before removing the blades (which will require re-assembly and balancing) I would suggest you first remove the entire main rotor assembly and check the main shaft for even the slightest wobble. It should run perfectly true when checked with a "finder". Try running the engine now with main rotor removed and tail drive removed . . . if vibration is still present, about the only place left is the clutch, transmission or engine, and there isn't too much you can do in this area except examine carefully for broken or missing parts or to replace the engine with one which runs smoother. If the vibration disappeared with main rotor head removed, then you will have to concentrate on the main rotor blades and check them for perfect balance, alignment, and tracking.

It cannot be emphasied too strongly that the main blades cause more vibration problems than any other part in the 'chopper. Sure, you did a good job of balancing, but somewhere down the line, something happened to change all of that (a hard landing perhaps?). The smoothest running blades are those which have been machine-formed and have a uniform airfoil for equal lift distribution. Equally important is the fact that the blades must be equal in weight *and* have identical center of gravities.

If you're not familiar with the Kavan system of balancing the blades for C.G. and weight, I would suggest you talk to a knowledgeable pilot and see how this is accomplished. Once the individual blades are perfectly matched to each other, they may be installed on the main rotor head and balanced together as a unit. Blade tracking is very important from both vibration and efficiency viewpoints . . . if the blades are much more than an 1/8 inch "out of track", you will have vibration and your control efficiency will drop rapidly. Spend plenty of time here and do a good job for best results. Once balanced and properly tracked, the blades must be periodically checked, since a hard landing can easily bend the blade holders and cause uneven running.

As a final note, remember to check the stabilizer blades for perfect balance and angle of attack. Also check the stabilizer rod for bends or twists . . . it should be at exactly right angles to the main rotor blades. Measure it accurately, don't guess or makeshift! Finally, be aware that most all helicopters exhibit a characteristic known as ground resonance, wherein the spinning rotor blades can create a force or push on the body which is transmitted to the ground through the landing gear. As the landing gear springs back when the force is removed, it applies a returning force back into the main rotor blades. Now here is where the trouble develops . . . the main rotor is acting like a giant gyroscope and any applied force causes it to tilt 90 degrees away from the point where the force was applied. This new direction of tilt creates *another* push on the ground at a *different* point than before, which creates another tilt of the rotor, and so forth around the circle.

To sum it up, once started, ground resonance causes the helicopter to bounce and vibrate on the ground and often builds up to the point of destruction of the entire machine. I mention this so that you won't be tempted to exercise the cyclic controls to extreme positions while the rotor is turning and the model is setting on the ground. Teetering rotor heads, during cyclic extremes, may eventually hit the limit of their travel or compress the rubber stops to the extent that a vibration is transmitted to the main rotor shaft "once per revolution". This one per rev can easily set up ground resonance and appear to be an extreme vibration. The cure is to use minimum control inputs while on the ground and thus avoid hitting the stops. Once airborne, ground resonance cannot exist.

FINAL APPROACH

Well, there you have it. We would appreciate getting letters telling of your experiences, problems and solutions so that we might pass them on to the other modellers. Good quality photos of your ideas and helicopters (even your workshop) will receive every consideration for publication. BCNU next month. ●

Cox .15 . . . . . *Continued from page 54*

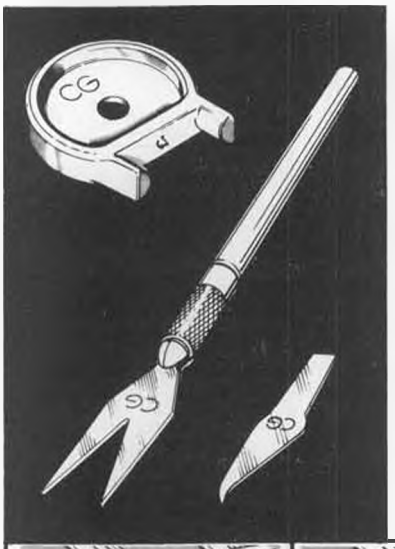
After a considerable wait, the new Cox Conquest 15 is ready for the market, and should be getting on your dealers' shelves about the time this review sees print. This review is not going to be on a par with those of other writers, who will give many charts, graphs, and metallurgy analyses. Instead, I hope to pass on what I have learned about the motor.

Construction: The Cox Conquest .15 is a complete departure from what we are used to seeing from the Cox factory. The first impression of the engine is that it is a highly-refined piece of racing machinery, and not a toy. Looking down the intake passage and seeing the amount

CARL GOLDBERG

NEW PRODUCTS FOR '76

HINGE SLOTTING KIT



Here at last is a uniquely simply Hinge Slotting System - makes hinge slots so easy you'll wish you'd had it years ago! First, the Hinge - Line Marker, developed from a great suggestion by modeler Mike Corbett. Takes trailing edges, etc., 3/16" to 9/16" thick, and scribes an accurate center-line in seconds! Does it even if the trailing edge is tapered! No measuring needed!

Next, the Slotting Fork pierces a slot the correct thickness and width in 2 to 5 seconds! So easy you just won't believe it!

And to slot a wide solid balsa stab or fin, you first use the Fork, then clean out the chips with the Slotting Hook!

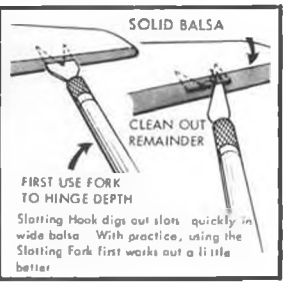
Complete Hinge Slotting Kit including special aluminum handle **HSK-1 $1.95**

Replacement Parts available

Hinge-Line Marker	**HM-1**	**50¢**
Slotting Fork blade	**SF-1**	**50¢**
Slotting Hook Blade	**SH-1**	**50¢**

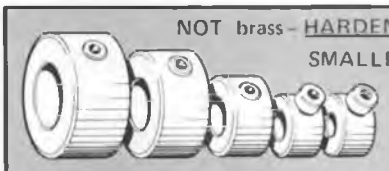
Tilt Marker so Guide Pegs touch the wood, then lightly pass the Marker back and forth. Point will scribe center-line.

For normal trailing edges, etc., line up Slotting Fork on center line and push through. Use end of handle to press in a recess for hinge knuckle.



Slotting Hook digs out slots quickly in wide balsa. With practice, using the Slotting Fork first works out a little better.

COLLARS



WC-316 WC-532, WC-180, WC-332, WC-116.

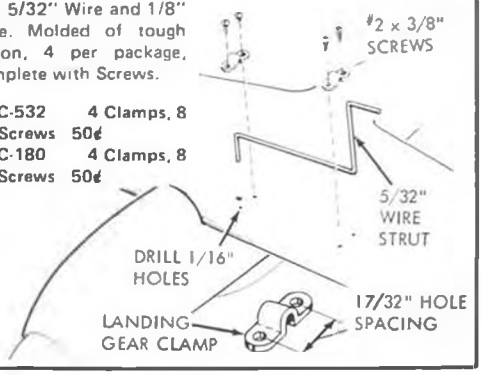
Have you ever seen a wheel come off on a hard landing, and go bouncing away? Chances are it came off because the wheel collar was brass - or even aluminum! The soft threads just couldn't take a reasonable torque from the set screw. The new CG Collars are different – hardened steel. They're also smaller and more compact. 5 sizes from 1/16" I.D. up to 3/16".

4 Collars and Screws, any size – 89¢

LANDING GEAR CLAMPS

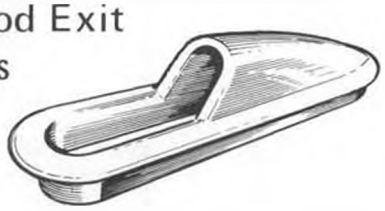
For 5/32" Wire and 1/8" Wire. Molded of tough Nylon, 4 per package, complete with Screws.

LGC-532 4 Clamps, 8 Screws **50¢**
LGC-180 4 Clamps, 8 Screws **50¢**



KLETT does it again!

BEAUTIFUL ***HOODED*** Pushrod Exit Guides

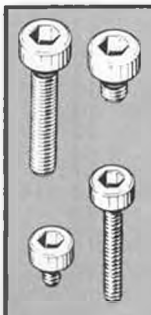


These HOODED Pushrod Exit Guides are more decorative, and help to keep dust and dirt out of your ship. 2 Sizes – for 1/16" Wire, and for 5/64" Wire. 2 per package.

For 5/64" Wire PEG1-H 2 for 69¢

For 1/16" Wire PEG2-H 2 for 69¢

SOCKET HEAD SCREWS



6-32

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6-32 x 1/2"	SH-604 49¢
6-32 x 3/4"	SH-606 49¢
6-32 x 1"	SH-608 49¢
6-32 x 1 1/4"	SH-610 69¢

4-40

4-40 x 1/8"	SH-401 49¢
4-40 x 1/2"	SH-404 49¢
4-40 x 3/4"	SH-406 49¢
4-40 x 1"	SH-408 49¢
4-40 x 1-1/4"	SH-410 69¢

Socket Head screws have long been favored by expert modelers. They are made of a higher alloy steel, and can be torqued down precisely. Now for the first time, very short and long lengths are made available in 2 popular thread sizes. 4 screws and 4 washers per set.

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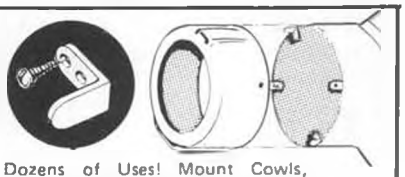

Dozens of Uses! Mount Cowls, Canopies, Internal Pushrod Guides, etc. Molded of Nylon, 4 per package, with Screws.

NMB-1 Four 90° Mounting Brackets, 8 Screws **50¢**

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of air the engine can ingest makes you feel sorry for any insect up to the size of a honey-bee, for it would be ingested whole! Looking at the crankshaft, the intake port has a slight "Coke-bottle" shape, to allow the large amount of material taken out of the shaft to not weaken it. The crankshaft is supported by two precision ball bearings, and is counterbalanced by three carbide-steel inserts in the counterweight, held in place by an aluminum cap.

The piston is of sintered iron, and runs in a sleeve of hardened steel. Each piston is hand-lapped to its liner, so we will continue to see piston/liner sets on the dealers shelves, rather than individual parts.

The heads on the R/C and the F/F versions are different. In the R/C version, the head is of conventional finned design, with a removable glow plug. Accordingly, it can be fitted with any R/C long plug. The R/C version will also be supplied with a Perry carburetor as standard equipment.

The F/F version has the more familiar Cox glow-head, with a trumpet-shaped combustion chamber. The head is held in place by four long Allen screws which hold an aluminum clamp down on the head, and also secure the cylinder to the crankcase.

There are differing thicknesses of paper gaskets which can be used between the cylinder and the crankcase. They are .002 and .005 thick, and can be added as necessary to fine-tune the compression ratio of the engine for differing weather conditions.

The crankcase and cylinder are of high-pressure cast aluminum, and are sand-blasted (by hand!) to enhance the appearance of the engine. The backplate is of black-anodized aluminum, and has a nipple which can be drilled out, if desired, for using the engine on crankcase pressure.

Operation: Since this test was based on the premise that the average modeler would buy the Cox 15 as his first high-performance motor, all testing was performed in situations simulating the use of the engine in actual field conditions.

We hand-started the engine for all tests. Fuels used were Cox Glow-power, Cox Racing, and Fox 40-40. We used a small Tatone bladder tank to provide fuel pressure, rather than a pacifier, (pacifier tanks are not recommended by Cox) or utilizing crankcase pressure.

To arrive at a useful approximation of the engine under flight conditions, we borrowed a trick from our old mentor, Bob Holland, and mounted the engine on an air car. This was made up of a large Easy-Just stand bolted to a sheet of plywood, with four large, soft DuBro wheels, running on a steel cable securely imbedded in asphalt. Speeds on the car averaged forty MPH, and we timed the car for acceleration and top speed for each fuel and prop combination.

Following the instructions provided with the engine, we put a few drops of fuel on the top of the piston, and a few more in the intake port. We then had a very flooded engine, which took about ten minutes of hand-propping to clear. One or two drops on the piston, and no crankcase prime, gave us the most consistent starts. The feed line from the bladder is pinched off with the fingers, and once the engine has started on the prime, we let it almost completely starve out before releasing the feed line. In this way, we were able to get consistent starts by hand-propping.

A series of runs was made on the test car after the engine was broken in. We used a series of readily-available props, such as the Cox gray plastic 8x4, Rev-Up 7x4, 7x4-1/2, and 7x5 normal and widebladed props. The Cox gray plastic 7x3 is specifically NOT RECOMMENDED for the Cox 15, as too many of them came apart under testing at the Cox factory.

Fuels used were; Cox Glow Power, Cox Racing, and Fox 40-40. With fuels any higher in nitro content than the Cox Glow Power (15%), it is *mandatory* that two head gaskets be used. Otherwise the glow plugs will burn out after about thirty seconds of running. With the Fox 40-40, which is 40% nitro, two .005 cylinder gaskets, AND two head gaskets were necessary to keep the plug from going away!

We got the best results by running a Cox gray plastic 8x4, cut down to 7-1/2x4, and Cox racing fuel. The other props gave a lot more RPM, but didn't haul the car nearly so fast, or accelerate nearly as well. This bears out what has been said before, that the Cox 15 seems to be a higher-torque engine than the imports, and will not need the high RPM and resulting wear and tear, in order to be competitive.

In Summary: This is NOT the engine for the "Average" modeller. It is a

highly-tuned piece of performance equipment, and if operated within the parameters for which it was designed, will give outstanding service. For the high-nitro fans, put them-there head gaskets under the head, or the plug won't last for one run! The biggest market for this motor will probably be in the R/C Quarter-Midget circles, where the high-torque output and power curves will match the props these fliers are accustomed to using.

In free-flight, although the engine will happily crank a 7x3-1/2 prop at 26,000 RPM, this is not the regime at which it is happiest. Its higher power output at lower RPM's mean a larger disk area and more efficiency.

Scale racers in control line will also be able to use the greater economy of the lower RPM's. For the control-liners, who have doggedly struggled through all this prose, there will be an exhaust extension pipe, about four inches long, available soon. However, there are no plans at the present time for Cox to produce a "Tuned Pipe" exhaust. Get out the lathe and start whittlin'. •

Sailing . . . . . *Continued from page 25*

This month we will take a last look at the new 50/800's which have popped out during the winter. Next month we will have a report on the Colonial 50/800 Regatta in which a goodly number of the boats are entered. We'll have a chance to look back at our old predictions and revamp our thinking.

I am getting a number of calls asking for recommendations for hulls in this formula class. At the present time, I have to know a number of things before making such a guess, but the crying need in the sport is for a boat which can be competitive, and yet have had enough homework done on it to be a successful project in the hands of a beginner. The only one I know of right now is the Soling by Vortex. The price is the probable point at which a beginner pales, but the format, quality and proven performance of the Soling is the level at which new manufacturers must aim. For the experienced skipper, general wind strength, sea states encountered, and other vessels already sailing all have to be considered. In this case, I don't take into account the problems encountered in building the boat, nor fitting out, nor basic trim and balance of the seagoing vehicle.

A more immediate source of recommendations is your own local lake. Check with the other skippers as to what they are sailing, what they like and dislike about their boats. I've never yet met a skipper who wasn't willing to talk candidly about his craft. Local weather conditions can often have a strong influence on hull choice. If you are buying your second boat and already have some experience under your belt, you should also take into

account your own sailing style. Have you the concentration necessary to continually helm and trim a lightweight, or would you rather have a more stable, heavier boat which can be set up to take herself in the required direction with a minimum of intervention?

From Bill Nielsen, in Miami, comes the Checkmate. This is the first 50/800 from Bill's board, and no amateur he, as he earns his bread and butter by designing power boats that people actually sit on!!! The Checkmate hull is a powerful one that will be most happy in a blow, and one that should be a joy to plane downwind, as the hull will greatly assist the directional stability in contrast to some of the flat-bottomed racing machines we see. There is plenty of room inside the hull for auxiliary controls. The suggested sail plan is definitely not high aspect, but this is in line with her heavy air capability and means that performance off the wind will be further enhanced by the sails. The 'glas work is very good, the molded deck has a coaming forward of the hatch, and the hatch itself is generous and placed just about amidships. Some contorting may be encountered to make rudder adjustments after the deck is down, but a small extra hatch would be easy to fit over the rudder post. (Wm. Nielsen, Box 431081, S. Miami, Fla. 33143.)

Also from Miami (no address at this time), is Chip Bullen's Liberty 76. Chip aimed at the light-to-medium range with this hull, and acknowledges that the design was an amalgamation of all the best features he has observed in other boats. As a result, depending on what angle you view the Liberty from, and depending on what boats you are familiar with, you are bound to see resemblances. I particularly enjoyed the Yankee style tumblehome which appears in the after sections, as well as the sheer lip on the hull in the manner of the EC/12's that I used to kit. The hull shape requires a two piece mold, and I'm sure that future hulls will utilize a bead of gel-coat before the two halves are mated so that the joint has the hull color right in it. This hull is quite narrow, and I would be surprised to see her plane in any but the most fresh conditions. The result is a hull form that has been given the task of keeping both wetted surface and wave making resistance to an absolute minimum.

Liberty 76 sports a single hatch with a raised lip around it. The hatch is well rounded to avoid catching a mainsheet when gybing in light air. The rudder is placed right under the transom and the bulb keel is probably the deepest currently available to balance the tall rig that Chip recommends.

The Aquilo 50 was designed by Ray Ozmun and Tom de Lombardi, and made its debut in the Sandusky area last season. Ray has promised to come to the Colonial, so we expect to get a good assessment at that meeting. While a deck does not make the boat go fast, this one looks so good that it will probably psych out the opposition before the first heat starts. This hull is quite beamy, and a maximum waterline looks like it will require an all-up displacement of about 20 pounds. Ray is building a Yankee style keel shell with a rather fat cross section, and a side area of 77 square inches not counting the bulb. With all this lateral plane it should not make much leeway. My thought would be to purposely make the boat light, count on the deep midsection for leeway prevention, and cut the keel down to a minimum area to reduce wetted surface. This hull does look like it can be custom fitted out to do well in almost any wind range. Adaptations which will undoubtedly be made should make this boat a potent competitor. Glass work is excellent. Much time must have gone into the surface finish on the plug. (Ray Ozmun, 1801 E. Perkins Ave., Sandusky, Ohio 44870.)

I will be taking our new Wind II, the son of the Wind design published a month or so ago in these pages. It is an adaptation of its father, and in tuning trials, showed great promise in company with the Bingo that won last year's ACCR. It seems that the boat likes heavy air, as we went out with a 650 square inch rig and sailed with complete control in a steady 30-35 knots during a long frontal passage. With the regatta schedule getting more and more crowded, I think we will see earlier and earlier regattas and second suit rigs will come into more common use.

Remember to send your dues into AMYA, care of Secretary Bud Salika, 3917 Sunnyside Avenue, Brookfield, IL., 60513. I will be happy to field questions either directly or with a self-addressed, stamped envelope from 7608 Gresham St., Springfield, Va. 22151, or in care of MODEL BUILDER. •

Hannan . . . . . *Continued from page 45*

PUTNAM BOOKS: A high percentage of our mail involves requests for scale reference material, especially 3-views. How important are such draw-

WACO S.R.E.

RADIO CONTROL MODEL

SPAN: 56½" LENGTH: 45 3/32" ENGINE: 40 to 60 SCALE: 1 5/8" = 1 FT.

Its hard to find words to describe the breath-taking beauty and great flight performance of this graceful and beautiful cabin bi-plane of the "Golden Thirties". If you're an R/C flyer, whether Sport or Scale, then you are bound to fall in love with this magnificient aircraft. Beautifully engineered for ease of assembly and long-lasting ruggedness; the Waco S.R.E. has loads of room for R/C equipment and scale detail, (it can also be built for control line). It's truly a joy to fly and likewise just to look at, whether on the ground or in the air. The kit's a real dandy too . . . top grade-density selected balsa, sanded to micrometer tolerance. Die cut & numbered parts make assembly swift and sure as you follow the detailed step-by-step plans and instructions that cover every phase of construction. Formed Landing Gear, Alum. Engine Mounts, Giant Scale Decals, Linkage Hardware includes Pushrods, Aileron & Elevator Horns, Bellcranks, Clevis, Connectors, etc. . . also Plastic Cowl with molded-in-place dummy engine cylinder, Wheel Pants, and much more . . .

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Peanut Scale models are rubber powered flying models scaled from real aircraft. Span is strictly limited to 13" and they may be flown indoors or outdoors. Sterling "Peanuts" are fun to build and fun to fly. Designed by experts, they are remarkably realistic in appearance and are great flyers. All material required is in the kit for both models except glue & dope (paint). In addition you need pliers, straight pins, hammer, tweezers, single edge razor blade, flat building board, Saran Wrap (or similar).

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ings to model builders? Very! In fact, in these days of hobby magazines costing as much or more than Playboy, some modelers simply refuse to buy any issue that doesn't contain at least one 3-view!

Small wonder then, that the well-known English Putnam & Company aviation books are so popular with our audience. Featuring MANY 3-view drawings, authoritative text, and hundreds of photographs, it is difficult to imagine any comprehensive enthusiast's library without at least a few of these fine volumes. Of the more than 20 available, we especially value the following:

AVRO AIRCRAFT SINCE 1908, by A.J. Jackson (58 3-views)

BRITISH AIRCRAFT 1909-1914, by Peter Lewis (108 3-views)

BRITISH CIVIL AIRCRAFT 1915-59, by A.J. Jackson (2 volumes, 188 3-views, recently superseded by a 3-volume set)

FOKKER: THE CREATIVE YEARS, by A.R. Weyl (40 3-views)

Latest to be added to the hangar archives is POLISH AIRCRAFT 1893-1939, by Jerzy B. Cynk. This magnificent 760-page tome contains over 40 3-view drawings for truly unusual subjects. If you are tired of showing up at your local model field with the same common every-day types, here is your answer . . . guaranteed to shake up the judges and fellow contestants at *any* meet!

In common with all Putnam books, very good quality of paper is employed, which does proper justice to the drawings and photographs. From an historical standpoint, there are more than a few surprises to be found. Owing to poor communications, much of the design pioneering efforts carried out in Poland are almost unknown in the United States. For instance, the V-tail configuration usually identified with Beech Aircraft Corporation, was successfully developed and flown by Jerzy Rudlicki during 1931 (Beechcraft's Johnny-come-lately version did not appear until 1944).

Another interesting revelation concerns the American Menasco in-line engines. During the "Golden Age" of air racing in the U.S., failure of these popular power-plants was frequently blamed upon the "backyard mechanics", who constructed the racers, with allusions to improper cowling design, excessive "hoppin-up" etc. But now it seems, based upon Polish experience with these engines, in direct comparison tests with others of indigenous manufacture, that the Menascos were inherently troublesome and temperamental.

Another section of "POLISH AIRCRAFT" deals with early model aircraft experiments, some of which dated back to 1893. Photos and sketches illustrate a number of true "old timers" constructed and flown prior to World War I, including a twin-pusher, single tractor, a canard, and a helicopter. Hang-gliders also occupied the attentions of some early Polish aviation pioneers during the late 1800s.

In common with experimenters the world over, lack of finances and public disinterest severely hampered progress. Add to this extreme bureaucratic interference, and it becomes all the more remarkable that aviation in Poland ever got off the ground. But such was the dedication of the men involved, that they were able to surmount even the political stupidity with which aviation seems always to have been surrounded. As an example, one Jerzy Wedrychowski managed to save the RWD firm, a private concern, from bankruptcy and nationalization, by selling six RWD 13's in Brazil, by accepting coffee as payment! Distributing the coffee himself in Poland, he was able to carry on his important work. A worthy inspiration to us all.

All current Putnam aviation books are distributed in the United States by Rowman and Littlefield, 81 Adams Drive, Totowa, New Jersey, 07512, with the exception of "GERMAN AIRCRAFT OF THE FIRST WORLD WAR", which is marketed by Doubleday. Foreign inquires may be directed to Putnam & Company, The Bodley Head, 9 Bow Street, Covent Garden, London, WC2E 7AL England.

HOW'S THAT AGAIN? The National Transportation Safety Board announced in its bulletin that is investigation of a particular plane crash in Sonoma County "was focused on uncovering the reason behind the apparently unauthorized descent of the plane to an altitude below that of the airport." (From the Bankamericard newsletter, via Russ Barrera)

LONG ARM OF COINCIDENCE

Great minds run in a common groove, according to an old saying, and it came as no surpise to learn that our resident rotorbird specialist, John Tucker, had painted his Helix R/C autogyro orange. Why? Because French 'gyro model enthusiast Georges Chaulet paints his orange, as does California rotor designer, Ray Caswell. Maybe that color as a-peel? Boooo! Hissss!

LIGHTER THAN AIR

(a movie review, sort of)

The Christian Science Monitor's critic summed it up with a succinct " 'THE HINDENBERG—yes, a disaster". It can hardly qualify as light-hearted entertainment in anybody's book . . . a depressing experience perhaps. And yet, it does offer some of the most impressive special effects and outstanding model work to be seen, which may justify seeing the film from a model builder's point of view. The 25-foot long model was described in detail by R/C Modeler

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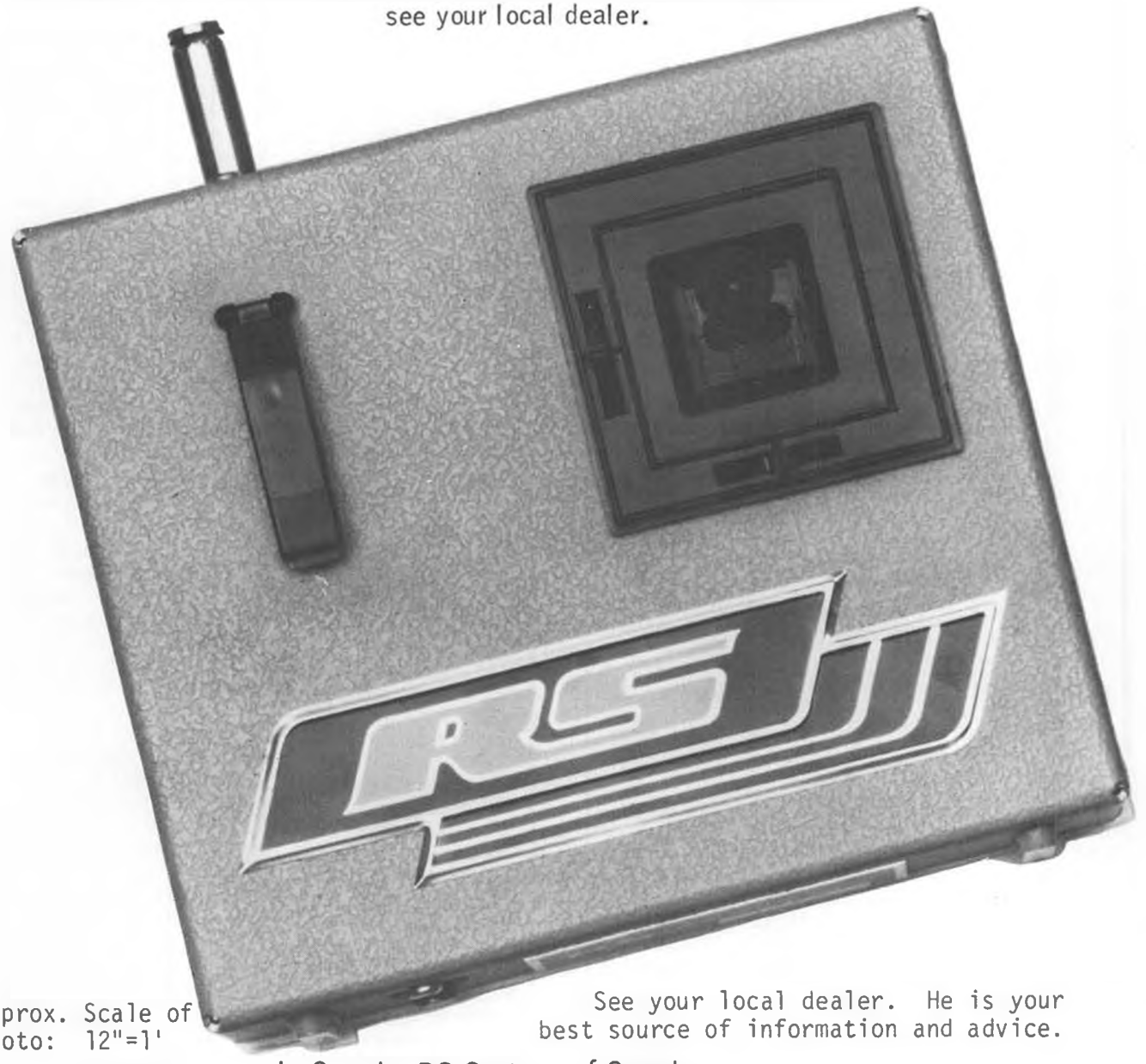

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in the June, 1975 issue. Although a non-flyer, it did feature R/C actuation of its controls, mooring lines, water ballast dump valves, lighting, etc. As for the acting, it was probably professional enough. It's just that it is difficult to shake off the "Mrs. Robinson" image of Ann Bancroft and Burgess Meredith still may remind one of his "Penquin" role in the TV Batman series.

We did enjoy the early film clips showing lighter-than-aircraft such as Santos-Dumont's pioneer efforts, not to mention the all-too-brief glimpse of the Confederate Air Force Bf-109, appropriately decked out in Spanish markings. Then too, the scenes featuring the Santa Ana blimp hangar stirred fond memories . . . of the pleasurable sessions spent flying indoor models, prior to our banishment from that splendid facility.

All in all, we'd have to say that we considered "Zeppelin" to have offered better downright entertainment value. But then, it had also Elke Sommer!

FAREWELL TO
HOWARD ROBARD HUGHES

Aviation lost another pominent figure with the passing of Howard Hughes. This much misunderstood man, always the focal point of controversy, died as he might have wished, aboard an aircraft.

During his life, Hughes found time to produce one of the all-time classics among films ("Hells Angels"); participated in the design of several widely different types of aircraft; and established important speed records, in addition to his more publicized activities in the world of business. Along the way, he managed to confound the medical profession by surviving a near-fatal crash, even designing a revolutionary hospital bed during his recuperation period.

Another innovation was the special brassiere engineered for Jane Russell, which played an important *supporting* role in "The Outlaw", itself a controversial Hughes production.

The world's largest wooden flying boat constituted another milestone in the life of this man, and in fact, it remains the object of much mystery and speculation today.

Although the subject of almost constant vocal attack by some factions, Hughes was respected by many of those personally associated with him, especially in the aviation fraternity. A man of dedicated action, he will be remembered long after his political detractors have been forgotten. Do any of our readers know if Howard Hughes ever had any interest in model aircraft during his youth?

NOW THAT'S POLLUTION!

Bob Wisniewski, commenting upon Lake Elsinore: "Its the only "fresh" water I know of that will rust Monocoat!" •

Drifter . . . . . . *Continued from page 32*

and top and bottom panels. The bottom panel was pinned down on the plan top view. There are dotted lines that continue beyond the top view outline so you can see where to glue the formers in place. Formers 2, 3, 4, 5 and 6 were then glued on the bottom sheet. The sides were then glued and pinned into place, making sure they were straight, and flush. Then the remaining formers were glued in place. The fuselage hatch is cut from 1/16 ply and is held on with four screws. For added strength, a 1/32 ply piece was added to the bottom of the nose to prevent damage when landing. The nose block was then added and sanded to shape.

STABILIZER AND RUDDER

The stab and rudder were fairly simple . . . eighth inch sheet balsa with 1/8 x 1/4 hardwood stiffeners added to the tips of both the horizontal and vertical surfaces for extra strength. The stab, elevator, fin and rudder were then shaped, hinged and epoxied to the fuselage. The dorsal fin is sanded and glued into place after the fin and rudder is attached.

WING

The first thing I did when I started building the wing was to cut out each wing panel separately from the plans. I started out with one inner panel of the polyhedral wing by trimming the T.E., L.E., and the 1/8 x 1/2 spruce spars to size and pinning them to the plans. Then I glued in all the W2 ribs of the inner panel. I then added the three 1/8 square spar strips in the slots in the top of the ribs. I saved six of the W2 ribs for joining the inner panel of the wing to the other sections of the wing.

Then I started on the outer panel of the wing, following the same method as the inner panel. After I completed both sections of the wing panel, I sanded each section to shape.

Then I repeated the same procedure on the other wing panel.

JOINING THE WINGS

The first thing I had to do in order to join the wings was to bevel off the joints. In order to do this I had to find a flat building surface. I took the left wing outer panel and laid the edge of it even with the edge of the building board. Then I blocked the end of the panel so that from the surface to the tip of the panel measured 3 inches. Then I sanded it till it was 90° to the edge of the building board. Then I took the inner panel and repeated the same thing, except it was blocked up to 1-1/2 inches. Now the wing panels are ready to be joined. The two panels were laid down on the plans and the tip is blocked up to glue the two ribs into place. The slot for the spar in the two ribs had to be widened for the plywood dihedral brace. The ribs were then glued in and the brace is then epoxied to the spar. Triangle braces are added to the L.E. and the T.E. of the wing. The same procedure is copied on the opposite wing panels. The completed wing panels were then joined in the same manner except it was necessary to beef up the inner panels with balsa webbing between the ribs and the main spars as set forth in the plans. The two center section bays were finally covered with 1/16 sheet balsa.

The wing was covered with medium weight silkspan with about seven coats of dope.

The fuselage was coated with three coats of Francis resin, sanded between coats and painted with K&B Superpoxy.

F/F ..... *Continued from page 53*

1978, one year later than planned. This does, very much, upset the entire apple cart and leaves much of the current committee plans up in the air. Since I have not received the official document as of the writing of this column, all of the details are not yet known. Ostensibly, because of the adding of events . . . now a total of nine . . . the FAI believes that the 2 year cycle strains it capabilities beyond its resources. I believe that since there was no firm site offered for the FAI F.F. Champs, this did affect the decision to postpone it until 1978. More information will be forthcoming.

SOME HINTS AND TIPS

Using lubricants on thread taps: Smart old B.S. (that's me) has thought all along that when you drill some metal in preparation to tapping it for a screw, a good lubricant is 3-in-1 oil. Not so, according to model shop proprietor Jim Trump, who says 3-in-1 is about the worst you can use, because it contains kerosene and produces galling in such metals as aluminum and magnesium. What to do . . . oh, what to do! "Is there a good substitute?", I ask. Sure, sez he. Candlewax. Howsabouthat!

Gluing sheet balsa with Hot Stuff: I guess we've all used Hot Stuff or Zap by now, but have never been able to use it on certain things, like wing sheeting or fuselage doublers. Well, thanks to Wayne Drake, there is a way. Punch the surface of the balsa with pinholes . . . using a large pin. Apply a drop of Hot Stuff into each hole (put the doubler in place first). The Hot Stuff will wick its way through each hole and bond about 1/2 inch diameter area. On sheeted wings or stabs, glue one side on as per usual, then mark the sheeting for the other side where the ribs are—but mark it on the outside. Tape or hold the sheet in place and punch through a bunch of holes at the rib markings. Wick the Hot Stuff through the holes to the ribs. It works. Don't worry about the pinholes, as your finishing material will fill them.

HUMOR SECTION—Famous Last Words, From Conn-Tact

In the history of man's endeavors, there have been many famous words spoken which have made the event even more memorable through our literature and in our memories. Such phrases as: "Give me liberty, or give me death;" "Remember the Alamo;" or "Nuts." How about, "I shall return."

Free flighters have been lax in recording similarly important phrases to commemorate events which characterize their lives. In an attempt to fill this void, MODEL BUILDER Free Flight presents some samples for you:

"Wash-in!! You've got to be kidding, that adds drag."

"This is my best D.T. Timer, it's never failed."

"I'll chase on foot, it's not too windy."

"Winding tubes are too much trouble."

"I shouldn't have to light the fuse on a day like today."

"So it's raining here; it probably won't be raining at the contest."

"It's easy to pick thermals, once you get the hang of it."

"Getting by the Semi's isn't hard, it's the Finals that are tough."

Last words that are famous will not be found at the end of this month's column. Instead, I'll close by saying, "See you all next month." •

Taube . . . . . *Continued from page 43*

wood while wrapping around the template.

After all the outlines have dried, place them on the plans and put in the straight pieces. Keep the rudder separate from the vertical stab until after covering, the same goes for the elevators and the horizontal stabs. Coat all surfaces with at least three coats of dope, or until a gloss can be seen on the dried piece, and cover with tissue. Shrink tissue with a water mist, and when dry, coat with two coats of 50% dope and 50% thinner mixture. Let dry for two days and check for warps. If any are found, hold over a low heat and bend them straight.

Glue vertical stab to rear of fuselage, checking for alignment as you go. Now glue rudder to vertical stab at the top, where the vertical stab meets the fuselage, and put a drop of glue at the bottom. Use a cellulose cement to do this. If you need to adjust for a right or left turn, just warm the joint with your breath and bend the rudder. Spot-glue the elevators to the horizontal stabs the same way. Glue them to the fuselage sides and mount the angled bamboo struts in place.

WINGS:

Now don't start screaming and waving your arms! The wings are not as bad to make as you think! Laminate the leading edges and allow them to dry overnight. While these are drying, make the "A" and "B" rib templates of cardboard, or place a row of pins over the outlines on the plan. Take one piece of 1/32 x 1/16 basswood and one piece of 1/32 x 1/16 balsa and bend to shape. I used Hot Stuff to glue these as it saved much time, however, one could use other glues, it would take longer, though. Pin the piece in place and glue. While this is drying, bend a rib on the other template and pin it in place and glue it. Now remove the first rib, admire it, and pin another one in it's place. Soon you will have all the ribs made. *(Less admiring will save time. wcn).*

Remove the leading edges from the plan and sand them to shape, I use a fingernail emery board for this operation . . . works rather well. Pin the edges back in place and glue each rib to the top edge of the leading edge (see plan). It is best to measure the rib length over the plan prior to gluing and cut the excess from the *rear* of the rib. Cross-pin each rib at the rear to keep it in line on the plan.

Now slide the spruce stringers under the ribs, shim them up to touch the ribs and glue in place. Be sure to leave about a 1/2 inch protruding from the wing root to fit into the fuselage. After this has dried, remove the wings from the plan and put the 1/16 thick spacers in place on each rib. Now glue the 1/32 x 1/16 bottom ribs in place, noting that they are in two pieces, one from the leading edge to the rear stringer, and one from the rear stringer to where the bottom covering ends. Glue in the 1/32 sheet at the wing root, noting the direction of the grain shown on the plan. This sheeting is done on the top and bottom, by the way. Cut the holes in the sheeting where shown and sand the whole works smooth.

Start the trailing edge on the bottom first, by gluing and tying grey sewing thread where shown on the plan. Keep this thread fairly tight, but not so tight that it won't bow a little with slight finger pressure. Do the same with the top trailing edge. Dope both wing structures with at least three coats of dope and prepare to cover.

Cover the bottom surface first. Be very sure that the dope soaks through the tissue on this surface, as the underchamber has a tendency to pull the tissue away when it is shrunken. The trailing edge is done by leaving a 1/4 inch piece of tissue past the thread, then making slits with a razor, back to the thread (about 3 or 4 slits between each rib). The tissue is then folded over the thread, creased with your thumbnail, and doped on to the covering.

The top covering is done next, this is done in much the same way as the bot-

tom, but shouldn't be done in one sheet. I found it best to cover all the "A" ribs with one sheet, then use another to cover the "B" ribs. This is done to avoid wrinkles and is easier to handle. Lap the forward end of the tissue over the leading edge (making slits as on the trailing edge) for a better looking wing.

Spray the wings with a water mist, and let dry. Coat with two or three coats of 50% dope and 50% thinner and check for warps. Check on plan where rigging wire goes through the stringers and drill these places with a number 75 drill (model train shops carry these if you don't have one). Make and glue the kingposts in place on each wing, cut a slot with a razor at the top of each to put the thread in later.

Put the wings in their sockets on the fuselage and brace the ends up one inch higher than the root on each side. Take the braided wire and put a 1/4 inch long piece of 1/16 aluminum tubing on it. Thread the wire around the tip tylon at the front and place the end through the tubing again. Flatten the center of the tubing with pliers and put a drop of Hot Stuff on it to play safe. Now thread the other end of the wire through the rigging point on the wing NEAREST to the fuselage and down to the front rigging point on the under-carriage. Slip an aluminum tube over the wire, pull the wire around the undercarriage and thread through the tubing again. Flatten the tube and glue. Continue to the next rigging point and back to the pylon on top. Be sure to thread the rigging wire through the loop of annealed wire and *around* the 1/16 wire for support each time. Do this on both sides, then do the same thing with the rear rigging wires. Check that each wire is tight, it should twang when plucked, and check angle of wing (a little wash out is OK . . . but no washin please!). If all is in good shape glue the wires to the stringers.

Cut, dope, and glue the outrigger to the ends of the wings. Tie and glue a thread from the leading edge to this and continue to the trailing edge as shown on the plan. Mark the points where the warping wires go on the outer six ribs and drill a hole on each for the thread. Make the pulley on the leading edge and pin and glue it in place. Align it so that the thread will pass from the kingpost through the pulley and down to the steering post, glue at pulley and steering post. Tie a thread in the hole at the end rib, glue it, and thread it through the loop on the kingpost, then down through the hole in the rib nearest the fuselage, tie and glue. Go to the next set of ribs and do the same, now all the rigging's done on the wings!

Use the braided wire to rig the undercarriage in the same way as you did the wings. Put the axle in place, hold down the rubberbands, and place the wheels on.

Make the exhaust pipes from aluminum tubing. This can be bent by hand to the shape shown and glued in place. I would recommend that you drill a hole through the aluminum sheet and the balsa behind it to better anchor these, as they do get banged around when you're handling the model.

Get out your camera and take a few shots of your completed model, you're DONE!

Glide the model over tall grass, or something that won't damage it, until you get a flat glide. Charge your battery and try a few short flights. Increase the charge time until you're satisfied with the length of flight. Hope you enjoy your Gotha Taube LE-4 as much as I do mine!! •

Counter . . . . . *Continued from page 9*

be of interest. For racers, the new digital stopwatch will help you calculate exactly how fast the other guy was going when he passed you. Mention MB when you ask for your copy from Heath Co., Dept. 350-02, Benton Harbor, MI 49022. •

Lightning . . . . . *Continued from page 57*

replace the paper shims with plywood.

The climb turn can be adjusted using the power fin. The principal of the power fin is that fin area aft of the center of gravity and in the lower part of the slipstream from the propeller will produce a turn proportional to the area of the fin. Li' Lightning will turn in a direction opposite to that of the slipstream.

Increasing the fin area produces a left turn, while decreasing the area results in a right turn. A height change of 2 inches will alter the turn from one extreme to another, while 1/16 will result in only a slightly perceptible turn.

To change the glide circle, tilt the front wing into the direction of the turn. This adjustment is very sensitive, and should be done with paper shims glued to the wing platform.

The final adjustment necessary is usually a small amount of ballast to achieve the desired glide speed. This adjustment will vary, depending on the tightness of the glide turn used.

FLYING PROCEDURES

Li' Lightning must be aligned and balanced very carefully, making sure the wing keys are tight. First, hand glide the plane, with the auto wing disengaged to obtain a straight, flat glide. With no tilt in the wings, correct any turn with a trim tab cut into one of the rudders. Next, tilt the front wing to the right about a 1/4 inch at the tip. The plane is now ready for its first flight.

The first power run should be very short (about 2 seconds), since this

canard is not very forgiving until adjusted. Use about 5 to 7 cc in the pen bladder tank, and allow about a 1-second delay for the engine to quit after the dump is triggered.

Increase the engine run length only when the climb is straight. When no perceptible turn is obtained and no looping tendencies exist, the engine run can be increased by 1 or 2 seconds. Short fuses should be used during these flights, and any deficiencies in the glide must be corrected. When the full-length engine run is finally obtained, reduce the power fin size in 1/16 increments until the transition is obtained, which is usually at about 1/8.

Normally, the best flight pattern for the Li' Lightning is right-right, but every combination has been used. This depends on the plane itself. If your plane will not behave in the right-right pattern, try another. In these instances, let the plane be your guide, and follow its natural tendencies. •

White Airplane *Continued from page 37*

or a fabric you can cover with. There are no lucky lines, handles, glow plugs, or sacred wheel parts.

If you compete often you will often run into things you can't explain. Sometimes they're good; sometimes not.

Figuring luck into your equipment or strategy is like spending a paycheck you don't have.

If you are physically and mentally prepared to win; if your equipment is ready; and if you have left as little to chance as possible, you have made all the luck you can make.

Now, all you have to do is take your good straight airplane with your Fox .35 hung on the nose and fly the wings off of it.

Good hunting. •

Birds . . . . . *Continued from page 33*

flaps change wing area as well as camber, while plain flaps vary only the camber. The former are heavy and complicated in terms of mechanism, while the latter do not help as much as they should.

If one optimizes the lift/drag ratio at low forward speeds, then high speed performance suffers unless a great deal of ballast is added; that is, penetration and flight into the wind is difficult. On the other hand, if too much attention is paid to penetration, thermal performance declines. These conditions are directly related to the problems of slope soaring and thermal soaring as practiced by R/C model sailplaners. From these factors we could conclude that hawks are better thermal soarers and albatrosses are better slope soarers, and this is in fact the case. Each has adapted to the predominant mode of coping with its environment, with some slight capability of using the other mode. Thus, gulls can and do thermal-soar, while hawks often ridge-soar. Neither can change their behavior and habitat, however, yet this is exactly what we sailplaners are asking of our models! Can we do it? Yes, if you want to add weight, complication and cost; no, if you want something light, simple and cheap. The best solution under these constraints is to have two sailplanes, each designed for a particular set of conditions. While compromises do an average job of coping with narrow ranges of the soaring spectrum, they cannot cope with its extremes. Even the birds are faced with this problem as mentioned before; now lets attach some numbers to the story and see what it looks like.

• *To be concluded next month.* •

C/L . . . . . *Continued from page 39*

the 2 inch bellcrank.

As Hot Stuff was used, there is no reason to wait for the wing to dry overnight. Pull it off the board and trim off the excess sheeting all the way around. You should now have a real strange-looking hunk in your hands. Here's how I got mine ready for the top sheeting.

First you need a good, long sanding block. I used the 22 inch long sanding block marketed by ADC (Applied Design Corp.) that should be available in most well-stocked hobby shops. This is basically an aluminum "T" extrusion and it makes a super sanding block as it is light and *straight*. Ruff-Stuff, an adhesive-backed sandpaper, also from ADC, is cut to size, the backing peeled off and stuck to the sanding block. I suppose you could contact cement regular paper on whatever you normally use for a sanding block. The important thing, though, is to use a sanding block that is at least 12 inches long (the longer the better) and dead straight.

Now lay the partially-built wing on a smooth, solid surface. Moving the sanding block from tip to tip, sand the ribs down, where they meet the 1/4 sq. spar, until they are flush with the spar.

To get the ribs sanded down to meet the leading and trailing edges is easy and accurate, *if* you pay attention to what you're doing. Still moving the sanding block from tip to tip, but holding it at an angle so that the block is always in contact with (or at least directly over) the spar, the leading edge (or trailing edge) and at least two ribs, shimmy and shake and make balsa dust. Keep sanding until both the leading and trailing edges are chamfered and the tops of the ribs are dead straight from the spar to the leading edge, or trailing edge. If you're careful to never sand directly on the ribs, without the block supported by the spar and a leading edge or trailing edge, the top sheeting will go down perfectly.

Now we're ready for the top sheeting, right? Only if you want to build a

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wing for a hand-launch glider. Let's put the bellcrank in before we button things up. Drill the hole for the bellcrank bolt and trial-fit the crank. Not much room, is there? The arms of the crank will have to be bent down a little, to clear the top sheeting. Attach the lead-outs to the crank (125 lb. test lead-outs are recommended) and bolt the crank in again, being sure that it can't hang up when the top sheeting is installed.

Installation of the crank is an area where I went with one of my old tricks, rather than Kilsdonk's suggested method. He makes up the push-rods for both the elevator and shut-off, runs them through flattened brass tubing (for a bushing) at the leading and trailing edges. This is OK, I suppose, but requires permanently installing the push-rods and bushings before putting on the top sheeting. This means that you have to work around these protruding push-rods while glassing the wing and painting.

I prefer to cut a crescent-shaped slot in the top sheeting for access to the arm of the bellcrank and subsequent installation of the pushrod after the plane is completely finished. This demands a little foresight, however! First, you have to know exactly where the crank is, so you can cut into the top sheeting and come up with the bellcrank instead of an empty rib bay. Second, you have to be sure that you can install your push-rod after the wing is completed. I use a regular "Z" bend without too much trouble, but would suggest that you try a "dry run" installation of the pushrod, before gluing down the top sheeting. A word to the wise, etc.

Guess I lied a few paragraphs back. I reverted to 5-minute epoxy and Titebond glue for installing the top sheeting. A very thin coat of 5-minute epoxy was spread on the 1/4 spar and the 1/16 top sheeting (one piece, just like the bottom sheeting) was weighted down to the spar and allowed to dry. With the wing off the board, a bead of Titebond was laid on the tops of the ribs only. A glue nozzle is handy when doing this, both ADC and Peyton Products make them, however, the Peyton item is a little handier as it is long and curved.

With the wing back on the board, the sheeting is pressed into place (be sure to get it flat and in contact with all of the ribs) and glued at the leading and trailing edges with Hot Stuff. If you've done this carefully, you should be able to remove the wing from the building board, but I suppose it's best to let it dry overnight, even though the Hot Stuff is already dry.

Trim off any excess sheeting and true-up the leading and trailing edges, if necessary, with the sanding block. Now we should probably install the wing tips. I made up laminated tips, it seems to be the easiest way to go. A piece of 3/32 balsa is cut roughly to shape and temporarily positioned against the end of the inboard panel. Three pieces of 1/8 balsa are next. One is cut so that it acts as a divider for the 1/8 brass tubing lead out guides. Once it fits, glue it to the 3/32 base *only*. Now cut a couple of pieces of 1/8 balsa and butt them up against the 1/8 brass tubing. Glue them to the 3/32 base. Now you can (or should) take this partially-completed tip off the wing and glue the brass lead out guides into the grooves. I sprinkled micro-balloons into the groove, pressed the tubing in place and stuffed-it. Rather, I glued them in with Hot Stuff. If you were careful to not have a mound of micro-balloons on top of the 1/8 balsa, you can now glue on the top of the tip, a piece of 3/16 ought to be about right.

Now sand the laminated tip to its finished outline. Notice that it's OK to leave the brass tubing protruding slightly, as it can be sanded flush when completing the tip, making a nice, smooth installation. The other tip is made in a similar fashion, or simply cut out of a solid piece of 3/8 balsa, and they are both glued permanently to the wing. That pretty much takes care of the wing, at least until we are ready to cover it with glass cloth. The fuselage is next and is pretty easy to do, as is any profile plane.

One piece of medium weight, 3/8 x 3 x 36 balsa is plenty of wood for the

fuse, if you plan ahead a little when cutting the wood. If you'll look closely at one of the pics, you may be able to see that the fuse on my plane is made up of three pieces of wood. They are butted together to each other and glued with, of course, Hot Stuff. Once the fuse blank is glued up, transfer the fuse outline to it and cut it out. Notice the "reference line" drawn on the fuse. This is important. Using this line as a reference, you can be sure that the engine thrust line, the bottom of the wing and the stab are all on the same plane. Racing planes with up-thrust and/or built-in incidence don't fly very well.

Using the reference line, draw in the position of the motor mounts and cut this area out. The 3/8 x 1/2 maple motor mounts are then glued into the fuse. Make every effort to be sure that they are glued in square and flush with the fuse. I used 5-min. epoxy for this, but don't recommend it unless you can work fast. The quick-setting epoxies generally set up before they have much of a chance to soak into the mating pieces of wood. If you can't do this job quickly, I would suggest using slow-drying epoxy.

Just below the lower motor mount, you'll see another piece of motor mount stock that ties into the lower mount and points slightly forward and down. The landing gear will attach to this. It isn't really all that necessary, but does add a lot of strength and gives you something solid to bolt the gear to. Moving to the back end, you'll notice a piece of 3/8 sq. bass wood that has been inset into the lower side of the fuse. This is the mount for the tail skid. Although you can't see it, this piece of bass has been drilled for 4-40 bolts and has blind-nuts installed on the top of it. In this way, the tailskid can be made removable and/or replaceable as it simply bolts in place. Maple motor mount stock can be used for this piece, of course, but bass sands much easier when tapering the fuselage. Also, bass is plenty strong enough and, when glassed-over, won't be able to be pulled out of the fuse itself.

With all the pieces in the fuse, take care to sand the area where the 3/32 ply doublers will be as flat as possible, to insure a good, strong bond between the fuse and the doublers.

Before gluing the doublers on, take a few mintues to chamfer the aft edges of them, as this is almost impossible to do after the doublers are on the fuse.

At this point, I glued the *outboard* doubler on. Again, I used 5 min. epoxy, but ya gotta be quick! As soon as this was dry, I drew in the wing and tank cut-outs on the *inboard* side of the fuse, as this is the only side of the fuse that is flat and easy to draw on. In case you're wondering about that big hole in the fuse, I'm using a 3 oz. Don's Rat tank, and it is being set into the fuse as far as possible. The only reason for using this tank, and for inserting it so far, is that we may want to try a megaphone or pipe sometime in the future.

At this time, the fuse was drilled for the 4-40 mounting bolts and the blind nuts installed. In the close-up, notice that the blind nuts are recessed into the motor mounts. This is easy enough to do with a Dremel moto-tool and a No. 115 cutter. Also notice that I decided to add another piece of motor mount. The cut-out for the tank removed most of the lower mount and I decided not to take a chance with it as is, and spliced in the piece shown.

Double-check to see that the inboard side of the fuse is sanded nice and flat and that you have some old 4-40 bolts in the blind nuts, so they don't get filled up with epoxy. Now glue the inboard ply doubler on. When dry, and using the existing cut-out as a guide, complete the wing cut-out.

You should, by now, have realized that a lot of effort is going into making the front end as rigid as possible. This theme can be carried a little further when cutting out the inboard ply doubler to clear the case of the motor. Cut out only as much as is necessary. You should end up with about an inch of uncut double tying the front ends of the maple motor mounts together.

A carefully-built Goodyear should

last a long time, and will, if you take the time to do things right the first time. My current Goodyear, pics of which were in last month's column, has three years of hard racing on it and is still going strong. Rather than being worn out, it has simply become obsolete, although it will be used as a backup airplane for this season's racing.

I guess that's enough about Project Goodyear for this month. Next month we'll get into installing the hardware and putting some trick paint on it.

In a recent letter, Bill Hunter, of Satellite City, producers of Hot Stuff, had an interesting suggestion: "Try Hot Stuff under one arm, and your regular glue under the other . . . and you'll be in bad shape. WE'RE *SURE!!*" What can I say? I tried Bill's suggestion . . . and can just barely reach this typer!!

Bill also had a suggestion (a serious one, this time) concerning using Hot Stuff to apply sheeting. Bill says to first glue the sheeting to the leading edge, the full length of the sheeting. Then, working from the leading edge to the rear edge of the sheeting, push it down with your hand tight against each rib and glue it to the rib or spar. Do this the full length of the sheeting. Now, to glue the sheeting to each rib, a flexible ruler is laid over the sheeting at each rib location. With a pin, put a small hole every 3/8 inch (this hole should, of course, hit the rib). Do all the ribs in this manner and then go back and put one very small drop of Hot Stuff in each pin hole. The Hot Stuff will go right through, bonding the rib to the sheeting for about a 1/2 inch in either direction of the pin hole. Also, it helps to apply finger pressure near the hole to insure a tight fit. As with most things, it takes longer to describe the operation than it does to actually do it. I've tried this procedure and it works very well . . . Watch those fingers, though!

Keith Trostle, president of PAMPA, sent me a very nice "form" letter (kind of impersonal, but thanks anyway, Keith) announcing that Cox will again sponsor 1/2A Stunt at the Nats. The rules are quite simple and basic (PAMPA wants to keep it simple and fun, and I couldn't agree more with that attitude); any engine up to .051, no builder-of-the-model rule (to allow the use of Cox ready-to-fly planes) and .008 diameter lines. The full AMA pattern will be flown.

If you plan to enter 1/2A Stunt, or just want more info, write to: Keith Trostle, 10900 Phillips Dr., Upper Marlboro, Md 20870 or to: Bart Klapinski, 1507 Mammoth Circle, Placentia, California 92670.

Several columns ago, I mentioned that I was testing a couple of the new Combat G-21's from ST. Both of the motors have turned out just great and run like Jack-the-Bear. As mentioned previously, one of the engines blew a rear bearing, but it has given absolutely no trouble since then. The other engine didn't blow a bearing, but only because I put in a Fafnir unit before running it hard. I would definitely recommend replacing the stock rear bearing. A New Departure 3L01 works OK, is cheap and readily available. Check in with your local bearing supply dealer.

In box-stock condition, both of the new-style G21's are pulling 118-120 mph on a Nemesis in full Combat trim, on 20% Nitrotane and without whipping. This is plenty of speed to be competitive, in fact I'll probably drop back to 10% fuel.

The cranks have always been a weak point with the G-21's, but that problem appears to have been corrected. I haven't broken a crank in either of these two engines . . . and I've been trying to! I figured a few runs on 40% fuel with a 9 x 6 prop would pop a crank, but it didn't. Went to 50% fuel and whipped the tar out of one engine . . . and still no two-piece crank!

Although these engines just took a jump in price to $39.95, they are presently the best motor available for both Fast and Slow Combat, and worth the

asking price.

Fusite, makers of Glo Bee plugs, will be (or already have) coming out with a neat little unit called the "Fire Plug." With a sealed battery of some kind in the base, an ammeter to show plug condition and a "Power Lever" to dial in the amount of juice you want to flow to the plug, this accessory will make you the envy of everybody.

The Fire Plug is small enough to strap on your arm for use in conjunction with a "hot glove" for the Racing events, and has enough power to light off any plug (including Glo Bee's, of course) or to burn out a flooded engine. The usual 1-1/2 volt dry cell batteries have been less than satisfactory for some time, due to their short life and limited amount of power, for the serious fliers. Now the dry cells are selling for around $3.00 each, which is a bit much.

The time has come for an item such as the Fire Plug. Take a look at one, I think you'll like it. The fliers in this area do, they are always borrowing mine!

Got something to slip in here at the end of the column. As I write this, there is talk of banning ball-bearing engines in Slow Rat, and the '76-'77 rulebook isn't even out yet! The idea of an "emergency" ban on BB engines is nonsense. If, by the time you read this, there is an announcement that only plain bearing engines may be used in Slow Rat, rest assured that somebody is dealing off the bottom of the deck!

Hopefully, common sense will prevail . . . we'll see!

FLASHO!!!

Don't scrap that burned-down HP 40 Rat motor you've converted into a 36. The proposed ban on BB engines in AMA Slow Rat was flat turned down (and for good reason, incidentally) by CLCB chairman Dick Hall. More on this next month, but I think it's important to let you know that Dick had given serious consideration to a ban on BB engines, but changed his mind when he got some input from actively involved racing fliers. I've been telling you guys that the CLCB needs input, that said input does get serious consideration, and this proves it. •

Remotely . . . . *Continued from page 19*

free-style maneuvers. Note: Unlimited assistance may be given the flyer by a more competent helper, but if the helper touches the transmitter during a judged maneuver, that maneuver only will be scored zero. Obviously, a buddy system is also not allowed.

For the other two aerobatic classes, the 12 maneuvers in the AMA Novice Pattern will be the required "School" portion, followed by 5 preselected free-style maneuvers. All three classes have a 10-minute time limit.

The AMA Sport Scale event will also be held (again, biped-or-more only), and finally, there will be a High Noon Barnstorming event, with a 5-minute-per-contestant time limit. The latter is an anything-goes event, short of endangering anyone's life, where even a crash will be scored (but it better be good!). Sounds like a wild two-winged weekend! THAT BAR-FLI AGAIN!

We've previously mentioned the Bar-Fli die-cuts that we still have on hand, dating back to our days with M.A.N., and have unloaded quite a few . . . but there's still more, and we'd like to clean them out.

It suddenly occurred to us that many new R/Cers have come along since the introduction of this small pattern ship by Phil Kraft, back in August of 1968, and probably just as many have no idea what the ship looks like.

No sooner said than tooken care of!

We had sent Phil a set of the die-cuts, and lo and behold, a new Bar-Fli has now joined his fleet of test models! The .40 powered ship was built to tail-dragger configuration and really looks sharp. We asked him to send us a photo so you could see what it looks like. Die-cut sets (ribs, bulkheads, tip outlines, etc.) are $6.00 postpaid, and the supply is somewhat limited. Buy two and build a Bar-Bipe!

HOW *NOT* TO . . .

Jim Houston, from San Antonio (or was it Jim San Antonio from Houston?) is a professional photographer, and also a guy with a good sense of humor, so we're sure he won't mind if we use some of his work for an object lesson in the art of photography.

In his haste to send us a photo of his just-completed DC-3 (from M.A.N. plans) before going on an extended trip, he rushed into the backyard and took a quickie Polaroid shot. Much later, he sent us some photos posed at the local flying field . . . The improvement is obvious. Incidentally, the original plans were run through a reducing Xerox machine, bringing them from an 8 foot span down to a 6 foot span. Power is two Wankels and the homebuilt retracts are driven by Freon cylinders.

Jim purchased a plastic kit of the DC-3 and photographically blew up all of the decals to the size of his model and then cut the parts from the correct color of Monokote. The ship has operating flaps and retracts, and all horns are inside the surfaces. A 6 channel EK radio does the work.

Jim's Junior Nobler is powered by a Cox Tee Dee .051 and uses a Cannon Tini Twin radio, on elevator and aileron. Since it required 2-1/2 ounces of dead weight for balance, he's going to add two more channels for rudder and throttle!

INTERNATIONAL QM PYLON RACE
Mexicali, Mexico, April 18, 1976
Report by ELOY MAREZ.

How do contests get started? And how many get talked about that never really get off the ground? We know how this one got started, and there is no doubt that it got off the ground. And there is little doubt that another 'annual' will be the result.

It seems that a few weeks ago, a casual conversation took place between two members of the Club Cachanilla de Aeromodelismo, of Mexicali, Baja California, Mexico. Benny Sanchez, and Raul Sanchez Diaz were apparently talking about 'Why don't we start racing?', and 'Who can we get to help us get started properly?' The next step was a phone call by Benny to Bud Anders at NMPRA, who agreed to help. He contacted Mel Santameyer, of the Quarter Midget Racing Club, who brought up the subject at the next club meeting. The vote was almost unanimous to 'let's go down to Mexicali, put on a race, and get them started'. Picking a date was probably the hardest single

obstacle, as this time of year the calendar is pretty full for us Southern Californians. Easter Sunday, April 18th, was one of the few possibilities. After some discussion and a vote, that was to be the date.

Bob and Kathy Root, and Yours Truly were 'volunteered' to set up and coordinate all the details involved . . . all within six weeks. We really didn't mind at all. I know the language, and all three of us had thoroughly enjoyed our contests in Mexico before.

After a number of phone calls were exchanged, I decided I would go to Mexicali for a pre-contest meeting. The city has a population of over 600,000 and is located exactly 200 miles from the MB offices in Santa Ana. So it was south to San Diego, across the mountains through some real moonscape looking countryside to Calexico, and across the border to Mexicali . . .

At this meeting with the Club Cachanilla, all the details were ironed out, to include notification to the customs officials, insurance for our vehicles, and the designation of a contest headquarters. Our choice of the Motel Lucerna on Justo Sierra Boulevard must have been a good one, as everyone came away extremely pleased with the atmosphere, service and assistance provided. QMRC has tested and approved the Motel Lucerna.

The invasion started Saturday morning, and by mid-afternoon there was no doubt that a bunch of modelers had arrived. We were spread out all over both swimming pools, the many patios, both lunch rooms, and oh yes, a couple of the group even found at least one of the motel's five bars!

Official festivities started that evening with a welcoming banquet hosted by the Club Cachanilla. Originally, when the invitation was extended, only the QMRC accepted. But when the count exceeded fifty, we changed our acceptance to include flyers and race officials only, and offered to have all others purchase tickets, as is normally done. This was promptly vetoed by the Mexican Club officials . . . at last count, seventy-eight QMRC'ers and guests were to descend upon them at dinner time! A count was not made, but at least 125 of us enjoyed a sumptuous Mexican dinner of tacos, enchiladas, tamales, and assorted delicacies.

We had short speeches by Francisco 'Pancho' Lopez, and Nick Nichols, presidents of the Club Cachanilla and QMRC respectively. Nick presented Pancho with all the tools of the trade: a set of racing flags made by Bob and Kathy Root, a set of QM gauges made by Mel Santameyer, some NMPRA booklets courtesy of Bud Anders, and a set of QMRC racing rules.

To wind up the evening, a free raffle of model goodies was then held. We had forty-five prizes, all through the courtesy of QMRC's friends in the industry and hobby. Afterwards, the unofficial phase of the evening started, which naturally consisted of much model and flying talk. It was accompanied by a more-than-usual amount of hand manuevering, as the language problem crept up now and then.

Vince Stagnaro, CD, set the time for takeoff of the first heat at nine a.m., Sunday, which we only missed by fifteen or so minutes. The spectators had started arriving at eight, and by first heat time, it was obvious that we had attracted the largest crowd any of us had ever flown before. Our amigos in Mexicali did a tremendous PR job. For the two weeks prior to the contest, the city was bombarded with announcements in the local newspapers, radio, and TV stations. The race-to-be was even described in a half page of the local TV guide, and no other race can make THAT statement. The festivities at the banquet, and the flying, were both filmed for TV showing later in the week. Since the site was located some fifteen miles south of the city, and far enough off the main road that the activity was not visible to the passers by, it was obvious that the resulting 2000 plus spectators were there because of the advance, and obviously favorable, publicity.

Announcing during the day was done by Benny Sanchez, who displayed a remarkable, and until then, hidden talent for it. He certainly made the day's events much clearer for the large audience, many of whom were seeing R/C flying of any type for the very first time. By the start of the second round, Benny had become familiar with the names of the 20 flyers and their airplanes and some of us had the rare experience of being identified as . . . "the flyer just walking back carrying the yellow airplane is Señor So and So, who just won the last race. Let's give him a hand." Just what do you do when you have your hands full of transmitter and airplane, and 2000 people are applauding you?

We had the pleasure and honor of being joined by Señor Jose Bridi, who was promptly voted in as flag man. Halfway through the scheduled number of rounds, we gave Joe a break and let him fly his Dirty Birdi in a demonstration of precision aerobatics. Again, Benny Sanchez provided a blow-by-blow description. This was followed by demonstration flights by the Cazares brothers from Riverside, and Gilberto Gallegos of Mexicali. Then we took time to show some of the other forms of racing, with a HalfA race between Kathy Root, Bob Nichols, George Kureck, and Bob Novak. Gary Hawke then warmed up the course with his X-40 powered Prather Toni, and we returned to serious racing.

After the dust settled from the last round, last heat, Kent Thomas and myself were tied for first place. I'm not sure about Kent, but with that crowd, at that point, walking out to the line, I knew how some of the participants feel at another popular Sunday afternoon Mexican sports event. At the bull fight, I knew just how the bull must feel.

Permit me a moment of bragging: we flew a good, exciting, tight race. We exchanged the lead four times, were never over fifty or so feet apart, and I was over the finish line not more than ten feet ahead . . . But then, the bad news. I had my only cut of the day! It can't be shrugged off, as all racing pilots know, but even second is better than where I usually place, which we won't go into. Good race, Kent!

We were presented beautiful trophies by Señorita Lourdes Paredes, as follows:

First: Kent Thomas
Second: Eloy Marez
Third: Dave Robertson
Fourth: Bob Root
Fifth: Mel Santameyer
Sixth: Bob Novak
Seventh: Ron Dickson

More airplane talk followed for most of us for a while, after which we all reluctantly said 'Hasta la vista' to our new friends and started the four to five hour ride back home. Tired, sun burned, dirty, but grinnin' from ear to ear.

And PROUD! Proud because we went, were well received, and accepted; because we made some new and what will develop into lasting friendships; because we helped in the propagation of our favorite sport; and proud because we all feel that in a small way, we have helped spread good will and understanding between our respective countries. VIVA MEXICO!

We'll be back next year, for the Second Annual Cachanilla/QMRC race, and will expect some stiff competition from this latest crop of racing 'pilotos'. Can we send you an entry blank? •

Plug Sparks . . . *Continued from page 31*

the help he has received from Tom Crompton, in England, and Walt Winberg in Canada. Bert is still pooling ideas from these boys.

In response to the question, "What is a good epoxy to use for gluing the aluminum cans together?" Bert recommends 3M "Structural Adhesive." This is a very tough epoxy, not brittle, and still cures at room temperature. This epoxy is one of the very best available and goes by the number "22168/A Clear Amber." It is a 50-50 mix and is the only one Bert has found in the good old USA. Do not use cyanocrylates, as the ends will pop through at 70 to 100 p.s.i.

50TH ANNIVERSARY SOUVENIR BOOK

Here is an ambitious project by Bert Pond, who sez the printing will be very limited, dependent entirely on reservations. The book will include the story of the 1st Nationals, complete with details of model design, formula, and ten plans of the leading designs at that time. Included will be the winner of the First Nats. Bert says be sure to order your copy now; exact price not fully firmed up as yet, but with the discount offered for advance reservation, the price

should be under $5.00. Write Bert Pond at 128 Warren Terrace, Congmeadow, Mass. 01106. The book should be out by the time of the 50th Nationals.

SCIENTIFIC HORNET CONTEST

As previously announced in MODEL BUILDER, Stan Fink has finally firmed up the rules for his proposed Scientific Hornet contest. Here they are:

1. No deviation from plan dimensions.
2. Propeller and airfoil modifications are acceptable.
3. Rubber limit: 6 grams.
4. Hand launch will be permitted.

Stan reports that some fellows are starting to get some good flights. Dean Ing, of Marysville, Mo., got 65 seconds using the original flat bottom airfoil and a single-blade, folding propeller. Stan Fink himself, has obtained 73 seconds using a Korda-type airfoil and single-blade folder. For details, write Stan at 80 Crest Dr., Eugene, Oregon 97405.

SCIF 1976 KICKOFF MEET

Was this ever a great contest, with 85 contestants . . . Ed Kelley running things with the rest of the K's to help out. Weather was almost ideal, with all sorts of good left developing around 11 o'clock. Matter of fact, things got so good that Jack Jella was "volunteered" to fly his lightplane in search of at least a dozen models. Many were found this way plus a few more brought in by the cooperative farmers, oil men, etc. in the surrounding area.

Of course, at the first contest of the year, the spectators were treated to some excellent crashes. Notably among those were F.L. Swaney's Super Queher and R.G. Brickner's V-K Challenger. If Brick keeps busting up V-K designs, Vern is gonna gettum! Haw!

According to the *Flight Plug*, official newsletter of the SCIFS, the editor proudly brags that of the top 30 places, 17 were taken by SCIFS, and only 4 by SCAMPS, the rival Southern California club. Youse guys is asking for it!

Probably the busiest guy on the field was Wade Wiley; taking first in Class A Pylon, first in Class B Pylon, third in .020 Replica, and first in O/T rubber. He needed a truck to haul all the trophies home!

After two days of cloudless sunshine, mild breezes, 70 to 80 degree temperatures, the writer couldn't help agree this was a terrific way to start the season. Just think, that was only the first act! More darn fun coming up!

SAM NATS COMPRESSED AIR EVENT

Just received notice from Tim Banaszak, Secty-Treasurer of SAM, that he is again sponsoring a compressed air event for all those interested. Tim is hopeful there will be more entries this year, as he claims everyone has had a year to build one. How about you Bert? Got one?

SAM NATS JUNIOR RUBBER EVENT

Also received a call from "Gorgeous George" Perryman, of Georgia. He will again sponsor trophies for the Junior rubber event to be held on the same day as the other rubber events. There must be some young lad out there who can beat Stephanie Perryman . . . Well, there is, isn't there?

S.D. "NO-NAME" R/C TEXACO MEET

Headed up by that red headed dynamo, Red Barrows, the No-Name Club of San Diego, with Gene Bach doing C.D. honors, put on their spring O/T F/F radio assist contest at Lake Elsinore. Contest featured lots of entries, and beautiful weather, as the winning time of Red Barrow's hang Record Breaker will attest to . . . 46 minutes! Wouldn't you know it, his sidekick comes in second with his Dallaire at 36:57. Those guys are tough. Even the "one-armed bandit", Norm Burnham had to take a back seat with his Clipper, doing 31:28!!!

The limited engine run contest wasn't much help either, with Roger Larson registering three perfect flights on a Buzzard Bombshell, doing 16:28. Closely following him were Ross Thomas (Playboy Sr.), and Bob Longstreet with a Comet Clipper. In short, there was one heckuva lot of good flying going on. We'll try to get some pictures later on.

KLONDYKE ENGINES

At the highly successful Region 2 MECA Collectogether held at Glenmoor

High School, the writer was informed by Mark Fechner (all the way from Salt Lake City!) that those highly prized Klondyke engines would be available again in May.

The engines have been improved in appearance (if this is possible) and now feature gold anodized head, tank, spinner, and timer housing. Best part about it all is that this engine runs as good as it looks.

For fellows looking for Torpedo Green head conversions (called Klondykes after re-work) this is an excellent way to go in the ignition route. Interested modelers should write for particulars . . . Mark Fechner, 112 Clinton Avenue, Salt Lake City, Utah 84103. Get your order in early!

PRECUT RIBS AND FORMERS

Just about everyone in this old timer game knows of Gene Walloch and his P&W service that provides partial kits for about ten popular models, which include only the ribs and formers.

According to the latest information, Loren Schmidt is also cutting parts, but does not go in for "kits" as such. He offers to cut all ribs and formers shown on any old timer plan. Of course, this is a specialized service, so if you like the idea, write to Loren Schmidt at 11948 Franklin Blvd., Elk Grove, Ca. 95624, and let him know your needs.

MORE SUPER CYCLONE PROTOS

A couple of columns ago we were kidding Larry Boyer about his six or so Super Cyclone engine prototypes and the source thereof.

Turns out the last laugh appears to be with Boyer, as he has had more offers on his prototypes than he had ever expected. As he sez, "This was a real surprise (the offers) as I took them to Denver to display and couldn't raise the faintest hope of interest!"

Larry concludes by saying the set is not for trade, but that is another laugh. Who ever heard of a horsetrader who didn't trade? Nuff said!

BOWDEN CONTEST RULES

We have been kicking the idea of a Bowden Contest around for quite a time with no one quite knowing what the original rules were. The writer was fortunate to run into a British magazine (now defunct) "The Model Airplane Constructor," June 1937, wherein the lead article, "Bowden International Trophy for Petrol Engined Models" is featured, complete with all rules.

In capsule form, there are three judges who examine all models (in a special enclosure!) and time the flights. Flights are strictly by rotation, with each entrant being allowed three flights. Each flight must be more than 40 seconds and *less* than 1 minute-30 seconds. Any variation results in a total loss of that flight. Of course, all models must R.O.G.

Now get this rule! Immediately after each competitor's last flight, a judge will inspect the model, and if it is undamaged from its original inspection, it will be awarded 30 extra marks, very slight damage 10 extra marks, damage other than slight disqualify for extra marks.

Another goodie is: Any appeal against the judges decision shall be handed to the Competition Secretary (we call 'em C.D. over here) in writing immediately after the event, with a fee of 2 shillings and 6 pence, which will be forfeited if the appeal is now allowed.

This last rule has a lot of appeal to an old Contest Director like myself. I'll bet this would cut down the amount of moans at a meet!

Any individual or club desiring to hold a Bowden Contest might do well to acknowledge and enforce these rules. If you need a copy, the writer will be pleased to forward same. All you gotta do is write!

LOW WING O/T KIT

It's about time a low wing old timer for radio assist was produced! Due credit should go to Sam Blumberg, Micro Models, for producing a real cutie; the Peerless Panther. This model, with a 46 inch span, 3 Channel Cannon set and an OS-10 engine, came out at 24 ounces. The model flies extremely well. Report from another Panther modeler, employing a Tee Dee 051, stated it outflies the Miss America. Sez "It's extremely stable, won't stall or drop a wing, and floats on the slightest lift!"

How about that? Well, you don't have to wait long as Sam sez the kit will be out sometime in May. So, if you are looking for a good performance model out of the general rut, here is your chance to be first on your block. The writer may even run a Product Review on this one he is so excited over this new item.

IWT CONTEST

The last several issues have had a few paragraphs devoted to an "It Went Thataway" contest, with this as a new idea of letting a model go with all the fuel you were brave enough to put aboard. Bud McNorgan, the originator, writes to say this is nothing new, as he used to do it quite a bit with some of the old SCAMPS members.

Bud says the only reason the event fell into disfavor (besides losing models) was that he recruited a bunch of old men who didn't want to chase a model. Some of them even used radio. Haw! That's what makes horse racing . . . a difference of opinion!

SHEER NOSTALGIA

Ken Hamilton, for years, the mainstay of the Flightmasters, wrote the best letter this writer has seen in a long time. In a completely unsolicited letter, Ken recounted some of the early days as follows (with some editing):

"In 1935, while in school and before starting with North American Aviation, I was one of Danner Bunch's draftsmen, working after school and on Saturdays. I count myself fortunate to have made all the drawings on the initial Mighty Midget. These were production type drawings, strictly for the machinist. I did do the drawings on the Cadet Major and Minor models (Incidentally, real fine flyers, as noted by the writer).

"Donner Bunch built his own, large, one-cylinder engine for a twelve foot tapered high wing monoplane with a clock timer. We took it out to Miner

Field and launched it from the northeast corner. It flew beautifully, climbed very high, and came down in a flat glide. landing perfectly, where the San Diego freeway is now.

"The succeeding flight ended up somewhat farther west in the undeveloped north side of Miner Field. Upon arriving out of breath, I discovered the model had landed in an extremely dead and bloated sheep! Taking a real deep breath, I raced in, scooped up the model, and ran as far as I could without another breath.

"Although a complete success, the model was big, and Danner flew it very little thereafter. It hung in the South Hoover shop for years. After I left Bunchs' employ to go to North American, I often wondered what happened to that big model. I never will forget the thrill of that huge model flying off in the blue."

MORE BULL SESSION

As Jim Brown put it, "With all these good bull stories going on, the second liar hasn't got a chance." In another letter received from Gordon Codding, now of Kingman, Arizona, a familiar problem arose.

Gordon has several designs he would like to have authenticated for Old Timer Flying. These models, which clearly show the old G.M.A.A.S.C. decal (Gas Model Airplane Association of Southern California) on the fuselage side, were photographed at the Western and Rosecrans flying field in Gardena Valley. This is the No. 2 ship of the Loew low-wing designs that competed in the very popular low-wing only contests in the Los Angeles area.

Certifying old designs is always a touchy thing, as a refusal to do so touches off an immediate controversy, and in many cases ends up by offending the petitioner. As the Historian of SAM (a rather unofficial official title conferred on the writer many years ago by J.G. McNorgan), the following method has been set up to authenticate old designs:

1. Design must have been published or kitted. Published can mean photo published in magazine (for date of design).
2. Date of design must be proven by dated photo, affadavit, actual model, or corroborating testimony by others.
3. Plans should have been drawn in this time era; brown paper layouts, sketches, and/or specifications. The actual model may be used to (re)construct plans as necessary.
4. Plans must be made available to all modelers so that this does not become a one-of-a-kind.

In many cases, plans have been sent to John Pond O/T Plan Service so that copies could be made for interested modelers.

In addition to the above, the application is then reviewed (under the new rule just enacted) by a board of examiners. Approval by this board eliminates any further discussion and/or controversy over that particular model design.

CONTESTS

It's about that time of the season when we can start announcing all the Eastern Seaboard activity. So, let's not waste any more time and get into them (in the order received).

CENTRAL JERSEY RADIO CONTROL CLUB: O.T. F/F R/C, Classes A, B, C, Antique, and Texaco. June 27, at Middlesex County Model Airport, Piscataway, N.J. C.D. is Jim Clark, 1127 Denmark Road, Plainfield, N.J. 07062. Also a possibility of half-scale .049 powered fuel allotment event.

SOMERSET SIGNAL SENDERS: O.T. F/F R/C assist, September 12, Classes A, B, C, Antique, and Special Fuel Allotment Event. Mufflers on all glow engines .10 c.i.d. or larger. Contest Director: Jim Clark.

S.P.O.T. 2ND ANNUAL O/T F/F R/C CONTEST: August 15, North Branch Park, Somerset County, New Jersey. Classes A, B, C, Antique, and Fuel Allotment. Mufflers required. Jim Clark, C.D. (again!!).

BUTLER AREA RADIO FLYING SOCIETY (BARFS): Annual Fun-Fly and O.T. F/F R/C Fly-for-Fun meet, June 20 at Butler, Pa. Bill Henderson C.D. For info, Tom Barnes, 509 No. McKean St., Butler, Pa. 16001.

SAM-7 CONTESTS, WESTOVER AFB, CHICOPEE, MASS.: (1) "Summer Outing", July 18, 10 events, all free flight, Tom Lucas, C.D. (2) East Coast O/T Championships, Sept. 5, 9 events, F/F and R/C, Jack Whittles, C.D. All trophies to third place.

SLAM O/T ANNUAL: June 12 and 13, 6 events, including O/T hand launched glider. Collectogether at Salt Lake International Airport. Mark Fechner, C.D., 112 Clinton Ave., Salt Lake City, Utah 84103.

CENTURION TEXACO: This promises to be the biggest R/C Texaco event yet! Entry fee will be $5.00, with a brand new $100.00 bill going to the winner! Site: Lake Elsinore; date, September or October. No-Name Club sponsor. Red Barrows C.D. 10615 Porto Ct., San Diego 92124.

SAMIG O/T F/F: Bridgewater, Mass., August 22, Rubber, Gas, and towline events; Sleek Streak and H.L. glider for Juniors. For info: Sears McCorrison, 29 Wheeler Circle, Apt. 189, Stoughton, Mass. 02072.

There! That ought to hold you fellows who say you don't know about contests. Meanwhile, if we have overlooked anyone, please send in your announcement. Remember, we need at least 45 days advance notice, otherwise the announcement will be printed too late to do you much good *(or won't be printed. wcn)*.

FLORIDA FLASHES

As reported a few issues back, Jim Kloth has taken over the editorship of FMA News (Florida Modelers Assn.), and his first issue is extremely newsy albeit the old timer news was a bit sparse. However, Jim has promised the next issue will have a lot of goodies on old timer activities.

Probably the best story out of the King Orange Internationals was generated by several Yankees. One of the Northerners approached an official, who shall remain nameless, and asked what time it was. The official fumbled around a bit trying to find his watch and finally growled some reply. Nodding as if they understood, the Yanks walked off. One asked the other, "who is that guy?". His friend replied, "I don't know. I thought I had better save the hard questions for later." Haw!

That's the humor for this time. We'll talk about R/C assist old timer seaplanes next issue. Don't miss this latest fun! ●

DFH-18 ..... *Continued from page 15*

With this, I end up with a total weight of 3100-3300 grams (empty tank) and the shown center of gravity. If you are afraid that your plane will be tail heavy, I suggest that you apply Monokote, or similar, to the stabilizer and the fin in place of the paint. This saves a lot of weight, but makes a soft surface.

WEIGHT INDICATIONS

For a model with cellulose paint and clear polyurethane.

A. Sanded, including HobbyPoxy 2, ready to be painted.

Fuselage	600 grams
Rudder	25 grams
Elevators	for two 25 grams
Wing, including belly pan	550 grams
Ailerons	for two 15 grams

B. Painted, all details mounted including ailerons, rudder, elevators, retracts and wheels. No R/C gear or engine.

Fuselage	1100 grams
Wing	920 grams

C. Including R/C gear and engine.

Fuselage, empty tank	2150 grams
Wing	1050 grams
Total weight, empty tank	3200 grams
Fuel	300 grams
Take off weight	3500 grams
D. Surfaces Wing Area	45 DM_2
Stabilizer Area	15.5 DM_2
Total area	57.5 DM_2

E. Surface loading

$\frac{3500}{57.5}$ 61 grams/DM_2

Surface loading, max return 75 grams/DM_2

F. Max permitted take off weight 75 x 57.5=4300 grams

FLIGHT TRIM

Adjust the nose gear length to a little nose-up attitude. This improves the take-off very much, with the penalty of a little more risk of getting bouncy landings. Don't forget the nose wheel drag brake.

Check the center of gravity and adjust if necessary. If the CG is too far back, the plane will be unstable when flying slow before landing, but on the other hand, it needs less corrections in rolls and round maneuvers. It is also easier to "stop" the model at the spin entry and the spin is easier to have. Experiment and make your own choice.

Check that one wing is not heavier than the other. If so, balance by putting lead in the light wing tip. You will probably have to make more corrections later on, when flight testing, as the two wing halves are sure to be different and, for example, seldom have the same area. And only 2-3 grams out of balance in a tip is easily felt as out-of-trim.

Check the aileron, rudder and elevator throw to be as indicated on the drawing. Later on, try to flex with as little throw as possible, to get a smoother flight.

Now make your first flight. If you have trouble retracting the long landing gear, it might help with 2-3° "nose-in" for the main wheels. Just before enter-

ing the bays, the wheel have a 4° angle of incidence against the air. This angle tries to force the wheels out. The "nose in" also helps a little to avoid ground loops.

First check the upright and inverted loop radii to be about equal, and as big as possible with full elevator throw. For safety reasons, always make the first inverted loop upwards. If you fly the plane nose-heavy, you may need more down than up, which can be had by drilling your own hole on the rotating servo disk, a little towards the tail. On the other hand, the linear racks give less sensitivity around neutral, which is good . . . but there is usually more play.

One very common problem is that the wing does not stay horizontal in the loops and bunts (outside loops). Mostly the problem can be traced to wing halves being out of balance. Sometimes it is interconnected to an engine being angled to the right or left, which together with dihedral and/or a big distance between engine axis and wing, may give a roll if they are not matched to each other.

If the above variables are properly matched, an engine angled to the right or left ought to give only a sideways movement with the wings horizontal all the time in round manuvers. The reactions are sometimes very confusing, but midwing designs are much easier to correct, as they have less interaction.

Try these methods:

A. Fly straight and level and note if one wing drops. Then fly inverted and note is the same wing drops, if so it is too heavy. If the other wing drops, you have just too much aileron trim. You can only find a severe unbalance this way.

B. A little more sensitive method is to fly straight and level and give full up to get a vertical climb. If this climb is inclined to one side, the same wing tip is too heavy.

C. A far more sensitive way is to make several bunts. If the plane slowly rolls to the right, it is possible to correct this by applying right aileron trim. But this is no solution as it gives other problems. Instead, you will probably have to put 3 to 5 grams in the left wing tip. This text has to be made on a calm day.

D. If all is confusing, just put lead in one wing tip and observe what happens. You ought to be 50% sure that it is the right side. The problem is how much lead.

Always remember that contrary to what most people say, even a very warpy and unbalanced plane can be made to fly clean and nice if you just work hard and try different ways.

Now adjust the aileron throw to give 3 rolls in 5-6 seconds.

Next try a spin. I say "try" because one drawback with low wing-loading and as little throw as possible on the control surfaces is that it may be difficult to make a spin.

A. With idling engine, reduce speed by giving more and more up elevator all the time with the same altitude until the plane "stops" in the air with full up elevator.

B. Then give full right rudder.

C. After a 1/4 turn, give full right aileron.

I am well aware that this spin entry is not what is considered the "right" one by many. To the confusion of others, even the Head Judge at Bern 1975 demanded a climbing entry instead of a level one, which is more difficult and even impossible with some models. I consider that this climbing spin entry idea relates from the fact that some model and full scale planes cannot "stop" after a straight and level entry, they just move the nose slowly downward. Also, many flyers at Bern didn't care what the Head Judge wanted. I had a feeling that many of the judges didn't care either.

If you have trouble getting a spin, first try to reduce the idle and increase the rudder throw as much as possible. It is for this and the resulting big neutral play that the two control rods to the rudder are used.

If you still have problems, move the rudder trim to full left on the transmitter with neutral on rudder. Then when entering the spin, move the trim knob to full right to get more throw. You can do the same with elevator trim but then move the trim back during the spin exit.

Another way is to use reduced throw normally for rudder, elevator, or even aileron, and then full throw for spin. To have it on rudder may be the best because you can use it full on "figure M" also and have reduced throw in rolls.

The engine axis 0°-0° set-up ought to be the right one. Adjustment may be needed if:

A. The plane moves sideways to the left with horizontal wing in round manuvers. Then give the engine axis a right inclination.

B. It drops the nose applying idle

from full power. Then angle the engine axis a little down.

One problem which is surprisingly little discussed is the behavior in knife-edge flight. There are two unwanted reactions when flying straight and level in knife-edge:

A. A roll to upright or inverted position when you apply rudder. This effect is quite easy to counteract by giving more or less aileron, as there seldom is any interconnection. If it is too irritating, the problem can be cured by increasing the dihedral if the model rolls to inverted, or decreasing if it is the other way. It is only if the reaction is different depending upon what wing is down that there is not any simple solution.

B. Much worse is the phenomenon that the plane "turns" toward either the "fin"(=up) or the "wheels" (=down) . . . and that this behavior is worse with more rudder to hold the plane level.

What does the flyer do when he makes a slow roll to the right? In Bern, most top flyers started with something that is not in the rule book and they were obviously not downgraded. They raised the nose slightly before rolling to minimize the need for corrections later on. But if we suppose that you will not do something so bad, this ought to happen:

A. During the first 90° roll you will give more and more left rudder. Probably a little up in the beginning to keep the fuselage level.

B. From 90° to 180° (inverted) you will slowly neutralize rudder and start giving a little down.

C. From 180° to 270° you will apply more and more right rudder and neutralize elevator.

D. From 270°-360° you will neutralize rudder and if you need, you might even give a little up elevator, which is neutralized when finishing the roll.

What has happened to the control surfaces?

A. Aileron: constant . . . I hope. No problem.

B. Rudder: Left (90°), neutral (80°), right (270°) and neutral (360°). In low speed, or with insufficient fuselage side area, you need more rudder. Otherwise it is quite uncomplicated.

C. Elevator: A little up (0-90°), neutral (90°), more and more down to max at 180°, neutral (270°), perhaps a little up (270-360°), neutral (360°). This is more complicated. You could minimize the need for elevator correction, for example, by moving the center of gravity backwards.

What happens if you have a "down" elevator interconnection (to the "wheels") when giving rudder in knife edge? Only look at the elevator:

A. 0-90°, up elevator

B. 90-135°, elevator gradually to neutral

C. 135-180°, elevator gradually to "max" down

D. 180-225°, elevator gradually to neutral

E. 225-270°, elevator gradually to "up"

F. 270-360°, gradually from up to neutral.

This seems to be very complicated!

What happens with an "up" elevator interconnection (to the "fin")? Again, only look at the elevator:

A. 0-90°, perhaps nothing, as you will have a little up automatically.

B. 90-180°, more and more down elevator.

C. 180-270°, less and less down elevator.

D. 270-360°, again perhaps, nothing as you will have a little up elevator effect.

This seems to be much better!

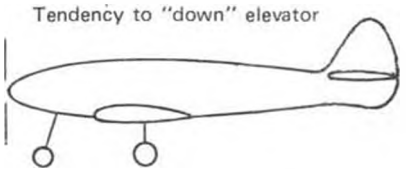
However, this "up" elevator effect will usually be far too much. So the best choice seems to be neutral to a very slight up elevator (to the "fin") interconnection.

How do today's models behave? The funny thing is that it is much more common with a "down" elevator interconnection than an "up". The terrible thing is that models built alike can behave differently, with no obvious explanation. In my own experiments I have only been able to observe tendencies and I have very few cures to the problems.

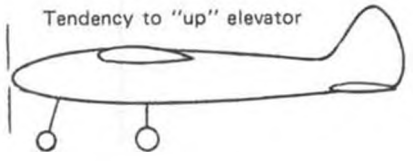
What are the tendencies?

A "standard" low wing model with a high placed stabilizer used to go towards the wheels ("down") or it is sometimes quite neutral.

Tendency to "down" elevator



A mid or high wind model with a low placed stabilizer used to go towards "up" elevator.



These observations make one guess that it may have something to do with a turbulence originating from the wing root and which increases when applying rudder. If the plane doesn't have the same tencency depending upon which wing is down, it might be due to an effect from the spiraling propeller slip stream.

How can this interconnection be avoided? The two obvious measures are:

A. Move the stabilizer away from the wing turbulence . . . upwards or downwards at least 2 to 3 inches, depending upon the fuselage length.

B. The other way is to place the stabilizer with equal turbulence on both the upper and the lower surface. This would mean in line with the wing. This would probably also mean a more horizontal roll axis in a snap or very fast roll. The worst stabilizer position ought to be a 1/2 to 2 inches above or below the wing. If you are unlucky you might need the crazy positioning of one stab side placed higher than the other!

C. Move the center of gravity. If a model flies straight and level, the wing lifts the model's weight, one G. If we roll to knife edge, this ability to life one G ought to be at least partly translated to horizontal and some tendency to move towards the "fin" (up) ought to be there.

If the CG is moved far forward, you have normally to fly with more "up". When the one G disappears in knife-edge, the plane ought to move a little more towards the "fin" (up). A move of the CG backwards would then create a tendency to move towards the "wheel" (down).

This way you can change the tendency only slightly.

D. Create another turbulence on the fuselage side at a wanted height to give the desired stabilizer influence as "A" above. A sidemounted engine or muffler might work as such a turbulator. Even in this case the influence is surprisingly marginal, but it is always safer to have both fuselage sides alike with smooth wing fillets.

E. A longer tail may help to get a more even turbulence on both sides of the stabilizer, as the turbulence spreads at a longer distance from the wing. But if the stab not until now will enter the turbulence, it will be worse with a longer tail.

F. Make yourself a "black" electronic box similar to Ken Gustafsson's, here in Sweden. It gives the proper amount of elevator compensation when rudder is applied on his "Mach 1".

Most of this discussion is based upon the assumption that a turbulence is created affecting the stabilizer. But I have never seen it and do not know. Someone interested ought to investigate it with the help of a wind tunnel.

In the mean time I keep to a high speed midwing design like the DFH 18.

• • •

Westburg . . . . *Continued from page 21*

The YP-23 was flown at least once with the Prestone radiator removed to obtain comparative drag data. The main fuel tank was filled with water which was pumped through the engine and overboard. The airplane had a time-in-air of approximately fifteen minutes on the 20 gallons of fuel in the reserve tank. Unfortunately, the results of the test are not available. Eventually, the P-23 was returned to Curtiss where the empennage was used on the XP-31 Swift.

It was the Boeing P-26 that shot down the P-23. It was a thousand pounds lighter and 35 mph faster, and it did it without supercharging on a 600 hp P&W Wasp. •

Peanut . . . . . *Continued from page 47*

shown is as follows.

Black: Cylinders, tires, cross, struts.

Aluminum: Cowl, wheelrims, spokes, cylinder heads, crankcase, thrust button, and pilot's goggles.

Brown: Fuselage covering, wing covering.

White: Horizontal and vertical tail, tail skid covering.

Tan: Propeller (simulated wood grain), pilot's helmet.

Have fun with your Hergt Monoplane. One loop of one-eighth flat rubber will power it. •

Workbench . . . *Continued from page 6*

pick up a microphone, thumb a switch, and start yakking about nothing in particular, doesn't take too much in the way of gray matter, skill, or determination. However, when it comes to "pull" with the FCC, having the three latter characteristics doesn't buy us much of anything!

Actually, only about two or three weeks prior to the announcement of the now infamous Docket 20120, the AMA's Frequency Committee met with the FCC to discuss the possibility of new frequencies. Our purpose was to find relief from the interference on our "blobberized" 27 mHz channels, and the increased (though controlled) usage of this 72 mHz frequencies. At this meeting, the FCC brought up the matter of possible take-over of the 27 mHz frequencies, but indicated that such a thing would not be coming up in the near future! It can now be determined that at the very time that this meeting was in session, someone else, in another part of the FCC office building, must have been working on Docket 20120. You could say we have been "Pearl Harbored" by the FCC!

As this is being written (May 6), the outcome is uncertain. Unfortunately, we have been given very little time by the FCC to file official comments; in fact, as we said at the beginning of this article, when you read this, the deadline will have been passed (unless by remote chance it was extended).

We hope you did your part . . .

This situation represents the second major entanglement between modeling and the U.S. Government. Almost 40 years ago, when gasoline powered model aircraft were first becoming common to the modeling scene, Uncle Sam tried to pull another stunt which was just as unreasonable, thoughtless, and stupid as the one it is trying to pull now. We quote excerpts from Phil Zecchitella's column, "Gas Job Gossip", in the November 1937 issue of that greatest of all model magazines, Flying Aces:

"According to present indications, we may be heading for legislation that will place us gas modelers in the same category as commercial aircrafters. In short, we are going to licensed . . .

"The numeral system presumably will be organized and maintained by the National Aeronautic Association."

This was the action that eventually started the formation of the AMA. That doesn't sound so bad, but the following excerpt, from the same column, was quoted from a Boston newspaper, and explains the reason for the government action.

"Springfield, Mass. (AP)—Acting on a ruling of Registrar Frank A. Goodwin, William E. Heaton, state aviation inspector, today halted scheduled trials of five gasoline powered model airplanes at Bowles Airport. Goodwin ruled that such models are legally aircraft and cannot be flown in this state unless licensed and operated by licensed pilots."

Al Lewis, a member of the Boston Gas Modelplane Society, later AMA's first president, and still later the editor of Air Trails, responded:

"Except for the chief test pilot of United Airlines, whom we understand

SOCIETY OF ANTIQUE MODELERS

MEMBERSHIP APPLICATION

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

DATE REC'D.

NO. _____

DO NOT WRITE IN THIS SPACE

NAME _____ BIRTH DATE _____ YEARS MODELING _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

Please check if you belong to any of the following:

A. M. A. _____ NO. _____

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

S. A. M. CHAPTER _____ NO. _____

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

Enclose Membership Dues of $5.00 and send to:
Society of Antique Modelers
1947 Superior Avenue
Whiting, Indiana 46394

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

Signed _____

is an outstanding member of the Central Gas Modelplane Society of Chicago, we know of no pilot who is able to build and fly a gas model plane.

"Gas modelers are not pilots, therefore the ban is illogical. If you ban gas models, you should also ban rubber powered models. And indoor models, weighing fractions of an ounce, are also aircraft, according to Mr. Goodwin's definition, and also should be flown only be licensed pilots.

"Russia is preparing to give thousands of miniature gas engines to its model builders for experimentation in gas models, according to press reports emanating from that country. *(Any similarity between that and Germany's recent increase of R/C frequencies from 13 to 89 is purely ironic. wcn)* France, Italy, and Great Britain are already competing with the United States for supremacy in the gas model field . . . "

"Are American men, women, boys, and girls *(See? Women's lib is nothing new! wcn)* to be hindered in their creditable work in that field of junior aeronautics devoted to the building and flying of miniature gasoline engine powered planes . . . ?"

How similar this all was to the same bureaucratic shortsightedness that characterises the situation we are involved in today. Let us hope that the sensible and cool heads will again prevail.

LIFETIME SENTENCE!

Bill Johnson, a modeler from Cuyahoga Falls, Ohio, and a new subscriber, was the winner of the first drawing for a free lifetime subscription to MODEL BUILDER.

Introductory subscription cards were passed out during the Toledo Trade Show, and anyone sending their card in, along with payment, before April 26, was eligible to win.

Congratulations, Bill, and live a long life, because we have a lot more issues to publish!

THOSE TAC RAGS

We've always been suspicious about this, and are glad to hear it from someone else . . . in this case, old flying buddy Austin Gutman, writing in the Valley Forge (Pa.) Signal Seekers newsletter:

"'Wipe fuselage down thoroughly with a tac rag.' How many times have you read that statement? Many times I am sure. It starts off virtually every article on finishing I have ever read. The intent is good but there are some serious pitfalls in the use of this simple little aide to a good paint job.

"For those who have never used a tac rag (sometimes spelled tak or tack rag), it is a piece of cloth impregnated with a chemical to make it lift off dust, dirt, lint, or any small foreign matter from a surface over which it is wiped. The intent is great. One wipe with the cloth and your model is dust-free and ready for finish.

"Here is the 'Hooker'! The chemical or substance sometimes used by the manufacturer to cause the dust to cling to the rag instead of your project seems to contain oil or wax. The maker generally warns the user to wipe lightly and not to press too hard in order to avoid depositing the oil or wax on the surface to be painted. The question is, 'What is too hard?' My experience is the mere fact of using one of these things is too hard! For years I have battled little spots where the paint just would not adhere. It would pool and bead (not unlike a freshly waxed car in

CLASSIFIED ADS

Non-commercial: Rate is 25 cents per word with a minimum of $3.00 worth. Commercial: Rate is 40 cents per word with a minimum of $5.00 worth. No mail-order discount house ads knowingly accepted.
All ads are payable in advance and may be for any consecutive insertion period specified. Name and address free. Send ad and payment to: The MODEL BUILDER, Classified Ads, 1105 Spurgeon, Box 4336, Santa Ana, California 92702

IGNITION ENGINES: The entire O.S. Max line of fine engines is available converted to ignition engine operation. These engines are eligible for OLD TIMER competition and are the very finest obtainable anywhere. We also offer a complete line of ignition accessories, ie, coils, timers, condensers, etc. Send for free 1976 price list. 77 Products (Otto Bernhardt), 17119 So. Harvard Blvd., Gardena, California 90247.

FOR SALE: MODERNISTIC MODELS
New info. Market value $6,302. Over 300 steady customers. 4,729 plans, 4 storage cabinets. After complete inventory and re-evaluation, now priced at $2350. Call (213)-766-5868.

COLLECTORS: Many old kits for sale. F/F, U/C, some R/C. Manufactured by Megow, Berkeley, Falcon, Burkhard, and others. Also an original Comet Zipper. All kits in mint condition. Send S.A.S.E. for lists.
Bob Sundberg, 433 Ranken Place No. 2, Hayward, Ca, 94544. (415) 786-1634.

WANTED – Will buy multi-cylinder model airplane engines. In particular, the older spark ignition and certain glow ignition. All letters answered. Russel Sprague, 8800 Green Lane, Randallstown, Md. 21133.

SPECIALTY COMBAT EQUIPMENT - Pen bladders. Send S.A.S.E. for FREE brochure. William "Moose" Allen, 418 Fairmont Dr. DeKalb, Illinois 60115.

QUARTER MIDGET - Now available, the "Li'l Cobra" that is wiping them out in Southern California. Fiberglas, foam, machined balsa, all hardware, less wing skins. $50, postpaid, insured. Bob Root, 1601 Amherst, Tustin, Calif. 92680. (714) 838-4813.

QUALITY Stainless Steel Fasteners. Small quantities, reasonable prices. Catalog $.25. Caltronic Laboratory, P. O. Box 36356, Los Angeles, Ca. 90036.

BRAND NEW PEANUT PLANS: Gee Bee R-1, J.E.A.A. S-1, Chester's Jeep. One buck each. Illustrated plans catalog, S.A.S.E.
AERO ERA, c/o Tom Houle, 11333 N. Lake Shore Dr., Mequon, Wisc. 53092.

OKIE BIRD . . 1/2A contest F/F. Wing area 286. Kits $7.95 each. Add 10% for postage. CLEMCRAFT, P.O. Box 524, Sand Springs, Oklahoma 74063.

"SAILPLANE DESIGNERS HANDBOOK." Easy, complete instructions. $5.96. Eric Lister, 953 Klockner, Trenton, N.J. 08619.

the rain) at various odd places. It took me many years to finally track down the cause of this. I suspected the tac rag, but didn't check it out until my latest paint project where I had the old trouble.

"The use of the tac rag is ok on raw wood. By raw wood, I mean no filler, finishing resin, or dope. To dust a surface before the application of Solarfilm, Monokote, or Coverite on raw wood is ok. It assures no lumps under the covering and causes no adhesion problems.

"I have found the best way to render a surface dust free for painting is to first vacuum it as clean as possible then wipe it down with a clean cloth dampened (not saturated) with the recommended thinner for the paint product to be used. Dope thinner should be used for a dope finish, Hobbypoxy H-07 thinner or K&B 8120 for an epoxy job.

"I hope this bit of information prevents some of you from having the aggravation and frustration I experienced."

"MISTER PRESIDENT . . . "

In an attempt to reveal the actual goings-on at an AMA Executive Council meeting, to prove to the modeling public that it is not a rubber-stamp operation, and to let the council member's wives see what they do when they occasionally and mysteriously take off cross-country "for AMA business," President Johnny Clemens invited members of the model press, heads or representatives from special interest groups, and the aforementioned wives, to attend the council meeting held on April 30 in Anaheim, California, just prior to the MACS Trade Show.

Having known, flown with, and worked with some or all of the members in various capacities over previous years, and also having been chairman of the R/C Contest Board for about 10 years, the abilities and "modus operandi" of these gentlemen came as no great surprise. It is just a shame that the majority of AMA members could not see and hear the council in action. It could dispel a lot of the mistrust and misunderstanding that persists. This does *not* mean that we agree with everything the council has done, the magazine decision in particular, but we do wish to recognize them as a group that is doing its best for AMA as a national organization, if not for each and every member as he or she sees fit.

In brief summary, the following major items became official at this meeting.

The contest rules proposal deadline for 1978-79 rules has been extended to September 1.

Until further definitive technical data is available for consideration, the safety rule requiring that R/C modelers must not *knowingly* fly within 5 miles of another operating R/Cer, will *not* apply. In the meantime, clubs operating at closer distances are to voluntarily monitor their own activities to see if intolerable interference exists.

INDEX TO ADVERTISERS

Because of the unsettled nature of FAI rules, particularly pattern rules at the moment, CD's shall stick with the AMA Rule Book, while team trial contests shall try to follow the latest releases, whatever they are.

The Hutchison purchase, if made, will all come from donated monies.

THINGS TO DO

The Reno National Championship Air Races (full scale) will be on September 10, 11, and 12. The competition for Unlimiteds, Formula I, Sport Biplane, and AT-6/SNJ's, will be preceded by three days of qualifying, Sept. 7, 8, and 9.

* * *

The U.S. National Hang Gliding Championships will be held on June 12-20, 1976, at Dog Mountain, near Morton, Washington, between Seattle and Portland. The championships include three classes, Standard Rogallo, Unassisted Open, and Fixed Wing.

* * *

From John Embry, CD, we learn that the LARKS, the Louisiana club that was primarily responsible for arranging the 1974 and 1975 Nationals in Lake Charles, and then did a lot of the back-breaking work that made the Nats successful, is now sponsoring a contest of its own. Scheduled for July 3 and 4, 1976, the club is holding the First Annual "Holiday Bash" for R/C Pattern, Sport Scale, and Quarter Midget Racing. For more info, contact John at Route 2, Box 411A, Sulphur, Louisiana 70663.

In the article entitled "A Reliable Transistorized Ignition System," published in the May 1976 issue, the transistor referred to as HEP 57003 should be HEP S7003.

The zener diode 1N2992A ia a 39 volt, 10 watt, stud-mounted unit; any brand or designation within those specifications will work. One possibility is the Z-1324 by International Rectifier.

IN CLOSING . . .

Excuse us for getting serious for a moment, but in light of the FCC's foolish action that could curtail a wholesome, educational hobby/sport, while at the same time promoting another activity which has openly supported disrespect for law and order, perhaps it is time to print the following clipping from a newspaper, that goes back quite a few years:

"Who's Delinquent?"

"We read in the papers, we hear on the air
Of killing and stealing and crime everywhere
We sigh and we say, as we notice the trend
This young generation, where will it end?
But can we be sure that it's their fault alone?
That maybe a part of it might be our own.
Too much money to spend; too much idle time
Too many movies of passion and crime.
Too many books not fit to be read
Too much evil in what they hear said,
Too many children encouraged to roam,
By too many parents who won't stay at home.
Youth don't make the movies, they don't write the books,
That paint the gay picture of gangsters and crooks,
They don't make the liquor, they don't run the bars,
They don't make the laws, and they don't make the cars.
They don't make the drugs that idle the brain,
It's all done by older folks, greedy for gain
And how many cases we find that it's true,
The label 'Delinquency' fits older folk, too."

For many years, Ace R/C has pioneered the concept and development of small R/C airplanes and produced top quality kits, particularly in the 1/2A category. We've created rudder only airplanes designed expressly for pulse R/O (Dick's Dream, Ace High, Littlest Stick); a small, sport biplane was produced before the biplane bandwagon (All Star); we developed a sensible, solid 1/2A sport plane (Whizard); we conceived, established rules for, and produced the 1/2A pylon ship (Upstart); we conceived and developed the whole category of 1/2A pattern, offering two kits that remain the standard by which all are judged (Pacer, Mach None); expansion of the 1/2A pattern concept to larger engines resulted in a .23 powered pattern ship (Super Pacer). Check the record and stick with Ace R/C, the small plane experts.

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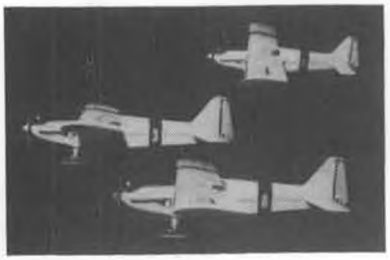
The standard for 1/2A pylon. Span 32"; area 200 sq.in.; for Tee Dee .049 and small two channel (ailerons/elevator) 13K102 $17.95



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Top performance 1/2A pattern. Span 40"; weight 22 oz.; for Tee Dee .049/.051; two channel (aileron/elevator). 13L108 $19.95.

WHIZARD

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ALL STAR

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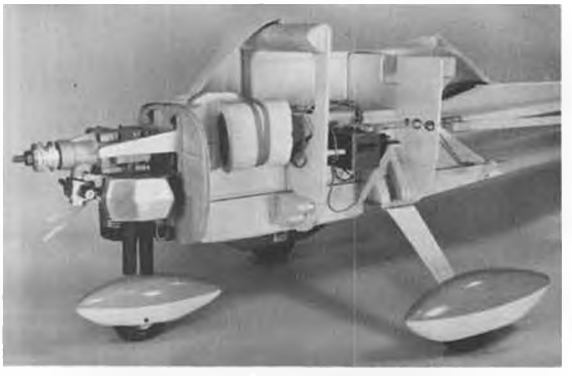

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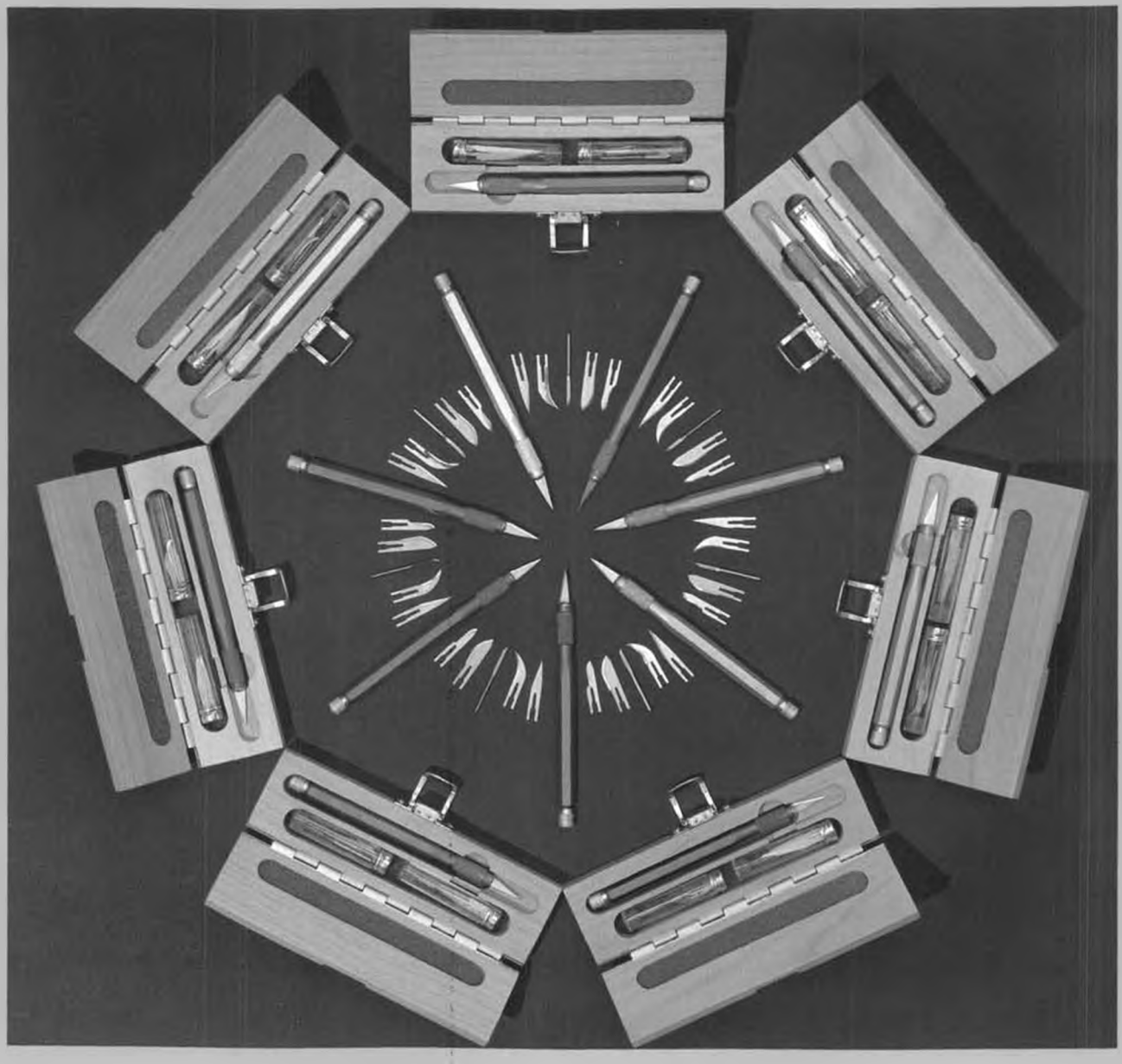

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