MODEL BUILDER

APRIL 1976

volume 6, number 52

$1.50

R / C ELECTRIC FLIGHT SYSTEMS*

*Patent Pending

from

ASTRO FLIGHT INC.

PIONEERS IN SILENT FLIGHT

13377 Beach Avenue
Venice, California 90291

3 CHANNEL SPORT TRAINER
ALL BALSA
SPAN 60"
DESIGNED FOR ASTRO 25
BUSHMASTER
$39.95

ELECTRA TWIN
$119.95
Span — 72"
Area — 780 Sq. In.
Flying Wt. — 7-9 Lbs.
4 Channel Radio
Fiberglass Fuselage — Balsa Wing
Sport Flyer — Astro 15 Twin
A/B Pattern — Astro 25 Twin

FOURNIER RF/4 $34.95
3 CHANNEL R/C
SPAN — 76"
AREA — 600 SQ. IN.
FLYING WT. — 60 Oz. w/Astro 15
Scale Electric Powered Sailplane
All Balsa / Spruce Construction
DESIGNED FOR ASTRO 15 ELECTRIC OR 15 GLOW MOTORS

2 CHANNEL SPORT TRAINER
DESIGNED FOR ASTRO 5 - 10 MOTORS
$22.95
ALL BALSA
ELECTRA-FLI

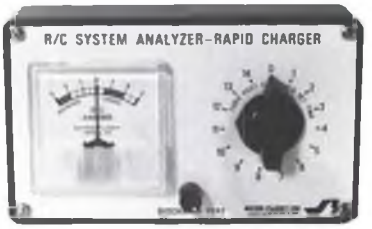
PARTENAVIA P-68 VICTOR
All Balsa
Designed for Astro 05 Twin
4 CHANNEL R/C
$49.95
Span — 49"
Area — 390 Sq. In.
Weight — 56 Oz.

FOR ASTRO 020, 5 AND MARINE 10 INDICATES CONDITION OF BATTERY AND AUTOMATICALLY TERMINATES CHARGE
RAPID CHARGER
$24.95

FOR ASTRO 10, 15, & 25
$38.00
FIELD CHARGER

12V BATTERY CHARGER
CARRY THIS MINI CHARGER IN YOUR FIELD BOX. DON'T BE CAUGHT WITH A DEAD BATTERY.
$8.95

NEW R/C SYSTEM
ANALYZER — RAPID CHARGER



This is the answer to your battery problems. Two years of development by the company that knows 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

ASTRO-5 (Astro Pup) $39.95
ASTRO-10 $69.95
ASTRO-25 $99.95
ASTRO 15 $84.95
ASTRO - 020
$19.95 F.F.
$22.95 R.C.
BATTERY INCLUDED

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

AS - W15
High Performance — Std. Class
Slope or Thermal
RUGGED ONE PIECE PLASTIC FUSELAGE IN RED, WHITE BLUE, GREEN YELLOW, ORANGE
$54.95
2 CHANNEL R/C
Span – 100"
Area – 650 Sq. In.
Flying Wt. – 38 Oz.

AS - W17 $79.95
Scale Beauty
Outstanding Performance
2 - 3 CHANNEL R/C
BEAUTIFUL WHITE GEL COATED FIBERGLASS FUSELAGE
SPAN — 132"
AREA — 950 Sq. In.
Flying Wt. — 60 Oz.

MALIBU
Holds Closed Course World Record of 189 Miles
Thermal and Slope Soarer
ALL BALSA CONSTRUCTION
SPAN — 76 Inches
AREA — 450 Sq. In.
Flying Wt. — 25 Oz.
$25.95
2 Channel R/C

MONTEREY
Perfect Thermal Trainer and Good Competition Plane
ALL BALSA SPRUCE CONSTRUCTION
$34.95
2 CHANNEL R / C
SPAN — 100"
AREA — 600 Sq. In.
FLYING WT. — 30 Oz.

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**

MACS SIXTH ANNUAL 1976

MODEL & CRAFT SHOW

2 BIG "ACTION" DAYS

SATURDAY
MAY 1st
HOURS: 10 A.M. - 8 P.M.
SUNDAY
MAY 2nd
HOURS: 11 A.M. - 6 P.M.

A NON-SELLING SHOW

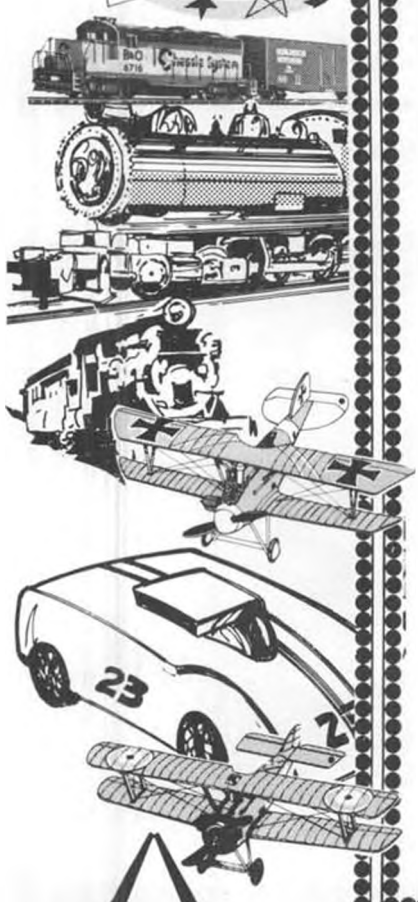
THE WORLD'S LARGEST
HOBBY SHOW!

Hundreds of exhibitors, demonstrating thousands of brand new products and ideas for your leisuretime pleasure.

Continuous Indoor and Outdoor demonstrations by world renown experts.

EXCITEMENT EVERY MINUTE!

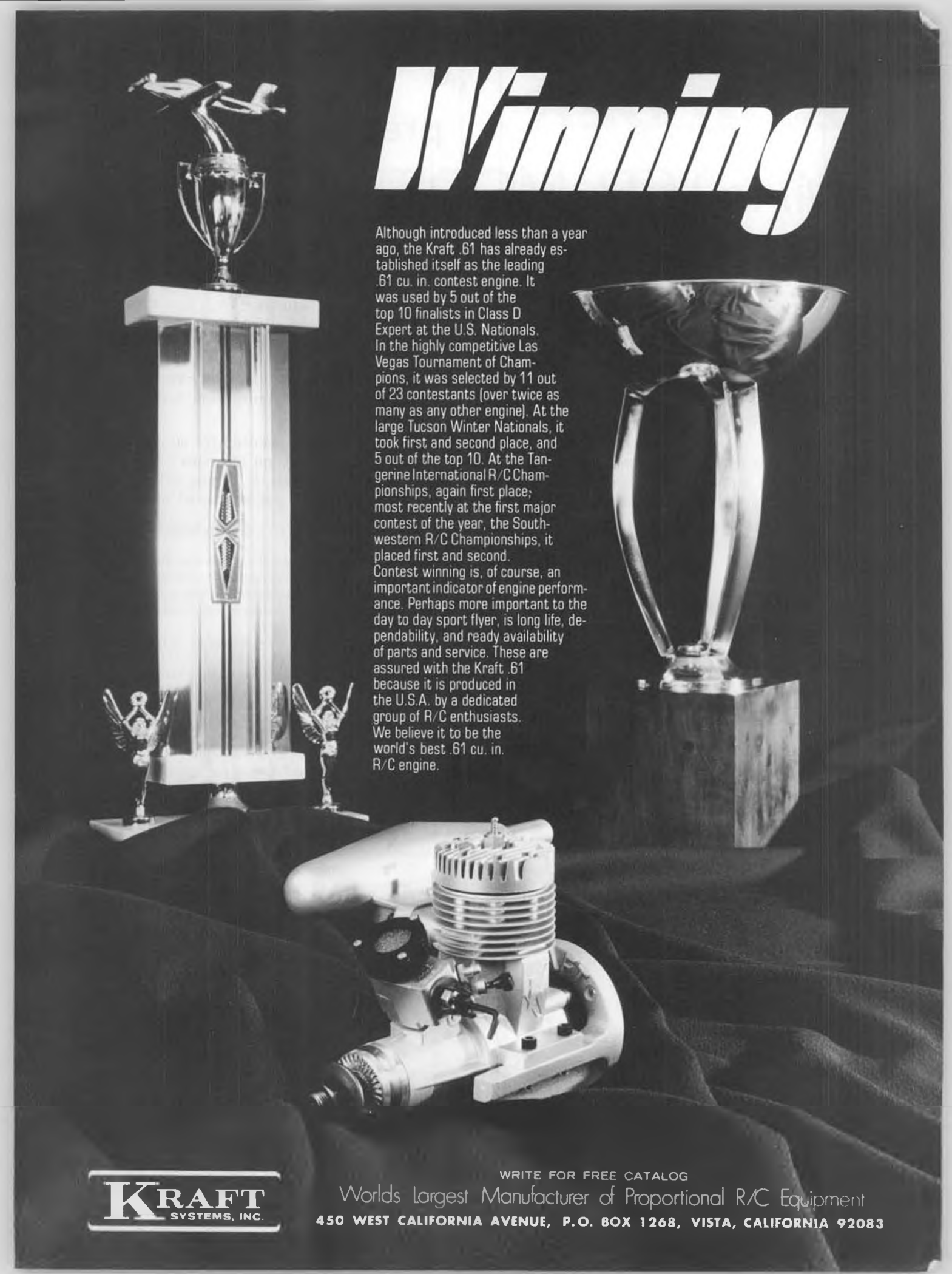
- ★ Radio controlled airplanes, boats, cars and helicopters in action plus u-controls and free flights!
- ★ Gigantic working model railroad layouts in all popular gauges!
- ★ Plastic models—Rockets flying!
- ★ CRAFTS of all descriptions . . . Jewelry Macrame · Decoupage · Paper tole · Eggury Stitchery · Candlecraft · Ceramics and more



HOBBY CONTEST
OPEN TO THE PUBLIC
NO ENTRY FEE!
Hundreds of Awards!
Stop by your local Hobby Shop for complete Details.

Regular
ADMISSION
$3.00 ADULTS
$2.00 Jrs Under 18
UNDER SIX FREE!
$AVE 50¢
Per Person
Get Free Discount Tickets where you work or at your local Hobby Shop

ANAHEIM CONVENTION CENTER
(Across From Disneyland)


Winning
Although introduced less than a year ago, the Kraft .61 has already established itself as the leading .61 cu. in. contest engine. It was used by 5 out of the top 10 finalists in Class D Expert at the U.S. Nationals. In the highly competitive Las Vegas Tournament of Champions, it was selected by 11 out of 23 contestants (over twice as many as any other engine). At the large Tucson Winter Nationals, it took first and second place, and 5 out of the top 10. At the Tangerine International R/C Championships, again first place; most recently at the first major contest of the year, the Southwestern R/C Championships, it placed first and second.
Contest winning is, of course, an important indicator of engine performance. Perhaps more important to the day to day sport flyer, is long life, dependability, and ready availability of parts and service. These are assured with the Kraft .61 because it is produced in the U.S.A. by a dedicated group of R/C enthusiasts. We believe it to be the world's best .61 cu. in. R/C engine.
KRAFT SYSTEMS, INC.
WRITE FOR FREE CATALOG
Worlds Largest Manufacturer of Proportional R/C Equipment
450 WEST CALIFORNIA AVENUE, P.O. BOX 1268, VISTA, CALIFORNIA 92083

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.

April's winner is **JOHNNIE SMITH**, Massillon, Ohio. His entry is a Curtiss HS-2-L flying boat, the first operational aircraft used by the U. S. Navy.

The 56 inch span model is built of bass wood, with fittings and engine built from brass. Wings have fabric sag sanded into surfaces, with rib tape over rib locations. Struts are spruce, while cannon/machine gun and radiator are brass. Finish is fiberglass undercoat with enamel and lacquers for the finish colors.

Model was built for the Smithsonian Institution to commemorate the 50th anniversary of Naval Aviation.

MODEL BUILDER

APRIL

1976

volume 6, number 52

1105 SPURGEON, BOX 4336, SANTA ANA, CALIFORNIA 92702 (714) 547-3963

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

WORKBENCH, Bill Northrop 6
OVER THE COUNTER, Taylor Collins 7
"IS SOARING FOR THE BIRDS?" (Part 3), Jim Gray 10
REMOTELY SPEAKING, Bill Northrop 14
PRODUCT$ IN U$E, Bill Northrop 17
PLUG SPARKS, John Pond 18
CHOPPER CHATTER, John Tucker 24
R/C SOARING, Le Gray 26
MODEL ROCKETRY, Douglas Pratt 32
CONTROL LINE, Dan Rutherford 36
F/F SCALE, Fernando Ramos 42
HANNAN'S HANGAR, Bill Hannan 44
FREE FLIGHT, Bob Stalick 50
STRICTLY SAIL, Rod Carr 56
R/C AUTO NEWS, Chuck Hallum 58

SCALE VIEWS

CURTISS A-8 "SHRIKE", Peter Westburg 29
KALININ K-4, Dave Stott 46

CONSTRUCTION

WEST'NER, Dr. D. B. Mathews 11
CABRULER O.T., Henry Struck 23
PROFILE GUARDIAN, Bill Melton 33
VACUUM MOLDING TABLE, Ron Williams 38
PEANUT SAAB MFI-17 SAFARI, Charles Roth 47
FLYING DIAMOND, Ken Willard 54

Cover: This Travelair 2000 was built by Bob Stoddart, Gardena, California, from your MB Editor's plans; first published in Nov. 1965 M.A.N., and then in July 1972 MODEL BUILDER (Plan No. 7724, $4.00). Powered by a Supertigre .71R/C turning a Top Flite 16 x 6 prop, the ship weighs 9 pounds. Top wing span is 69 inches, paint is Aerogloss, D/J striping, turnbuckles and fittings by Proctor, Williams Bros. wheels, S & O 6-channel radio. Kodachrome 35mm transparency by Stoddart.

It is again (crunch) that time of (grunt) year when the hobby trade ("Quit shovin!") shows take place. New products, model ("You're stepping on my toe!") displays, and meetings will bring modelers from ("S'cuse ME, lady!") all parts of the country. They're a great way to break up the long ("You say that %&*@†S hot dog cost 75 cents!?") winter months.

from Bill Northrop's workbench . . .

IT'S SHOW TIME!

• That time of year is upon us when, because the weather in most parts of the country is detrimental to active, outside participation, the modeling fraternity gathers together indoors to renew old acquaintances and to see what the manufacturers have to offer for the coming season.

Two of the four more or less primary gatherings have already taken place; the sound-alike RAMS of Seattle, Washington, and the WRAMS of White Plains, New York, on February 7 and 8, and on February 28 and 29, respectively.

The largest show/gathering of them all, and the one which started the whole idea some 22 years ago, is the Toledo Weak Signals R/C Club Exposition, which will probably have taken place by the time you read this . . . on April 2, 3 and 4. Following that, comes the MACS, on May 1 and 2, in Anaheim, California.

Although these shows have been originated by and for radio control modelers, we, as an all around model magazine, are glad to see free flight and control line entering the scene. It started with model exhibitors, then organizations, such as SAM (Society of Antique Modelers), and finally, non-R/C manufacturers have been appearing. As an example, but not to single out any one manufacturer, Tern Aero had a well-attended booth at Toledo two years ago, and Phil Koopman's Vintage Aero, with new and replica rubber powered kits, was continually swamped at this year's WRAM show.

Hobby manufacturers are also finding these consumer-attended shows to be more productive for sales as compared to the giant Hobby Industry Association Trade Show in Chicago (for dealers and distributors only) where toy manufacturers write their whole year's business. Whether you realize it or not, you're lucky . . . The nation's dealers and distributors decide what toys your kids will have, but *you* decide what items your hobby dealer will do best to keep in stock. If you don't create the ultimate destination for the manufacturer's product, there ain't no use in him making it!

MODEL BUILDER's Editor/Publisher and General Manager attended the WRAM Trade Show in White Plains, an old stomping ground of the editor's back in 1949 and 50. Not to take anything away from this excellent show, one reason we like to go to White Plains is to make the "Lobster Run." Both of us being former Easterners, we look forward, on Saturday evening, to driving up to "Skipper's," a seafood restaurant right on the water in Norwalk, Connecticut, and gorging ourselves on steamed Maine lobsters (we each ate 2-1/2!).

And while we're on the personal stuff . . . Anita, being a former New York City "Cliff Dweller," who would go back to live there at the drop of a hat, couldn't pass up taking another look, since we were so close. As fortune would have it, Nicky Wyeth, son of the world-famous American painter, Andrew Wyeth, both of whom, if you'll excuse the name-dropping, are on our list of special friends we are most proud to claim, invited us out to dinner, with his wife Janie, at Trader Vics in the Plaza Hotel. Nicky is an ardent modeler and engine collector, flies free flight old timers and R/C, and has a model workshop in his 12th story apartment on 5th Avenue.

On Monday, we spent most of the day around Times Square, window shopping and souvenier hunting, until time to head for JFK Airport and the flight back to California.

NEW AT MB

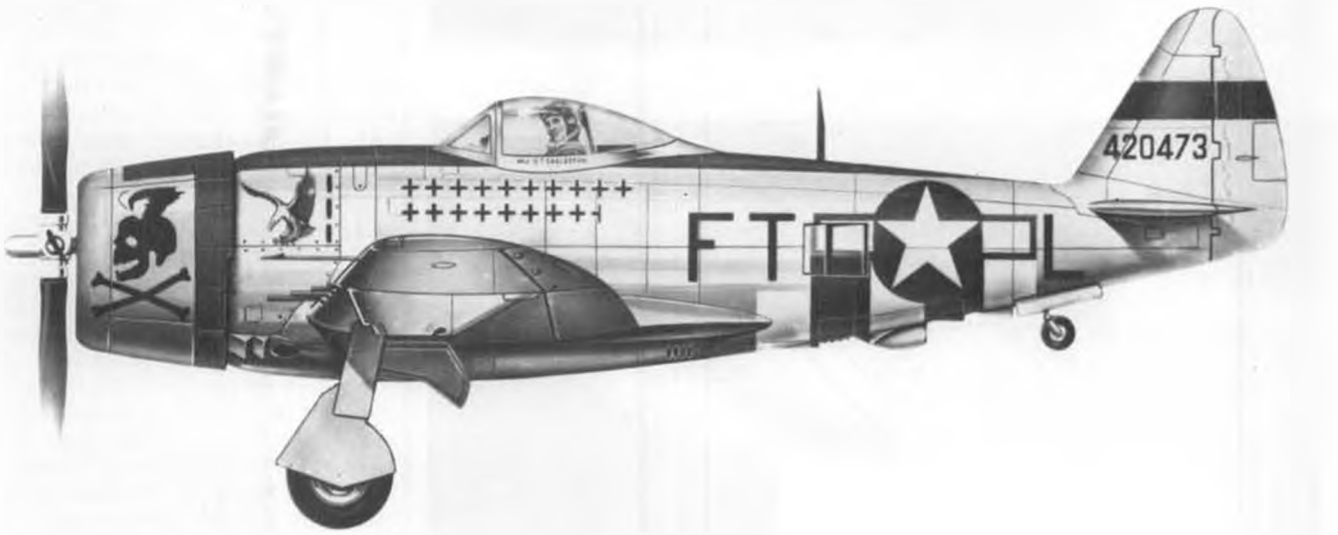
Beginning this month and continuing MODEL BUILDER's policy of looking into all phases of modeling, we are introducing a series of articles on model rocketry. Model rocketry has been with us for some time, but except for some material that was published in the now-defunct AAM a few years ago, it has had little recognition in the model press. Actually, we should say *American* model press, because in our magazine exchanges with model publications from other countries, particularly in Europe, we find consistent coverage on model rocketry. In fact, if it weren't for that, we'd hardly be aware of the fact that it has reached International and World Championship status, and the advanced stages of the hobby are extremely exotic, with radio control, multiple-stage firing, live cargo, and the like.

Model rocketry had its growth problems, just like gas modeling (both went through early stages of being banned in some states), but is now enjoying a great deal of popularity, especially among the younger modelers. It is our hope, that by publishing material on model rocketry, we will attract still more readers, who will then see what other interests there are in the field of modeling. We all need each other!

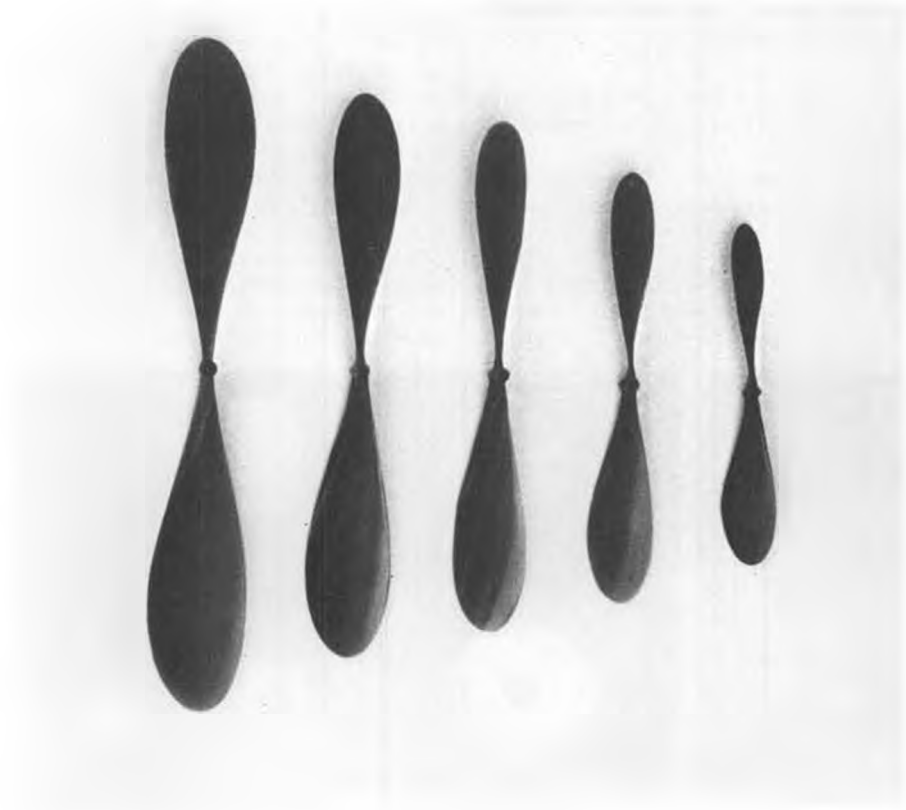
Doug Pratt, of Raytown, Missouri, will spearhead our model rocketry series. He has lots of material ready for publication, but we'd like our readers to

Continued on page 92

OVER THE COUNTER



R/C Sport Scale P-47D Thunderbolt, by Top Flite Models.



Plastic props for rubber powered models, from Peck-Polymers.

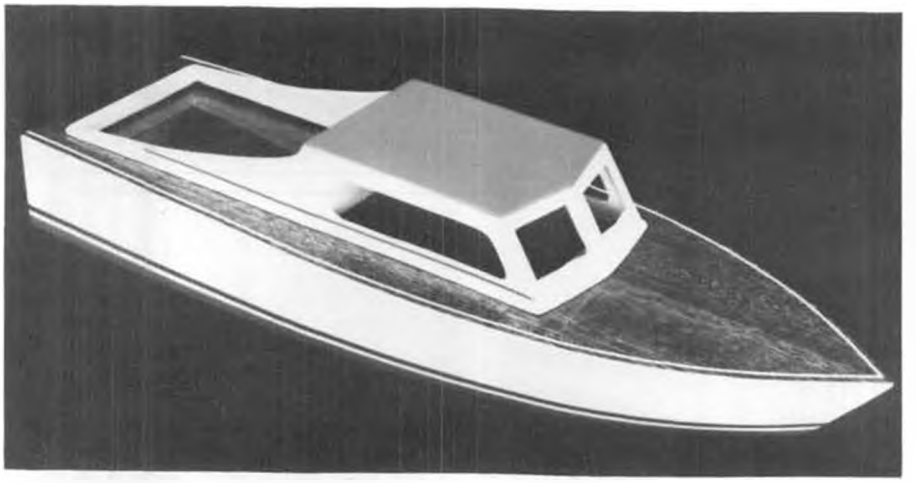
• The "Jug" is here! After two years of keeping WW II stand-off R/C Scale buffs on pins and needles, Top Flite Models, Inc., 2635 South Wabash Ave., Chicago, Illinois 60616, has finally released its P-47D Thunderbolt kit. Designed, built, and flown to several major contest wins by Top Flite's Dan Santich, the P-47D spans 60 inches, has 720 sq. in. area, and will fly with .50 to .60 displ. engines, using 4 to 6 channel (retracts and flaps) radios. Price is $79.95.

The kit features several unique structural techniques, including the formed balsa fuselage shells and the tough, two-piece injection molded cowl. One-piece balsa ailerons, flaps and stabilizer are also employed. Fuel-proof, matte mylar pressure sensitive decals, hardware package, full size plans, and an illustrated, step-by-step instruction booklet round out the complete package.

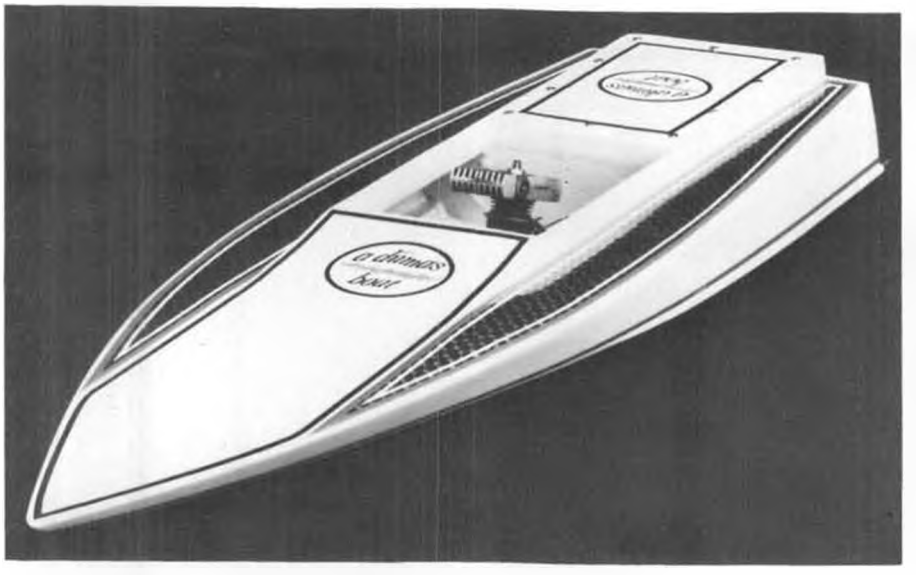
We bet the air will be full of Jugs this summer!

* * *

In a recent issue, we mentioned that Hal DeBolt was making a limited run (100) of kits for his stand-off scale model of the famous Caudron racer. Designed primarilly for Quarter Midget pylon, the model could also be used in Sport Scale, Pattern, and high-speed



Half-Pint Cruiser for .049 engines, by Dumas.



Skevee 10, 18 inch long V-bottom ski boat by Dumas, for .049 engines.

buzzing around. The immediate popularity of the kit made it impossible for Hal to limit the kit production . . . a nice predicament to be in!

The kit is a modeler's dream . . . parts are machine-finished to size, finished maple engine and fuselage crutches, finished pressure cowl and pod parts, machined wing ribs and jigs, shaped fuselage sides, bulkheads, and formers, formed wire landing gears, strip hinges, all hardware, full size plans, and instructions.

Ship is one-piece construction, although a removable power pod gives immediate access to the engine, fuel tank, and R/C installation. Span is 41-1/2 inches, area is 340 sq. in., weight 2-1/2 pounds, 3 to 5 channels, and .15 power . . . natch. Price of the deluxe kit is $42.95.

* * *

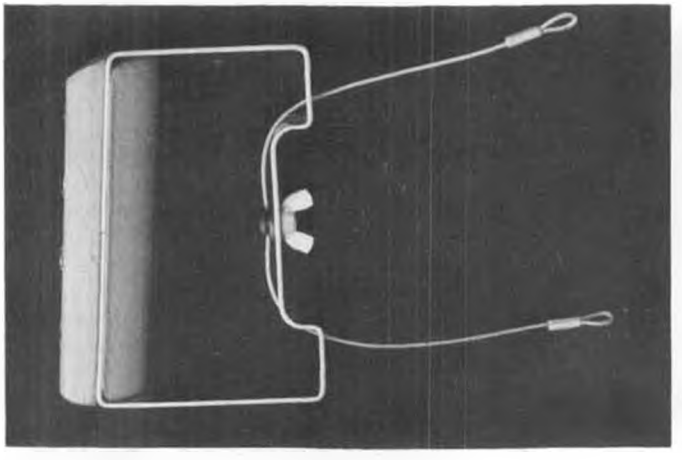
The entire Kirn-Kraft line of 1/2A engines, parts, and racing accessories has been taken over by Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, Calif., 92653. Half-A racers will be glad to know that the 128 threads/per inch needle valve and spray bar assemblies will be in full production. These fine adjustment needle valves are secured in a nylon sleeve which prevents any air leakage around the threads. The fine threads make precise mixture adjustment easy, even with pressurized fuel systems.

Kustom Kraftsmanship will also be producing the customized backplates for Tee-Dee .049 and .051 engines. These backplates, which are anodized in distinctive red color, are fitted with a pressure fitting which has a .010 inch orifice. This extremely small hole provides an ideal amount of pressure to provide even fuel flow.

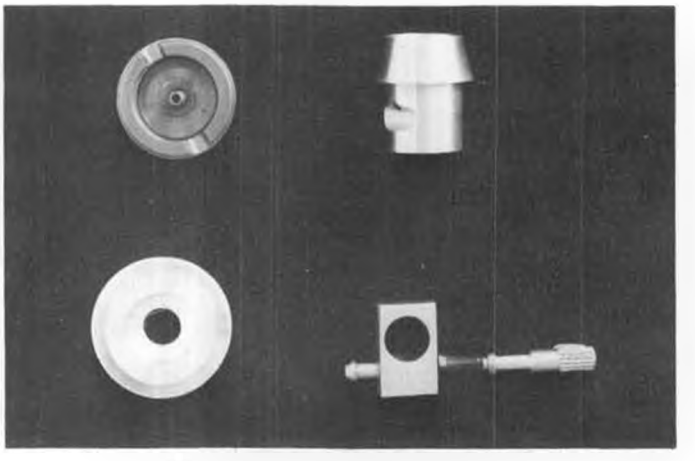
In addition to the 1/2A accessories, Kustom Kraftsmanship offers a line of engine accessories for larger engines. Two Rossi .15 accessories include a snorkel-type venturi which eliminates the fuel surging associated with stock Rossis run on pressure. Another item is a head insert, which allows conventional glow plugs to be used in place of the head insert type plug that is standard on the Rossi. For more information on the complete Kustom Kraftsmanship line, see your dealer or write directly to Joe Klause.

* * *

Carl Goldberg's traveling goodwill ambassadors, Bob and Doris Rich, have been asking modelers all over the country what accessories they would like to see produced. Among the items asked for and produced, are steerable nose gear assemblies in two sizes. The medium size unit uses 1/8 inch music wire, and a companion nosegear bearing and steering arm. The larger size now features an adjustable axle, allowing the 5/32 inch wire strut to be cut to any length. Also offered are 1/16 inch aileron pushrods with 2-56 threads which allow direct connection to servo output



New control line handle by Fox Mfg.



Rossi and Cox accessory parts by Kustom Kraftsmanship.

Compete-Tote field box by Custom Craft Products.

Replica kit for the Modelcraft Soaring Glider of the 1930's is being produced by CPM Products.

arms without having to enlarge the holes. Another clever item is their push-rod connectors, which attach to a servo output with a nylon snap nut. A simple lock screw arrangement locks down on the wire pushrod, allowing easy length adjustment. Since the wire rod does not have to be cut to exact length, the installation time is very short. Goldberg is also offering molded skids for use on wing tips, or as extra protection for the tail on tricycle gear installation. For reinforcing wing center sections, they are offering nylon tape in 4 and 6 inch widths. When applied with epoxy, the tape provides incredible strength and ding resistance. A total of eleven new items have been added to the line, including frequency flags, landing gear straps, strip aileron horns, wheel retaining springs, and solderable clevises. For more information see your dealer, or contact Carl Goldberg Models, 4736 West Chicago Ave., Chicago, Illinois, 60651. And tell 'em MODEL BUILDER sent ya!

* * *

The economy of Half-A engines is not only catching on for R/C airplane fliers . . . it has also hit the boating world. Dumas Products, 790 South Park Ave., Tucson, Arizona, 85719, is now producing two new power boats designed for .049 power. The Skevee 10 is an 18 inch long, Vee-bottom ski boat. The Vee bottom can even handle rough water for competitive racing. The Half-Pint Cabin Cruiser also has an 18 inch hull. With an .049 engine, two channel radio, prop and 'cool clamp' water cooling for the engine, the Half-Pint is a good choice for a beginners R/C boat. Both kits are of all wood construction, and retail for $14.00.

* * *

The Compet-Tote, from Custom Craft Products, is now available in kit form. This compact field box includes model support saddles that will safely support any size model. Special fuel resistant foam rubber cushions are provided to protect the model from 'dings'. The plywood and particle board parts are precut for easy assembly. Space is provided for a one gallon fuel can, and two equipment sections for tools, starter, batteries, and similar paraphenalis. If your hobby dealer doesn't have the Compet-Tote, it can be ordered direct from Custom Craft Products, 19 Florgate Rd., Farmingdale, N.Y., 11735. Price is $14.95, with a $1.50 postage and handling charge.

* * *

Fox Manufacturing is now offering the first significant change in a control-line handle in many years. The handle offers adjustable line centering, two position line spacing (to allow for increased or decreased control sensitivity), and a virtually indestructible design. The formed steel strap handle is fitted with what appears to be mahoghany grips. A wing-nut clamp holds the stranded steel lead lines firmly in position, yet allows easy adjustment. The Fox No.8000 Control Handle will be available from dealers everywhere for $3.95. For further information contact Fox Manufacturing, 5305 Towson Ave., Fort Smith, Arkansas, 72901.

* * *

Continued on page 89

Hal deBolt's Quarter Midget Caudron racer, now in full kit production.

Sku . . er, Pole Cat R/C trainer, by Prather products, for .10 to .19 power.

"IS SOARING FOR THE BIRDS?"

By JIM GRAY . . (Part 3): Continuation of a series on birds that soar, and what we can learn from them. Required reading for R/C sailplaners.

• I've often wondered what advantage a gull-shaped wing has over a straight wing, other than esthetic value, that is. We've already speculated about lift distribution, soaring ability and the like, but I'm convinced that there is still another "plus" for this shape. It is inherently stable, particularly gust-stable. In their early experiments at Kill Devil Hill, the Wright brothers employed unmanned tethered gliders designed to lift and stabilize overhead in the lift flowing up the hill face. Tethers or ropes were fastened to each wing to prevent the glider from rising further or from getting away; and, when conditions were right, the glider would rise and hover motionless directly overhead.

The Wrights often experienced side-gusts and destabilizing turbulence. Their first attempts to correct and overcome this difficulty was . . . as you might expect . . . to add dihedral. However, that proved totally unworkable. The problem was corrected finally by making the wings anhedral, that is, negative dihedral; approximately six inches in a thirty-foot span. Modern designers have eschewed anhedral, perhaps for well-founded reasons. However, for slope or dynamic soaring, anhedral may be "the way to go". We won't find out unless we try it. Interestingly, the Wrights chose the slope of the hill so that the direction of airflow coming up the slope would strike the wings at precisely the proper angle of attack, so that the glider could rise while trimmed perfectly horizontal to the ground on the "plateau" at the hilltop. As I recall, this angle was reported to be on the order of seventeen degrees. It occurs to me that sea birds are "designed" to soar under conditions of laminar air flow and slope lift; can it be that anhedral provides the necessary stability under these conditions? Why not research the matter with an R/C sailplane? Dihedral is not needed for soaring birds to make turns, inasmuch as they possess "full-span ailerons" in the form of wing-warping ability. Speaking of that, why don't sailplaners try wing-warping for control? *(Astro Flight is about to market pivoting wing panel devices for aileron-like control. wcn)* The Wrights used it very successfully with their thin "cambered plate" airfoils. It seems to me that modelers could use thin airfoils and aero-elastic structures, too. Why not? The Wrights proceeded cautiously and carefully, making exacting observations, taking their lessons from natural soaring, and trusting nothing that man had earlier held to be true. If one wishes to fly, then nature may be his best model or pattern.

Looking at the gull-shaped wing from the front or rear view, we see the body as if it were suspended between two inverted "U"-shaped arcs. It occurs to me that the naturally downwardly curving shape of a gull's wing (inverted U-shape) may also serve another useful purpose of a structural nature. Consider a cantilever beam; that is, a beam attached at one end to a support. This is analogous to a birds wing. The compression lines approach the *bottom* surface perpendicularly, smoothly curving from the "root" where they are *parallel* to the surfaces. Likewise, the tension lines meet the top surface perpendicularly out toward the tip, while lying *parallel* with the surfaces at the root. If we now carve away all of the beam structure, leaving only the compression lines, the resulting shape is that of a gull wing as seen from the front view. It appears then, that the gull wing is shaped in this fashion to take bending stresses in the upward direction, meeting them everywhere equally, yet in the lightest possible manner. If the time arises when the gull needs to fly inverted, he probably folds his wings entirely, otherwise they would likely fail under the reversed loads that were not designed to be met! How about it J.L.S.?

Bamboo is a light, fibrous, tapering, tubular structure which is also somewhat porous. Very similar to the long bones of a bird's wing! The major difference is that every few feet along the length of the bamboo, there is a circumferential "ring." This ring tends to hold the fibers of the tube in place under bending forces and acts as a stiffener against buckling failure. From these examples, I would like to see someone build a tapered, tubular fiberglass spar with ring stiffeners spaced along its length, in the manner of bamboo. If the spar passed through holes drilled in each rib, of course, then the rib itself acts as the ring stiffener. Such spars in a sheeted foam wing would produce an exceptionally strong structure.

In a bird, especially a soaring bird, the small bones of the "hand" must take the stresses of the pinions and of flapping. Simple tubes of the type found further inboard are no longer adequate to resist the forces applied near the tips. In a vulture, for example, the metacarpal bone consists of a triangular, trussed structure; very much like a triangular television antenna tower of the type having criss-cross or spiral bracing holding the three legs together formed by the wings: similar to a pair of parachutes, with the body suspended between them. This would appear to give excellent roll stability, together with somewhat of a parasol effect, while retaining substantially full projected area. The anhedral tips incline rearwardly in side view and slightly downwardly, below the bird's centerline; while the top portion of the "U"-shaped arc projects above the bird's centerline, slightly ahead of the c.g. The areas appear quite well balanced about the c.g., permitting neutral yaw stability; yet rotation of the tail to provide fin and rudder area aft of the c.g. provides immediate "weathercocking" for the bird. The initial act of tail rotation tends to overcome the parachute stability in roll, permitting some change of direction and steering. I think that it would be very interesting to find out from Rod and Mark Smith if any of these effects were discovered during their efforts to build and fly "Jonathan Livingston Seagull."

STRUCTURE

Bird bones are tubular; that is, they are round in cross-sections and hollow. They are also flexible, tapered and even porous! They are capable of withstanding loads in virtually all directions, with substantially uniform deflection. The tension and compression stresses produced by the bending loads are absorbed in the walls of the tubes and by the tubes yielding elastically, without failure. Lines of zero stress are found along the centerline of the tube where the bones are hollow. Nature economizes.

Tapered tubular spars are almost ideally suited to meet stiffness requirements for a wing with minimum weight. The principle is illustrated by rolling a sheet of paper or thin balsa into a tube, and testing stiffness; that is, resistance to bending. Failure of such a structure is by buckling under extreme bending loads. Prior to failure, a pronounced lobe appears on the compression surface. The long, tapering tubular "spars" of a bird's wing are nearly ideal for resisting the loads of ordinary soaring flight. . .and even the loads imposed by flapping. . .at the very minimum weight possible. The quill of a feather is another illustration of bending flexibility, in which the deflection is also coupled to a torsion mode, so that in tip pinions for example, the

Continued on page 77

THE West'ner

By DOC MATHEWS . . . A six-tenths scale model of Elbert "Joe" Weathers' great camera plane, small enough for an .049, but big enough to thermal soar with an Ace Pulse Commander radio on rudder only.

• In the memories of most old timers in this hobby, a few models of exceptional esthetic beauty stick out . . . one of the most graceful of these free flights of the pre-World War II Era was Joe Weathers' "Westerner." Published in May 1938 *Model Airplane News* as "a camera carrying model," the poor photo quality failed to really show off the design to its best advantage, however, most of us took one look at the plans and fell eternally in love. In an era of some truely ugly, highly utilitarian designs; the "Westerner" stuck out like a pretty girl in a crowd of boys. No insults intended, but most free flights of that time were designed only for the flying, not for the eyeing. Let's face it . . :"Lanzo's Record Breaker" and the "Powerhouse" don't exactly display a symmetry of line that is esthetically appealing. *(Rebuttals may be addressed to Dee care of MODEL BUILDER! wcn)*

For many years I have looked longingly at that old copy of *MODEL AIRPLANE NEWS,* thinking . . . someday. I even ordered a set of full size plans from John Pond several years ago. Great guns, that thing is big! Would you believe a 96 inch span and a fuselage 58 inches long? Since I still have three payments left on the Solarfilm covering for my Super Buc, I just couldn't ask the "Lone ah Ranger" for more. But how about scaling a Westerner down 60%? It gives a more manageable size, it doesn't cost an arm and a leg for materials, it can use an .049 and an Ace pulse system, and it makes a darn cute airplane. I'm sure you must agree, so let's get building on yours.

GENERAL

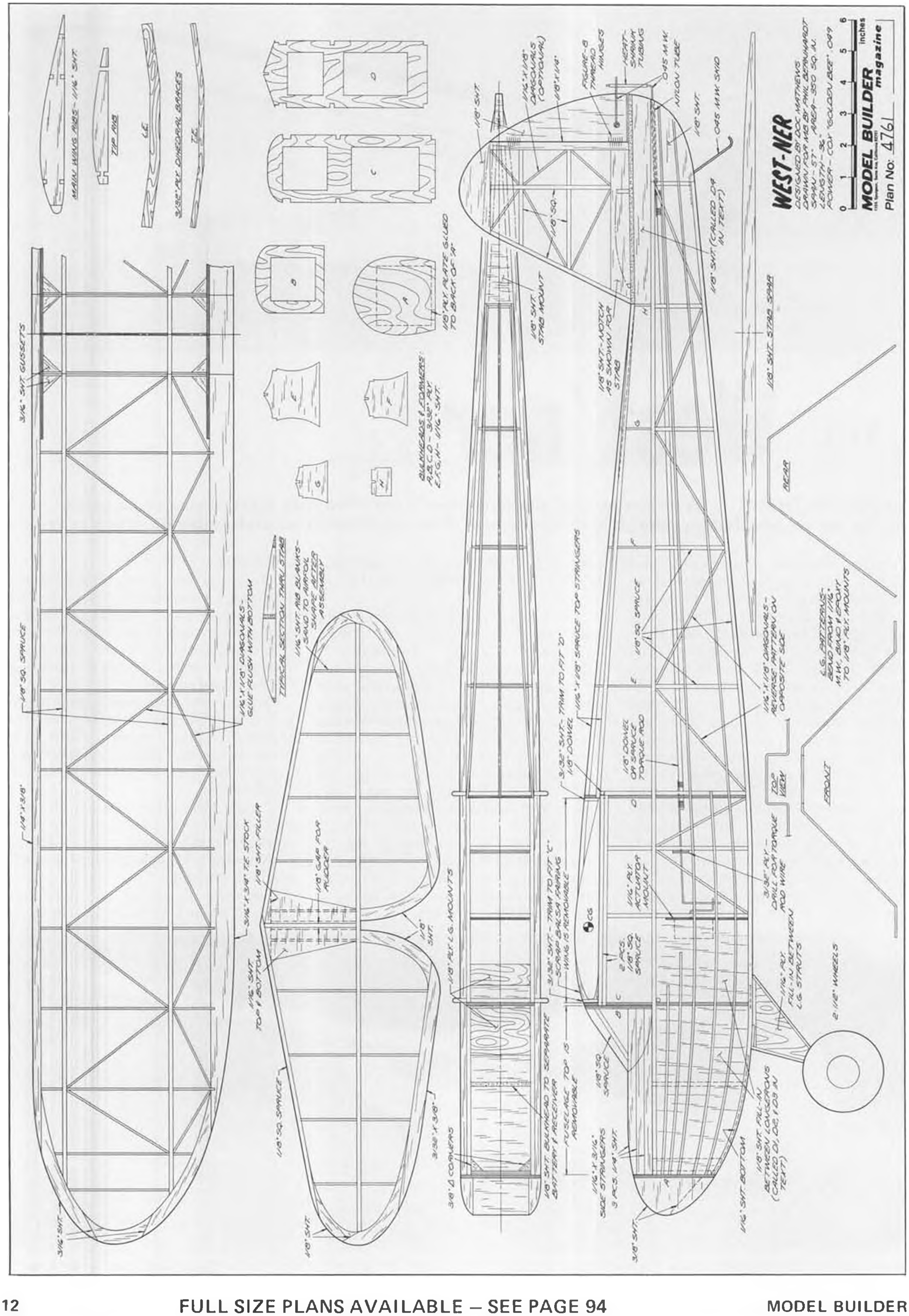
All joints are glued with Titebond, Wil-hold, or equivalent. Epoxy is used for dihedral joints, firewall and landing gear. Cover plans with Saran Wrap or something similar, but not wax paper. Use spruce where specified, balsa will not be strong enough.

Trace parts onto thin typing paper, use a straight edge for flat areas for accuracy, spray pattern with 3-M Spray-ment, then stick onto wood and cut out. Peel the paper off and sand.

FUSELAGE

Pre-cut all fillers, bulkheads, etc. before beginning construction. In other words, make yourself a kit. Start by pinning 1/8 x 1/8 spruce longerons onto fuselage drawing. Pins should not go through the wood, but on either side. Glue fillers D-1 through D-4 in place

May seem a bit large for an .049 engine, but the West'ner is really nothing more than a powered glider. The Ace Pulse Commander system keeps the weight down, and also keeps the model in sight of the flier!


WEST-NER
DESIGNED BY DOC MATHEWS
DRAWN FOR MB BY PHIL BERNHARDT
SPAN - 57"   AREA - 350 SQ. IN.
LENGTH - 36"
POWER - COX "GOLDEN BEE" .049
MODEL BUILDER magazine
Plan No: 4761

If you don't like pretty framework, this is not for you. As with the original Westerner, the frame features an intricate network of diagonal bracing.

(allow slot for C). Add vertical 1/8 x 1/8 balsa and diagonal 1/16 x 1/8 balsa, allow to set up, then repeat, building second side directly over the first. Allow the two sides to set at least 8 hours before removing from plans.

Separate the two halves by popping apart gently with a table knife. Trial fit B, C, and D into appropriate slots, then glue permanently. Invert and position wing rail on building surface, use a triangle and carpenters square to align everything at 90° angles, holding positions with masking tape, clothespins, and T-pins. When glue is set, mark the mid-line on the bottom (surface up) of A, C, and D. Place a straight edge on this mark and pull tail together at mid-line. D-4 is glued and held together, at rear, with clothespins, then cross members are fitted top and bottom. Diagonals are added to bottom, as are the cross sheet fillers.

The tail skid is formed and epoxied to ply filler. The landing gear is formed using a good vice-grip plier, and wrapped onto the ply cross pieces in front and rear. This assembly should be epoxied in place, and the thread wrapping smeared with the epoxy at the same time.

Allow glue and epoxy to set, then remove fuselage frame from surface. I prefer to leave the masking tape in place as long as possible to avoid loosening the cross pieces accidentally. Add deck formers, E, F, G, and H, stringers, stabilizer saddle, actuator mount, firewall, nose blocks; and sand fuselage to contour.

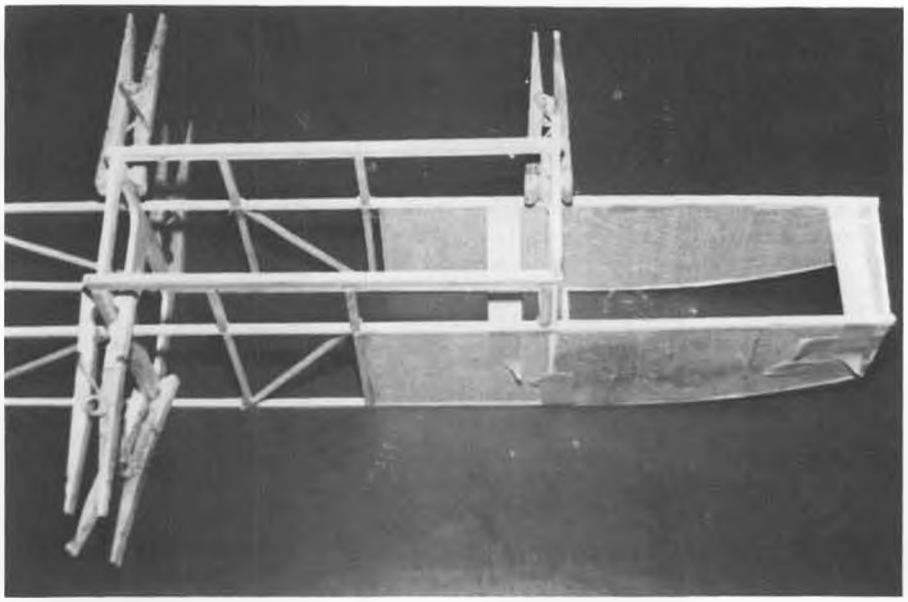
The actuator and radio gear should be installed temporarily, following Ace's instruction book. The torque rod is made up of 1/8 x 1/8 spruce, with wire bound on each end, then threaded from front to back *before* bending rear loop. Leave a considerable length on the rear wire, which will allow you to thread much more easily. Use torque rod bearing tubing (Ace) on cross piece and at the tail post. Position actuator on its mount and insert into loop on the torque rod. Check for free motion and position rear torque tube (I use Hot Stuff). Do not bend rear wire until final assembly.

Front hatch is made of two layers of 1/4 inch sheet, and 1/2 inch triangle balsa. The windshield frame and hatch are best made up directly on the fuselage. The undercarriage fairings are best made by drawing the outline from the wire onto 1/16 ply. The fairings are Hot Stuffed in place then covered with two layers of silk during covering. Drill holes for 1/8 dowel wing hold downs, but do not glue until the fuselage has been covered. Windows are installed *after* doping.

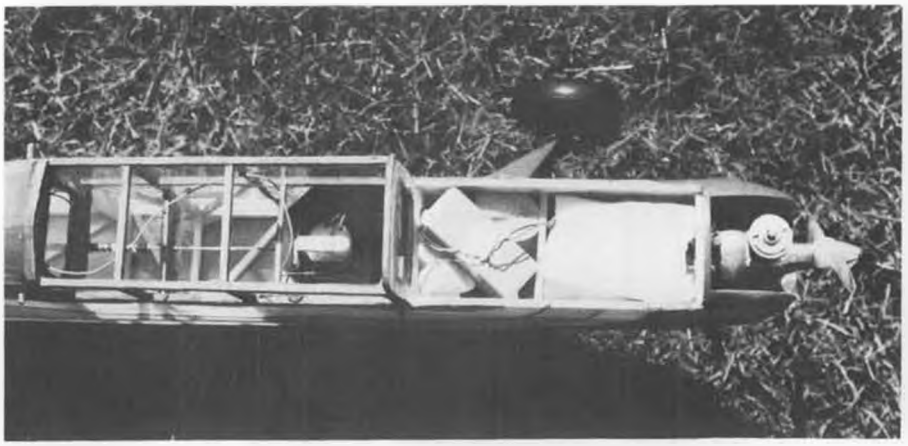
WING

Trace wing rib pattern onto thin typing paper, spray with Spray-ment, stick onto 3/32 or 1/8 ply, cut out, and

Continued from page 62



The handiest and most inexpensive modeling clamps in the world; clothespins and masking tape! At this point, alignment is of major importance.



In spite of the small size of the airplane, there's buckets of room for Ace pulser installation. Battery pack is up front with the foam wrapping.

Rear view of actuator mounting shows crank linkage. Loose fit is important . . no binding.

Entrance to the Westchester County Center, site of the WRAM trade show, 10 minutes before opening time on Saturday morning!

Digital radio control pioneers, Don Mathis (lt) and Doug Spreng receive Howard McEntee Memorial Award from Howard's widow, Elinor McEntee. Medals awarded for significant contribution in the R/C hobby/sport.

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

TRADE SHOW NEWS

• As discussed in our "Workbench" column, it is trade show season, and two of the four biggies have already taken place . . . the RAMS of Seattle, Washington, and the WRAMS of White Plains, New York.

In recent years, all of these shows have become so huge that it is impossible to cover everything and everyone when describing them, particularly in one issue . . . and it could get a little repetitious. So, we'll shoot you some pictures and mention various ideas and products, as they come to mind, in subsequent issues.

We couldn't make it to the RAMS 11th Annual in Seattle this year, however, the "Bothell Bumpkin," our Control Line columnist, Dan Rutherford, untangled himself, from his wires long enough to go take a look. After checking out the manufacturer's displays, Dan sat in on the 1/2A Pylon Racing Symposium, conducted by Vince Caluori, who had a great presentation on the aerodynamics of 1/2A pylon planes. "All very scientific, yet easy to understand, and Vince opened a few people's eyes with his presentation," Dan says.

"At the end of the 1/2A Pylon Symposium, they had a rules-making session and have dropped their previous set of rules, which was basically those presented in RCM awhile back. Basically the Northwest 1/2A Pylon rules, to go into effect this June 1st, require 20 oz. minimum weight, 200 square inch minimum wing area with 7/8 inch minimum wing thickness at the fuselage (taper to nothing at tips is OK). Any planform for wing is allowed, which should lead to some interesting designs as opposed to the ugly, rectangular planforms previously required. ROG not required (flying starts have always been used here anyway), and landing gear is an option. No scale conformance is required now, allowing more freedom of design.

"For those interested, a copy of the above rules can be obtained from Pylon Racers of Puget Sound (PROPS), c/o Nelson Eddy, 3003 9th St. N.E., Puyallup, WA. 98371.

"I've been following 1/2A Pylon ever since these guys started doing it, and have helped them with engines, bladders, props and fuels. At first, they had a lot to learn and it was really funny to listen to their doggy engines and pick up their 30 oz. planes. But they learned fast, and I am willing to bet that nobody goes faster in 1/2A Pylon, I don't care where they're from. And you can quote me on that! *(We did. wcn).*

"They are now in the process of planning the International 1/2A Pylon Championship Races for Memorial Day weekend (May 29th & 30th) and asked me to tell you about it so you could drop a line in about the Champs. *(Consider it dropped. wcn)* Further info can be had by writing to Nelson Eddy at the above address. They have a lot of experience at putting on good 1/2A races, and are working to make this Champs their best contest ever."

MODEL BUILDER had a booth at the WRAM show in White Plains. This

Best-of-Show at the Seattle RAM show was this Jenny, by Ron Adler, of Mt. Rainier R/C Society. Also took first in WW I Scale.

Bruce Christensen, who headed up the RAM show, with his DO-335. HP 61 front, OS 40P back, flaps,retracts, 8' span 16 lbs., EK radio.

"Come on, folks, for $125 it's worth it for the retracts alone!" Swap Shop in full swing at all times during the WRAM show.

MODEL BUILDER's General Manager, photographed from the balcony, was busy taking subscription and Uber Skiver orders.

was our third New York show in a row, and though we haven't seen the figures, it had to be the largest yet, in attendance. Last year's affair was hindered by gas rationing and heavy rains, but this year the weather was sunny and mild, and the modelers really came out of the woodwork!

It appeared to us that there were a few less manufacturers present. It was felt that the economy pinch dictated that some companies could only afford to attend one show, and that one would be the huge Toledo affair.

People always ask "What was new?" This is a bit difficult to sort out, because many *new* items were really variations on a previous product. Anyway, our own booth kept us so busy that we can only give a sketchy run-down of what was seen.

At Ace, we saw a new single-stick transmitter, a Half-A engine mount, and a glow driver based on Brian Ellis' Jan. '76 MB articles. Cox Hobbies, combining Cox and Airtronics, showed the new line of .15 and .40 engines. Bill Cannon was walking around with a working servo so small you could hide it under a postage stamp. The "Bingo" R/C sailing yacht by Dumas is a beauty. KGL's new "wire" wheels are very neat and rugged. They'll also be available with canvas covers. That Lenco Staggerwing Beech is a real eyecatcher and a new sport bipe has been added to the line. Polk's was showing a new CO2 engine, mostly plastic, which will sell for $19.95. A test sample is coming. Also Polk's was showing . . . Are you ready? Four-stroke radial engines in 5 and 7 cylinder configurations! Price? The 5 is $1000.00, the 7 is $1400.00. Displacement 13.86 and 19.40 cc, rpm 4,000 and 4,500, weight 18 oz. and 24 oz. Ralvin was showing a positive-action wheel brake, and low battery warning devices for transmitter and airborne packs.

Perhaps the most interesting new item was an operating scale model of the Convair "Tail Sitter" VTOL "POGO", by Steve Snyder Enterprises. This will be a complete kit with fiberglass and foam, plus a transmission kit for the contra-rotating 21 inch props. We understand the prototype model was scheduled for first flight tests the weekend following the WRAM show.

Mr. and Mrs Dave Wallick, of Wallick Industries, showing many special engine accessories.

Craft-Air's newest is the SD-100 sailplane, a plastic bodied version of the popular Windrifter. Goldberg showed

Ben Shereshaw, of Bantam Model Products, makers of Head Start glow plug.

Cliff Weirick models a pair of wire spoke wheels marketed by KGL.

Control line's engine man, Duke Fox, showing Fox R/C .45 with "candy cane" muffler.

Say 'Hello' to Jerry Bonzo, Pro Line's marketing man, enjoys something for a . . er, sore throat at the WRAM show.

". . . and if you don't want to build a wing, they make dandy small parts trays." Matty Sullivan explains his molded wing cores.

Tom Runge (left) and Paul Holsten in the Ace R/C booth. Ace is the mainstay of single channel radio control.

Hear (Keith Finkenbiner), See (Gil Rifkin), and Speak (Dan Pruss) no evil, manning the LSF and NSS booth at the WRAM show.

non-finger sticking cyanoacrylate glue, a hinge slotting tool, hardened steel wheel collars, and the new control line stunt P-40 which may also be flown R/C. Nothing new about Nitrotane fuel, except that the list of testimonials for its excellence keeps growing, including 23 first place winners at the '75 Nats. Rhom Products electric fuel pump screws on in place of the fuel can cap. Can't be much simpler than that! Midwest Model Supply (Gerry Nelson) has the new HP61FS which puts out 1.6 horsepower, while the HP40F is a mini-60 in power at .90HP. K&S has now added 3/4 inch streamline tubing (35 inch length) to its stock of sizes. Nice for those big struts. Walt Good, Don Clark, and Ben Givens, as Soaring Products, Box 117, Kensington, MD. 20795 are now offering their Thermic Sniffler 900 series, complete with monitor receiver for $99 postpaid. Airborne Associates now has Don Lowe's Phoenix VII, a much improved version of the VI.

That's just a taste of all the stuff that's coming up this year. Following the Toledo show, we'll have lot's more to add.

STOP THIEF!

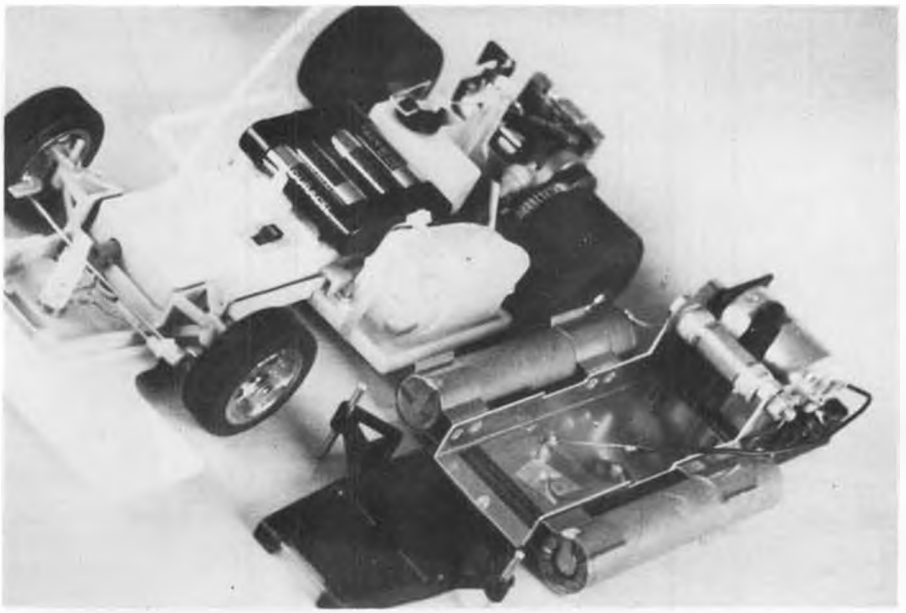
Recently, a substantial number of Hobie Hawk Gliders, completely finished and with radios installed, were stolen from the company's facility in Irvine, California. The following list is divided into glider colors, and under each is a list of the serial numbers of the radios installed therein. If you spot any of these systems, whether in a Hobie Glider or something else, contact MODEL BUILDER, or Dave Rouse, care of Coast Catamaran, 2026 McGaw, Irvine, California 92714.

WHITE		**ORANGE/WHITE**	
RS	6612	RS	6461
Kraft	15415		6552
	15760		6621
	15807	Kraft	15493
ORANGE			15850
RS	6851		15944
	6866	**RED/WHITE**	
	6876	RS	6530
	6877		6613
	6881		6773
	6882		6782
YELLOW/WHITE		**BLUE/WHITE**	
RS	6320	RS	6319
	6790		6405
Kraft	15706		6504
	15720		6524
	15731	Kraft	15331
	15733		15532
15791	15973		15827
15792	15976		15843
15857	15989		15853
15937	15996		15854
15939	15997		15978

Continued on page 88

Jerry Krause and Jim Simpson of EK discuss sales strategy with KGL's Jack Yarger. Bob "Skinny" Elliot was getting a diet Coke.

Bruce Paton, Chief Engineer at Cox, explains the new .15 and .40, and the affiliation with Sanwa Radio and Airtronics.



The Cox .049 Jerobee chassis and the Leisure Electronics conversion chassis, awaiting the transfer of parts for electric operation. Radio, axles, wheels and Lexan bumper get switched.

PRODUCT$ IN U$E

Leisure Electronics' JEROBEE ELECTRIC CONVERSION CHASSIS

By Bill Northrop

• Leisure Electronics, 11 Deerspring, Irvine, California, 92714, produces an electric powered version of the well-known Jerobee 1/12 scale radio controlled, Cox .049 powered "Greenwood Vette." The car is available with the Jerobee radio for $179.95, with the Futaba radio for $219.95, or without radio, for $99.95. In addition, for those who already own a gas-powered Jerobee, Leisure Electronics offers a complete electric conversion chassis, with power train, for $57.95.

The electric conversion chassis includes the standard Jerobee chassis bed, with the electric drive motor, speed controlling wire-wound rheostat, wiper, and rechargeable power batteries . . . all wired up and ready-to-run.

Actual conversion takes only around 20 minutes to a half-hour. One merely removes the "C" clips holding the rear wheels in place, pulls out the rear axle, and transfers the parts to the electric chassis. It is important to note that the spur gear supplied with the motor is designed to fit the standard Jerobee 56-tooth drive gear. Other gears can cause binding that might result in overheating and possible burn-out of the motor.

The front axle arms can be unsnapped from the king pins, and transferred to the king pins of the conversion chassis without bothering to remove the front wheels. The track rod and steering arm go along too, without modification.

Finally (at least with the Jerobee radio), the R/C system is switched, by undoing a couple of screws, lifting out the receiver/servo block, and relocating it in the conversion chassis.

The only bit of creative thinking required comes with the installation of the wiper arm for the speed control. The arm length needed for different servos may vary, so a long one is provided. Putting a "Z" bend in the arm provides adjustment for both length and contact pressure. The tricky thing is to combine the arc-shaped path of the wiper contact point with the straight line of the wire-wound resistor (rheostat) and still have contact along the full length. Furthermore, the drive batteries should be fully discharged during this adjustment period or you're going to have a jolly time holding onto the critter with its rear wheels spinning like mad! It is also of utmost importance that the wiper contact travels well into the dead, or "off" portion of the resistor when the throttle control is completely retarded. This is not only the "off" position, it is also the brake. The electric motor refuses to budge when you try to turn it through the 4 to 1 gear train!

Operation of the Leisure Electronics converted Jerobee is a piece of cake. You turn on the transmitter first (If you turn the receiver on first, the wiper may jump onto the speed control rheostat, either because of interference or just the normal turn-on "twitch", and the car could take off unexpectedly!), then the receiver, and you're ready to go.

Accelerate slowly! With the gearing and power of the electric motor, you'll get "instant spin-out" if you jab on full throttle. The Greenwood Vette, like its prototype, is a racing machine. It is entirely competitive with the .049 powered cars, and on short courses with many turns, its instant acceleration and late braking capability gives it almost unfair advantage. On longer courses, the gas powered cars may have higher speeds on the long straights, but the electric will eat 'em alive on the turns!

Charging of the electric power drive batteries is easy, once you get the hang of it and establish a certain routine. A charging cord is supplied with the unit, having an automobile cigarette lighter plug on one end and a plug to fit the

Continued on page 90

Speed control wiper arm must be adjusted for full sweep. Best that power batteries are discharged or disconnected for this operation!

Auto Charger works off car battery, provides controlled discharge and charging of drive batteries.

Oh for the life of a CD! Jim Clark wistfully twists the prop on his carefully staked down Sailplane . . . that he won't have time to fly.

PLUG SPARKS

By JOHN POND

• Beer can compressed air motor tanks. Yep! It's a fact and here's the way to make them, as promised in the last issue. Best part about it all is that the tanks are made from the columnist's favorite beer, Coors, sometimes called "Colorado Kool-Ade". The impact extrusion aluminum cans are light! So, all you guys who have been ribbing the writer unmercifully for his penchant for beer, sit up and listen carefully.

All credit for the beer can tanks should go to Bert Pond, who has promoted compressed air flying since 1930 (and is still doing it!). The first thing to do, according to Bertram (after drinking the beer, of course!) is carefully remove the crimped tops on all three or any number you have decided on. Now bump the bottom of two of three cans. Use a sponge or a conical tool (lubed with grease) to *partly* reverse the concave ends. A small baseball bat would also be handy to use. The concave effect should be enough to take valves. (See Figure 1)

The other end of the can should be rolled to expand about .006 inch so it will slip over the next can. That second can, by the way, can be left with a portion of the curved bottom to allow an easy slideover fit. (Figure 2)

Using a V-block, or some form of V-bar for alignment, all cans are now

Mike Beach won the 1975 Bowden event at England's Old Warden Aerodrome with Baby Cyke powered Bowden "Mouse." Slow flier.

Whyzit little guys fly big airplanes? Five foot Lou Levine with his ten foot Valkyrie, Anderson Spitfire powered.

epoxied together. We do not recommend five-minute epoxy, as the slower stuff is stronger. If you are worried about your joints, Bert actually used (in his first tanks) fiberglass or carbon filament strips over the joints for about 3/4 of an inch, epoxied to the joint. Incidentally, the joints will also hold much better if you remove the paint from the beer cans at the point of attachment.

The valves (one for pumping and the other to connect your engine) are installed in the convex portion of the "bumped" ends (See Figure 1). A bearing surface should be fitted against the inside of the can. *This should be done before all cans are expoxied together.*

A later system of installing valves, used by Bert Pond, consists of installing small pipe fittings in the end of the tank and then expoxying the valve proper inside of the pipe fitting. Makes a little more safe blowout-proof end.

Bert further reports the best cans to use are the long, 16 oz. versions. In tests the tanks have held 100 psi easily. Surprisingly, the Glastonbury boys in the area have only had to use 60 to 85 lbs. of air to get good flights. Best part of this project is the beer tanks are much lighter (1/3) than the standard brass ones. Matter of fact, the Massachussetts boys have been flying their models indoors with these ultra-light tanks.

Of course, the old Professor, Bert Pond, has a few words of admonishment regarding safety. When first testing your completed tank, and before pumping any pressure into it, place it inside a burlap sack and pump wi..1 your back to the sack. You might be propelled somewhat, but you won't suffer any real harm! Recommended tank size is three 16 oz. aluminum beer cans that will give you a length of 19 inches. As you gain experience, you can make them as long or as short as you want!

ENGINE OF THE MONTH

This month's engine, the Madewell 49, was a real puzzler for positive information regarding its design and source. Worst part about the writer's dilemna was that he lived in San Francisco while the motor was being produced across the bay in Oakland.

When one first sees a Madewell 49, one is immediately impressed with the idea that this engine is a scaled up version of the late square-port Vivell 35. Small wonder as Jack Keener, designer of the Comet 35, (the size of the Vivell 35 series) was one of the team that helped evolve the Madewell motor.

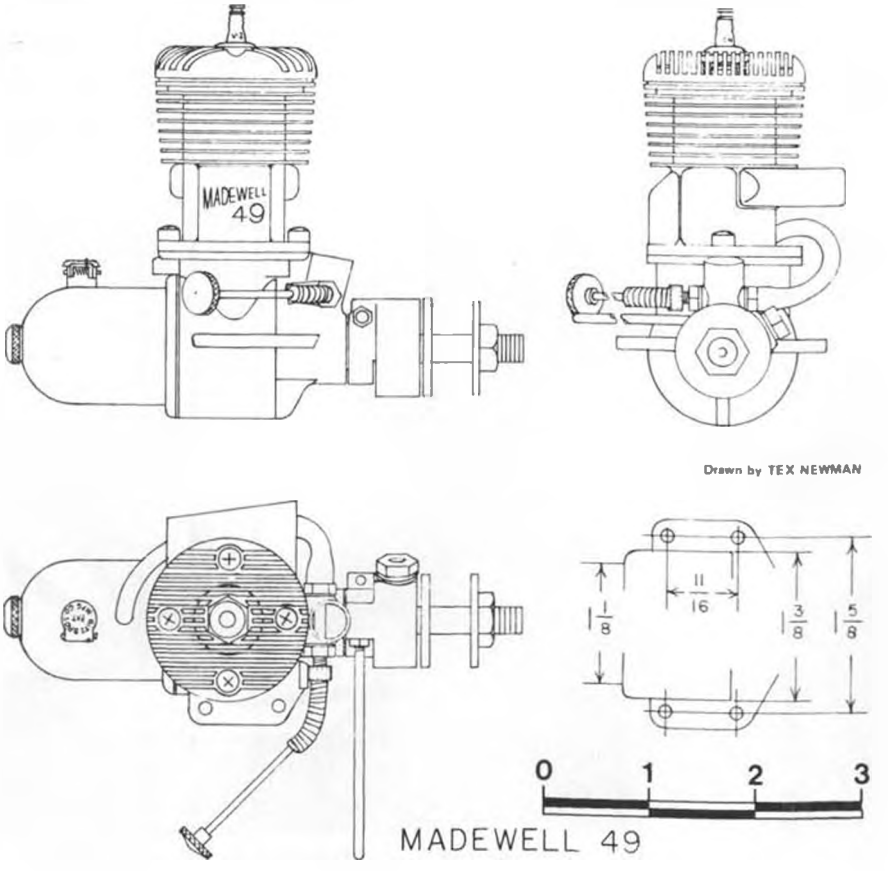
As a side note on Jack Keener, although he designed the original small Madewell engine, the Madewell 14 was the brainchild of Harry Congable, owner of Irrigation Pipe Co., who dabbled with the engine business as sort of a hobby.

Mr. Hurd, proprietor of Electro-Spray Co., financed the team of Jim Brown, Jack Keener, Harry Sharman, and Charlie Pottol, who developed the motor. There are unsubstantiated rumors that Al Hovsepian, producer of the micro engine, had a few contributions to the design.

Yes, there really is a place called the home of John Pond's Old Time Plan Service. For the exact location, see John's ad on page 92. Start by ordering the plans catalogs.

In any respect, the Madewell 49 was a real fine running engine. Matter of fact, its lightness and power attracted a considerable number of converts to this engine. Originally aimed at the control line market in the postwar boom years, this engine has turned out to be one of the top free flight engines in its class size. First advertised in the November 1946 issue of Model Airplane News for $18.00 (less coil and condenser), its slogan was "The 49 that goes like a sixty." They weren't kidding!

For the technical minded, the Madewell 49 featured a bore of .891, and stroke of .783, to give a displacement of .49. With tank, the motor weighed nine ounces. The crankcase and carburetor formed one aluminum alloy casting, with the back plate screwed in and forming part of the formed steel tank. The cylinder and cooling fins were machined from alloy steel bar stock,



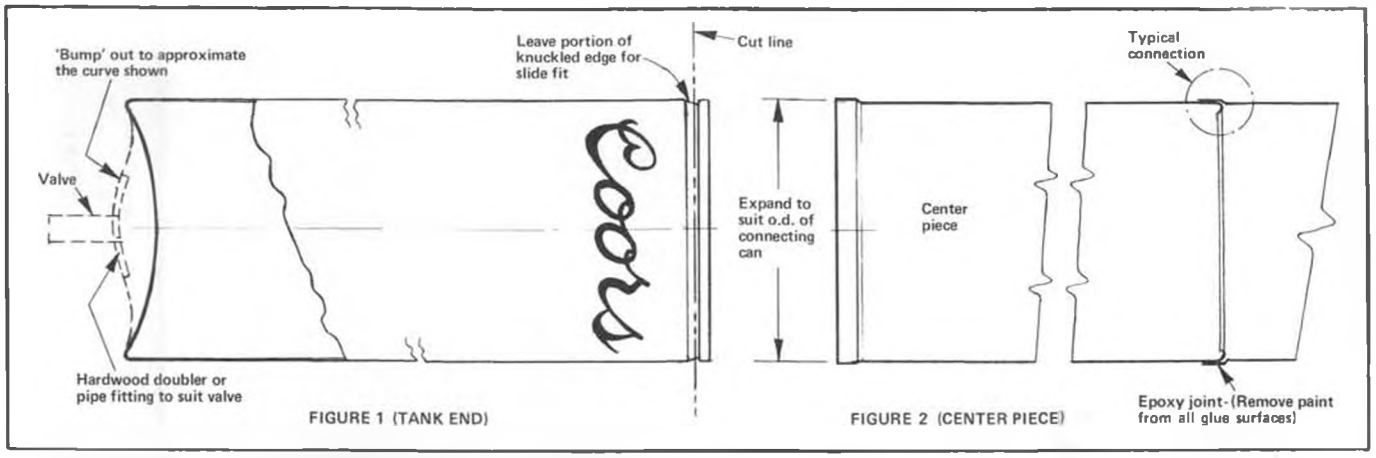
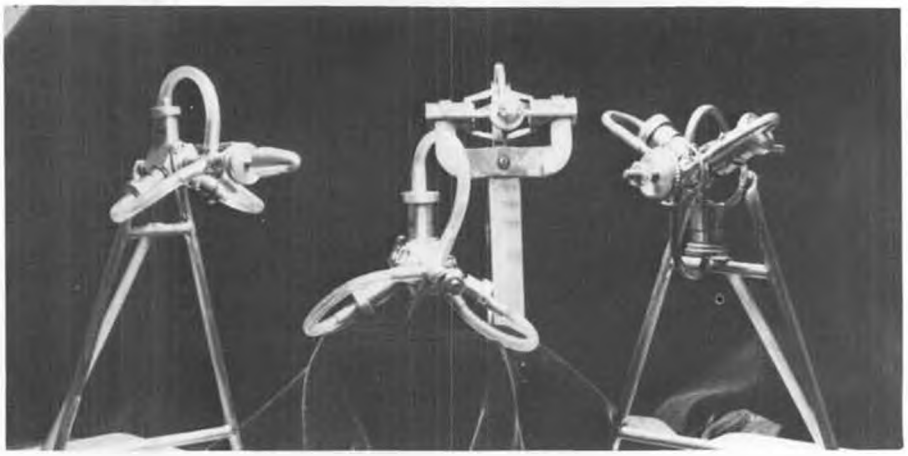


FIGURE 1 (TANK END)

FIGURE 2 (CENTER PIECE)



Various compressed air engines by Fred Collings, Pittsburgh, Pa. (l to r): half-size 3 cylinder .060, production "Aero-Whirl" .14 cu. in., early 1900's Landis, and prototype "Aero-Whirl."

with the bypass and exhaust stack brazed on. Piston was Mehanite with a tubular steel wrist pin provided with bronze end-pads. As with so many engines of that era, the crankshaft was ground from one piece of steel, and the connecting rod was die-cast from aluminum alloy with bronze bearings. V-2 spark plugs were popular then, and the Madewell was no exception in featuring this size plug.

In reading a test report of the engine's running ability, the same trap was fallen into again, as nothing but .60 size 14 and 12 inch dia., 6 inch propellers were used to check the r.p.m. The writer favors an eleven inch propeller, which turns up excellently. Do not exceed six inch pitch, as this motor loves to turn up.

Cliff Schaible puts alloted fuel in Jack Van Dusen's Red Zephyr for Texaco event at SPOT Annual . This event is catching on back east.

For owners of Madewell motors, parts are readily available from Karl Carlson, 14600 Ramstead Drive, San Jose, Ca. 95127. In talks with Carl, he regrets that the Super Cyke parts are slow in coming, but in the case of the Madewell, no problems. So power up that Playboy senior of yours, it does make a nice flying free flight combination!

FLORIDA SUNSHINE

Terry Remert and Gil Cochran report that the KOI meet (King Orange International) again featured old timer events. The writer is tickled pink to find Ron Sharpton's Foo 2-U-2 (Nov. '75 MB) winning .020 Replica in the capable hands of Gil Cochran. Guess who was second . . who else, Sharpton!

Bryton Barron never seems to wear out. Just like old wine, he gets better. This time he took all Ignition event with his very reliable Super Cyke powered Playboy. Of course, Sharpton was second with his (what, again!) full size F00. Those things go!

The rubber event should be re-named the Perryman event, as old "Gorgeous Gawge" did it again, winning handily with his California Champ. Not satisfied with that, he cleaned the boys in Unlimited Rubber, using his old time Lanzo Stick (Nov. '74 MB). The guy is uncanny! He lost his Lanzo Stick, organized a search party, and trampled half the woods down to find it.

John Walters took second in rubber with a Gollywock, and that irrepressible Ron Sharpton nosed in for third with a Korda "Dethermalizer". Terry flew a Scientific Gold Star and managed a fourth, a no mean feat with that small model. Good time was had by all!

VAMPS

The (Las) Vegas Antique Model Plane Society is really starting to get off the ground these days. Received their latest output, VAMPS newsletter, "Short Circuits" wherein they spell out most of the 1976 Activity. Great stuff!

As noted on their calendar, most of the contests are scehduled to be held at the El Dorado Dry Lake, roughly 35 miles east of Las Vegas, off Hwy 95. Their biggest O/T meet, held in conjun-

ction with the SCAMPS, is scheduled for Sept. 11 and 12. This is always a goodie, so make your reservations early.

For more info, contact Editor Larry Vance, at 5066 Cindy Way, Las Vegas, Nevada 89102. You can't miss this fun!

SCIENTIFIC HORNET CONTEST?

Hard on the heels of the report on the Jimmy Allen contest, the writer received an order for a flock of Scientific Hornet plans from Stan Fink. Stan reports he hopes to stage a local contest and then challenge the KC Missouri boys to a postal contest featuring this design.

If you are interested in participating in this model rubber powered contest, write to Stan Fink, 80 Crest Drive, Eugene, Oregon 97405. Details should be firmed up now.

O/T GAS TANK REPRODUCTIONS

Been looking for a gas tank to match that old time ignition motor you just dug up? Well, no sweat, as Fred Collins has expanded his "Custom Repro" gas tanks to 24 different types, varying from Brown Jr., to Dennymite, to James. You'll be surprised at his latest list!

The tanks are furnished with filler cap and full supply tube as required. For further info, write to Fred Collins, 29 Steward Avenue, Pittsburgh, Pa. 15227.

NO GUTS

Last month, we reported on the challenge contest called "They went thataway", a strictly "guts" contest for letting a model go full bore with all the gas you care to put aboard.

The writer had hoped to have a good report, but according to Jim Dean, Editor of the SCAMPS "Hot Leads" newsletter only two showed up to put a fin (five dollars) under the rock; Jim, and Bud McNorgan.

After some preliminary fiddling with his model, Bud put his Torpedo Special powered Long Cabin model (Feb. '76 MB) up for a flight of six minutes with a 2:40 engine run. Jim, employing his faithful Riser Rider, managed an attempt (less than four minutes). Thereafter, Jim attempted to establish a new Guiness record for consecutive ground loops on takeoff. He never did get another flight in!

Finally conceding, Jim offered his vive bucks to Bud, but McNorgan refused, saying he never took a forfeit yet. The latest development after this rather inauspicous beginning, is that McNorgan is now attempting to create a suitable trophy with a compartment for storing the five dollar challenge fee. Upon winning the trophy, the victor can then empty the money compartment and buy a round of beer all around. The last idea, is mine, haw!

AND THEN THERE WERE NINE LITTLE INDIANS

Ouch! Lost another one! This time it's that fun fellow, Ed Franklin, of New Jersey, a stickout member of the Thunderbirds for years. Imagine walking by the power room in the telephone building and all of a sudden . . BOOM! An unaccountable explosion.

On taking Ed to the hospital, he went into a deep coma for two months. Never did regain consciousness. Just received the information that Ed has now gone to that free flighter's paradise where you get "max" flights all the time. Gonna miss that stove pipe hat at the Nationals Old Timer Events, that's for sure!

HAGGART-BOWDEN PRECISION EVENT

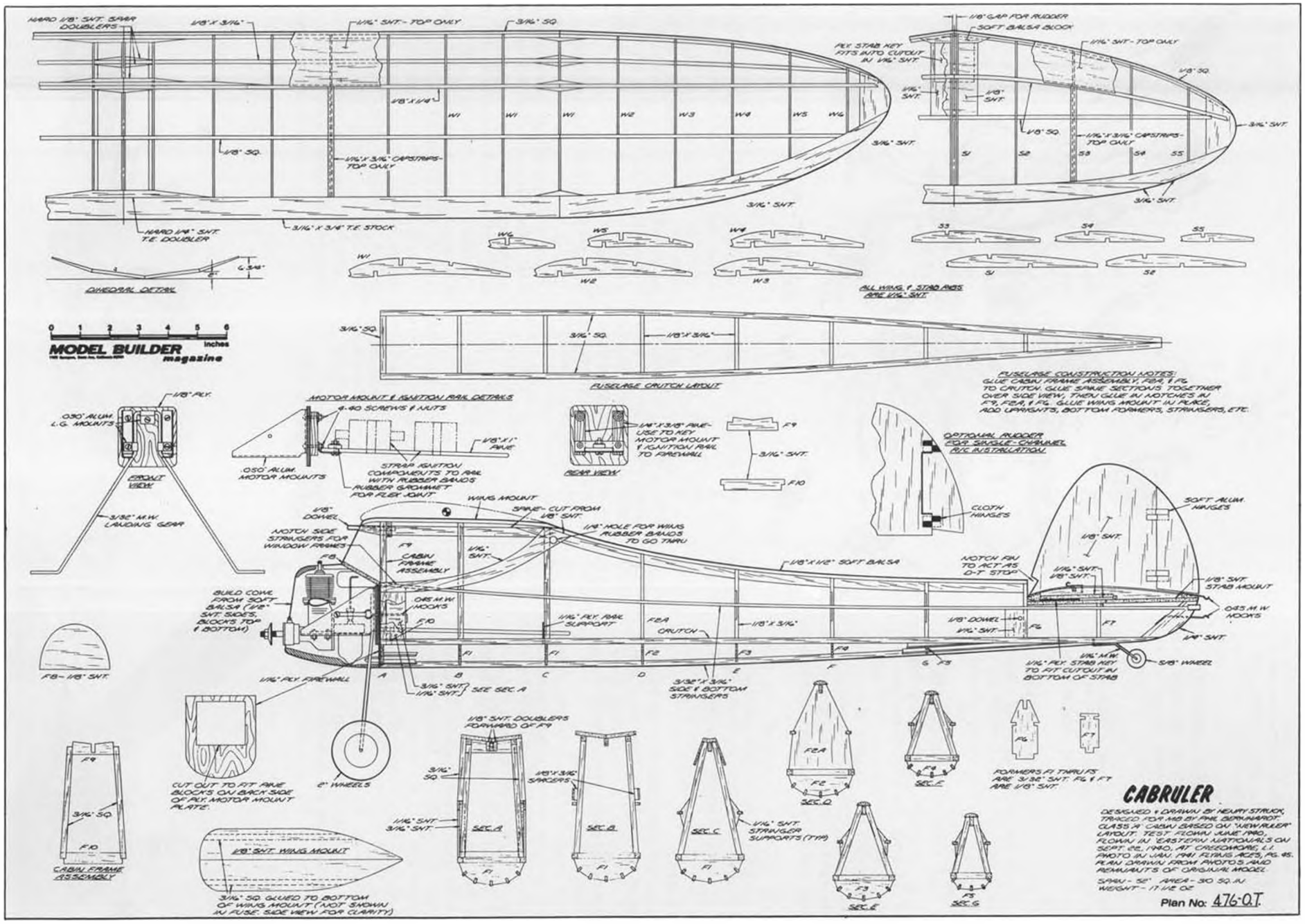
Some columns ago we mentioned that John Haggart (before his untimely death) was organizing a contest on the order of the old Bowden Event that Hamilton Fish won in 1937 (with Carrol Krupp's design) when visiting England with the USA Wakefield team.

According to Peter Fisher of Performance Models, this event was actually staged last August at the Shuttleworth Collection Aerodrome. Because of the small field, the rules as originally promulgated, suited the area. Basically, the

Continued on page 76

Jack Knapp's first O.T. model is this Berkeley Brigadier with Ohlsson 23. Excellent way to start .

John Targos sent photo showing Bill Seidler's gull wing design plus several Standard Bucs at 1939 Long Island meet. Identities anyone?


MODEL BUILDER magazine
CABRULER
DESIGNED & DRAWN BY HENRY STRUCK.
TRACED FOR MB BY PAUL BERNHARDT.
CLASS 'A' CABIN BASED ON "NEW RULER" LAYOUT. TEST FLOWN JUNE 1940, FLOWN IN "EASTERN NATIONALS ON SEPT 22, 1940, AT CREEDMORE, L.I. PHOTO IN JAN. 1941 FLYING ACES, PG. 45. RE-DRAWN FROM PHOTOS AND REMNANTS OF ORIGINAL MODEL
SPAN - 52" AREA - 310 SQ. IN.
WEIGHT - 17 1/2 OZ
Plan No: 476-O.T.
FUSELAGE CRUTCH LAYOUT
FUSELAGE CONSTRUCTION NOTES:
GLUE CABIN FRAME ASSEMBLY, F8A, & F6 TO CRUTCH. GLUE SIMILAR SECTIONS TOGETHER OVER SIDE VIEW, THEN GLUE IN NOTCHES IN F9, F8A, & F6. GLUE WING MOUNT IN PLACE, ADD UPRIGHTS, BOTTOM FORMERS, STRINGERS, ETC.
DIHEDRAL DETAIL
ALL WING & STAB RIBS ARE 1/16" SHT.
MOTOR MOUNT & IGNITION RAIL DETAILS
OPTIONAL RUDDER FOR SINGLE-CHANNEL R/C INSTALLATION
CABIN FRAME ASSEMBLY
CUT OUT TO FIT AXLE BLOCKS ON BACK SIDE OF PLY. MOTOR MOUNT PLATE.
1/8" SHT. WING MOUNT
3/16" SQ. GLUED TO BOTTOM OF WING MOUNT (NOT SHOWN IN FUSE. SIDE VIEW FOR CLARITY)
1/8" SHT. DOUBLERS FORWARD OF F9
1/8" X 3/16" SPACERS
1/16" SHT. STRINGER SUPPORTS (TYP)
FORMERS F1 THRU F5 ARE 3/32" SHT. F6 & F7 ARE 1/8" SHT.
SEE SEC. A
SEE SEC. B
SEC. C
SEC. D
SEC. E
SEC. G

Henry Struck's chaser for the "Cabruler" was Rikitikitavi, long gone since this July 1940 photo was taken. Other than photo in Jan. 1940 Flying Aces, design was never published.

STRUCK'S "CABRULER"

Here's a model that will even make hardened old timers do a double-take. Never previously published, it's a Class A cabin version of the famous New Ruler by its equally famous designer, HANK STRUCK.

• Based upon the proportions of the New Ruler, this Class A cabin was built to enjoy the advantages of the sensational new Bantam 19 engine. The Bantam was developed by Ben Shereshaw, creator of many beautiful aircraft of the early days of gas modeling. The Class A category of up to .20 cu. in. had just been established, chiefly due to the remarkable performance of Ray Arden's Atom engine.

To actually get one of these new "Benny's Beauties" was not easy. In fact it took about a year. Ben was building these first engines at his home in Nutley, N.J.. One day, a word-of-mouth message reached me that one was ready. So early in the morning, onto the subway in Jackson Heights, L.I., to the Hudson tubes and under the river to Newark, N.J.. There to the Bamberger store, sponsor of the famous Bamberger Aero Club, in which Ben was a leading light . . But he was in Nutley, they said, and so onto a bus . . but he wasn't there either. Nor was there any more than 5c in the engine seeker's pocket. Now it came down to the feet to get the pilgrim to where 5c would get him back to his far-away work bench. This was accomplished eight miles later, after crossing the George Washington Bridge back into Manhattan. Another subway ride and the end of a great day, and the inspiring memory of a trek across those empty Jersey meadows.

One day, however, Serial No. 294 arrived by mail! And it was all worthwhile, because it was in a class by itself. Today, several airplanes and many years later, it still runs, though its magnesium crankcase is darkened, plastic tank dissolved, needle valve replaced, and slight play has developed in its journals . . a treasure.

After emigrating to Connecticut to work in the Ludington/Griswold Smoke tunnel as a model maker and smoke generator, evenings were put to building a model for the new Bantam. When demonstrated to aero engineers, its steep altitude-grabbing climb was not too impressive . . a too-light unrealistic airplane! Of course, today, the F-15 reaches 39,000 feet in 59 seconds from a standing start. Now it's real!

Away from history and humor. The "Cabruler" is along the constructional lines of most of my ships of this period. The fuselage is erected on a basic "crutch" frame, and finished free-handed off the plan. Wing features the NACA 6409 section, with sheet balsa top leading edge to maintain the airfoil shape to the high point, and to stiffen the wing against bending.

The motor mount assembly is removable from the fuselage for inspection and clean up, and now provides an obvious way to add simple R.C. gear for directed free flight. The actuator can be left in the airplane for free flight, or removed through an access panel in the fuselage.

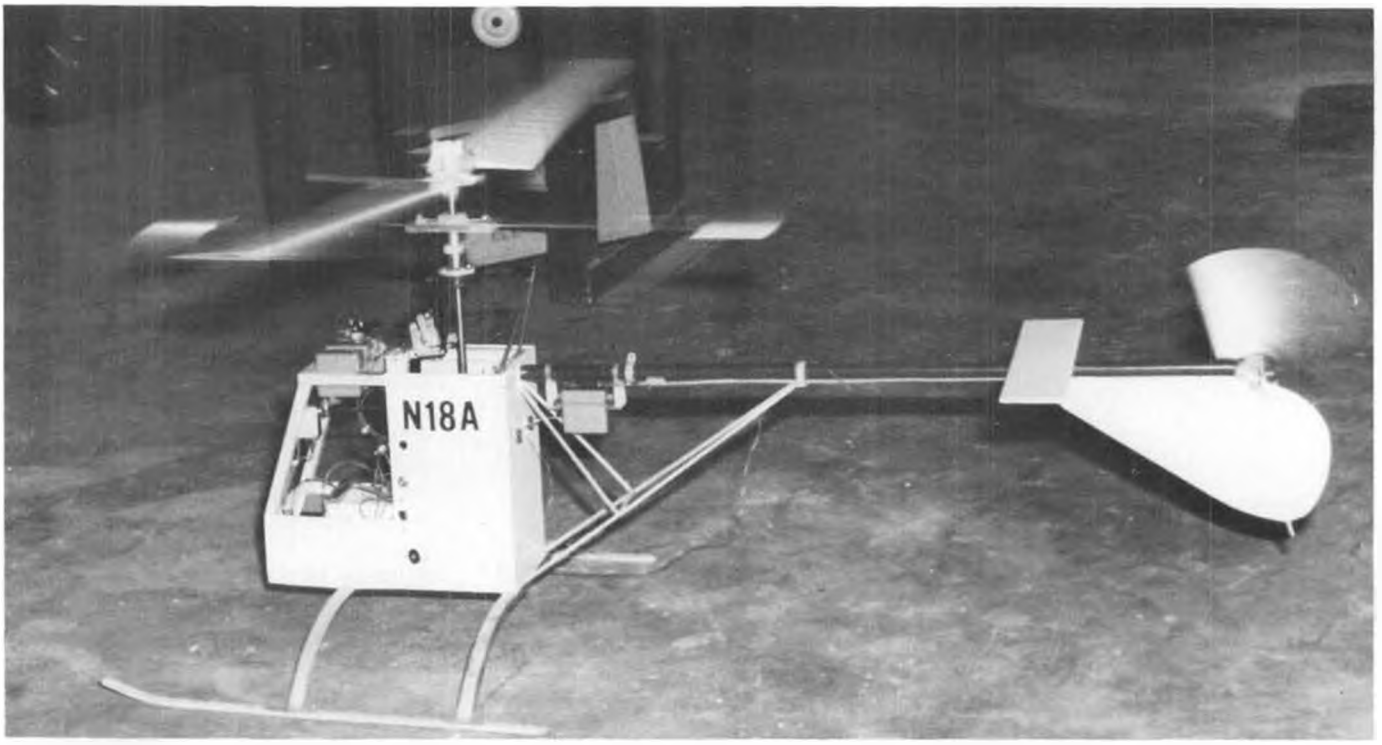
The original was covered with white silk on the fuselage, and red cross-grained double tissue on the wing and stab. If Monokote is to be used, diagonals should be fitted between the spars, and between the leading edge and the lower spar, to box in the leading edge and increase torsional rigidity.

The ship was adjusted for a right climbing pattern, with right glide. This requires some slight left thrust shims between the motor mount and the firewall. Glide circle was controlled by the rudder tab setting. A further development of this design, the Connecticut Yankee, flew well in right climb and left glide. Using stabilizer tilt, unknown to me at the time, will no doubt help obtain either flight pattern, if you can stand crooked airplanes . . but they admittedly are better than cracked airplanes.

For R/C flying, the glide should be trimmed just a little faster than free flight, as much rudder action as possible should be employed, in order to roll rapidly from one circling direction to the opposite without stalling in the cross over. •

With a little imagination, the famous New Ruler lines can be discovered in this cabin version. The cowling just never made it.

Typical of the period, the ignition tray came out with the engine. Timer arm stuck through bottom of fuselage. Looka that Bantam!



Charlie Gilbert's experimental electric powered chopper gets up a head of silent, smokeless "steam." Power-to-weight ratio is still on the weak side. Chopper will lift off and "swim" around, but does not quite fly. Success is not far away now!

CHOPPER CHATTER

By JOHN TUCKER

CHARLIE'S ELECTRIC CHOPPER

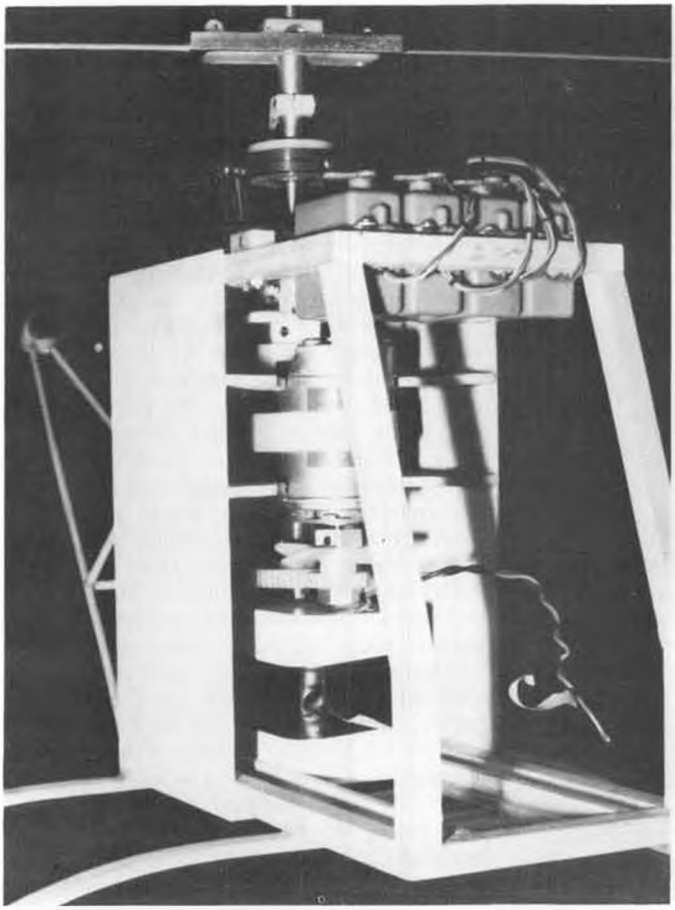
● Would you believe an electric powered helicopter with collective pitch and all that good-stuff? When my friend and flyin-buddy, Charlie Gilbert, told me he had one on the drawing board, I thought maybe he had flipped his lid, and passed it over with little more than a shrug of my shoulders. As the weeks rolled by I didn't give it another thought, until one night a couple of weeks ago when he called me and said bring over the camera, he had something to show me. It didn't take long to realize he had been serious about "electric-power" so I hurried over to see what he had come up with.

Charlie and his "electric flying machine." Note bamboo landing gear struts. Hmmm . . . how about a power converter and a long extension cord!?

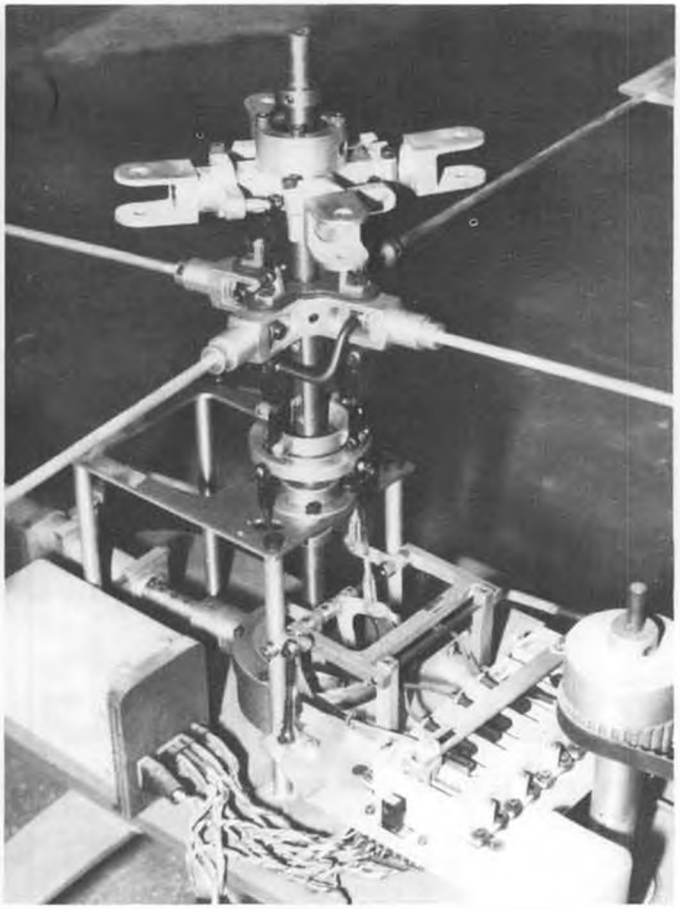
As the pictures will show, he had completed about 80% of the chopper and was getting ready to build the main and tail-rotor blades. We turned it on a few times and played with the controls to see if we could find any glitches in his design philosophy. There being none at the moment, I took my pictures and went home to wonder about its chances for flight. Charlie, being an experimenter from way back, had become intrigued with electric flight several months ago when he saw an R/C airplane fly with an Astro Flight, Inc. electric motor. Being a design engineer and machinist by profession, it wasn't very long before he envisioned an electric chopper and started to get it all together in his head before starting construction.

Without a doubt, there are several other modelers working on this idea and someday you'll see these little birds buzzing around the local flying field. They should have great appeal since they are very quiet and clean . . . no fuel, no messy exhaust, just a battery charger and a radio is all that will be required! We do hope that the data presented in this article will prove of value to those experimenters who are also constructing silent-flight choppers.

Of necessity, all components would have to be selected carefully for weight considerations. Charlie calculated the performance would be optimized by selecting the Astro Flight 15 motor, 1/6th horsepower, which is driven by a 24 volt power-pack weighing 1 pound. A simple box fuselage was constructed



Method of mounting electric engine. Cooling fan below engine. Battery tray in bottom of fuselage.



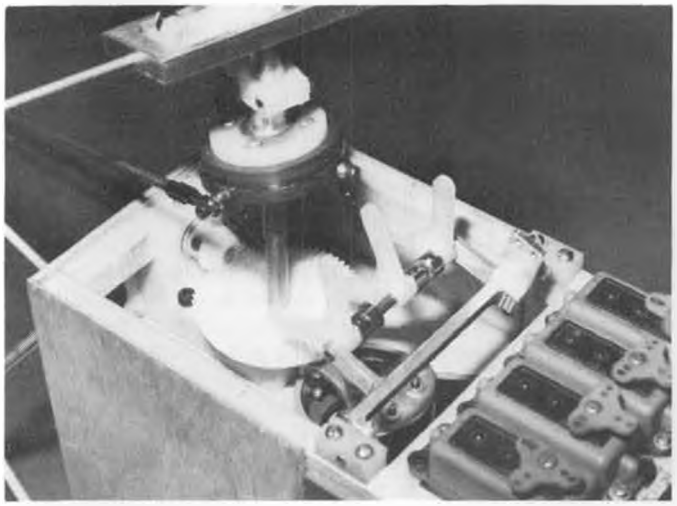
Another Gilbert experiment. This is an entirely scratch-built four-bladed rotor system. Not yet flown. Just give him time!

out of spruce longerons covered with birch (wing skin) plywood. Lightening holes were cut out wherever possible, and the entire shell was later covered with white monocote for strength. The motor itself was strapped into place in a "v" block arrangement so it could be easily slid up or down to properly mesh the gears. The battery pack, easily the largest and heaviest piece of equipment on the entire model, was placed on the floor between two rails . . . this permits an easy adjustment of center of gravity should it be required.

Special plastic gears were ordered to provide a gear reduction of 5:1 from motor to main rotor. The motor RPM was shown in the specs to be around 10,000 RPM with an 8x4 prop . . . the reduction gears would then drive the main rotors at something less than 2,000 RPM. Special bevel gears were also selected to drive the tail rotor at a ratio of 4:1 with respect to the main rotor, somewhere in the vicinity of 7,000 to 8,000 RPM.

The tail boom was cut from an aircraft "dip-stick" (used to measure fuel in the tanks) made from fiberglass about 1/2 inch in diameter with .020 wall thickness. This has proven to be extremely rigid and strong. Not wanting to take any chances on tail rotor vibration, Charlie added braces made from lightweight bamboo strips. I think his wife, Lorraine, had something to do with the extensive use of bamboo on this model, since she is an ardent handicrafter herself and has quite a supply of rods, strips, etc. on her own workbench (at least she *had* a good supply). The landing gear struts and skids were also formed from bamboo and steamed into the desired shape.

Continued on page 86



Electric motor is mounted in "V" wedge, driving main rotor bevel gear. Note tail rotor drive take-off.

Underside shot shows Delrin main rotor hub, rotor blade attach bracket, and pitch control arm.

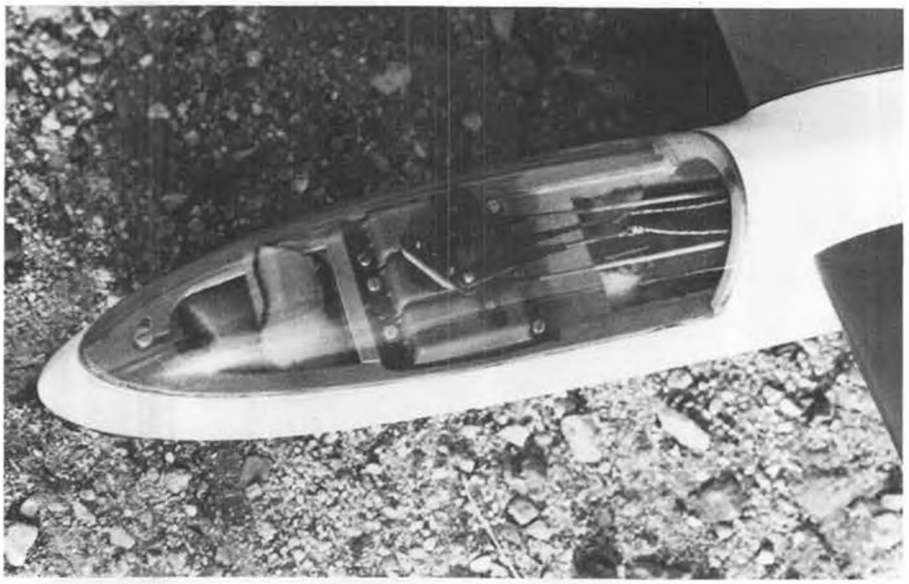


Photo of canopy latch system sketched on next page and developed by Bob Mickelsen, of Clovis, New Mexico. Neat and positive.

R/C SOARING

By TAYLOR COLLINS

• When I first inherited this column from Le Gray, I stated that it was not going to become a battleground for rules changes. That declaration still holds true, but in light of a situation that I witnessed (at least partially), I feel that it is time to make a point or two about the AMA Soaring rules.

The incident in question took place at the 26th annual Southwestern Regional Model Airplane Championships. This contest, incidentally, has had an R/C soaring event for only four years, but the contestant support has grown from only eleven fliers four years ago, to over seventy this year. The contest is held annually at an abandoned World War II airbase near the Arizona farming community of Buckeye, 40 miles west of Phoenix. It is unique in that free flight, control-line, and R/C soaring events are going on simultaneously along the length of one gravel runway.

The soaring portion of the contest was littered with a flurry of protests, counter protests, appeals, complaints, and general griping from all sides. The furor centered around one spot landing made by one contestant (who, to protect the innocent, I'll call Tom). Tom made his spot landing, and the nose of the plane stopped very near the center of the circle. Unfortunately, during the landing the left stabilizer of the plane broke (but did not separate from the fuselage). Jerry (another ficticious name for a real person) cried, "Foul! He shouldn't get points for that landing. His stab broke . . he couldn't fly the plane again in that condition!".

At this point, the Contest Director was pulled into the fracas. He agreed with Jerry that the plane wasn't flyable, but gave the landing points to Tom anyway. Now the pencils and paper were smoking. Jerry wrote a protest . . Tom wrote a rebuttal, Ralph (still another ficticious name) wrote another protest about Tom's landing. The Contest Director wrote home to mother. . .(naw, I'm only kidding). After the dust had settled, the Contest Director denied the protests and let Tom keep his landing points.

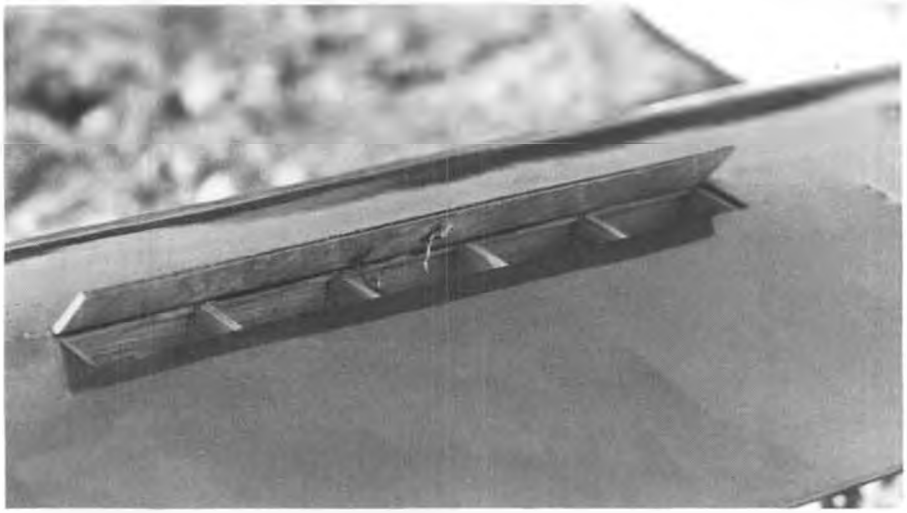
When everyone got back home, the phone lines started buzzing, and the typewriters started clattering away. Everyone got hot on my boss's case. (Remember him? W.C. Northrop . . R/C Contest Board Chairman . .) Jerry and Ralph were appealing the contest directors denial of their appeal. Mr. Northrop check the rule book and found that there is nothing in either the R/C Sailplane rules or the General Sanctioned Competition rules that would permit Tom's broken-stabilizer-landing points to be taken away from him. Since Tom's airplane did not land in an inverted position, did not shed any non-jettisonable parts (by the way, would someone care to tell me what parts *are* jettisonable? Is water ballast considered a part?), and since nothing in the pre-contest information indicated that the standards for spot landing would be any different than indicated in the AMA rule book, Mr. Northrop ruled to support the contest director.

OK . . so much for what happened. Now comes my question . . Are landings in which the airplane is rendered unflyable really landings, or are they better called arrivals (or crashes)? Somehow I find it difficult to believe that the intent of a spot landing task is to bury the nose of the glider in a given spot of earth, regardless of the outcome to the rest of the airframe.

What are the alternatives? Some say that we should have judges to evaluate the landing and determine what is a landing and what is a crash. The problem with judges is that you have to have judges. . .people to make decisions which are subject to protest. I personally am in favor of maximizing flying and competition enjoyment and minimizing the controversy. *(So far, not so good. wcn)* I've already had a class in debating . . and have no desire for a continual refresher course. Cast my vote against landings being judged.

Another notion that keeps popping up would require the pilot to fly under a string that is set up at a given height, and at a given distance from the landing spot. OK fine . . Now how do we set up the string so that the average guy (like me 'frinstance) can get under it, yet still have it low enough to control the approach angle of the glider. And what do you do when the wind direction, and velocity, keeps changing? I can just see the landing circle ringed with sticks and strings. In Viet Nam, I think they called the same thing a Punji trap!

Still another idea calls for a sort of claiming system for landings. If a con-



Spoiler mechanism, also by Bob Mickelsen, uses rubber band tension to hold spoiler open, rather than the usual reverse. Servo pulls it down. Spoiler material is counter-top Formica.

testant feels that another guy has made a crash instead of a landing, he can demand that the plane in question be impounded and flown in the next round without any repairs. Make no doubt about it . . that will make the pilot in question either put up or shut up (or sweep up the remains in a basket!). The problem with this system is, what do you do about a Cirrus that rolls its wings forward, or what do you do about a plane that gets it wings misaligned under the rubber bands, or one that loses rubber bands. *(Easy. None of these are repairs . . structural repairs, that is. wcn)* Another problem . . What about one plane being hit and damaged by another in the landing circle?

I'm sure that there are probably a dozen more good solutions to this problem. My point is this . . The longer we put off defining what a spot landing should be, the longer we are going to have angry people being denied or given landing points that they may or may not deserve.

Incidentally, "Jerry", in the case cited above, based his protest on an unwritten rule that if the plane is not flyable it should not receive spot landing points. Well, Jerry old buddy, it's high time that we get that rule, or some substitute for it, in writing. The deadline for rules change proposals is June 1, 1976 *(or maybe September. wcn)* As you read this, that is no more than 60 days away (or maybe . .) and probably less. If your proposal is not in to AMA by that date, you cannot possibly see a rules change in effect before January 1, 1980!!

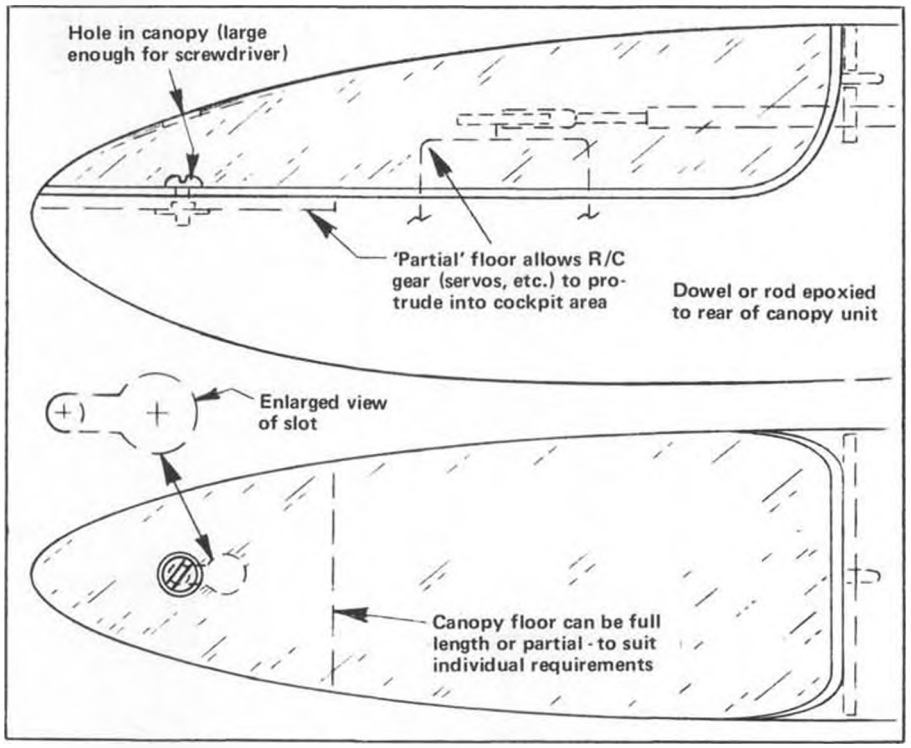
I would like very much to hear from you about this, or any other rule that you would like to see changed. Possibly I can put you in touch with other people who share your ideas, who have tried your ideas on a local level, or who would like to have your suggestions. If nothing else, I'd like to know that you at least read this, and disagree completely with me. If you've taken the time to call me a dirty name, at least you're thinking about me!

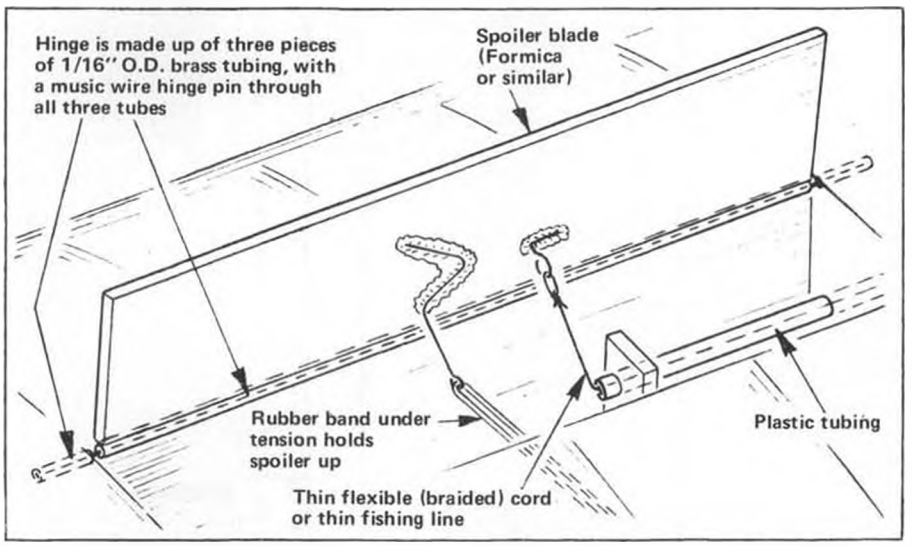
I did come back from Buckeye with something besides tears and heartache. I managed to steal two nifty ideas from Bob Mickelsen of Clovis, New Mexico. Bob was flying a Multiplex Alpha (which is a darned good, though not often seen standard class sailplane).

One idea was Bob's spoiler system. Everybody uses rubber bands to hold spoilers closed . . right? Well, Bob uses them to hold them open. The drawing shows how he does it. Light braided fishing line is used to haul the spoilers shut, and a small rubber band, hooked to a simple wire actuating arm, pulls them open. The rubber band has proved to be plenty strong to open the spoilers (remember, there is a vacuum on top of the wing . . that is what keeps der flying machinen in der air . . so not much force is required to open the spoilers.) The servo pulls them shut very positively, eliminating the usual problem of having one spoiler not quite shut and the other hanging half open.

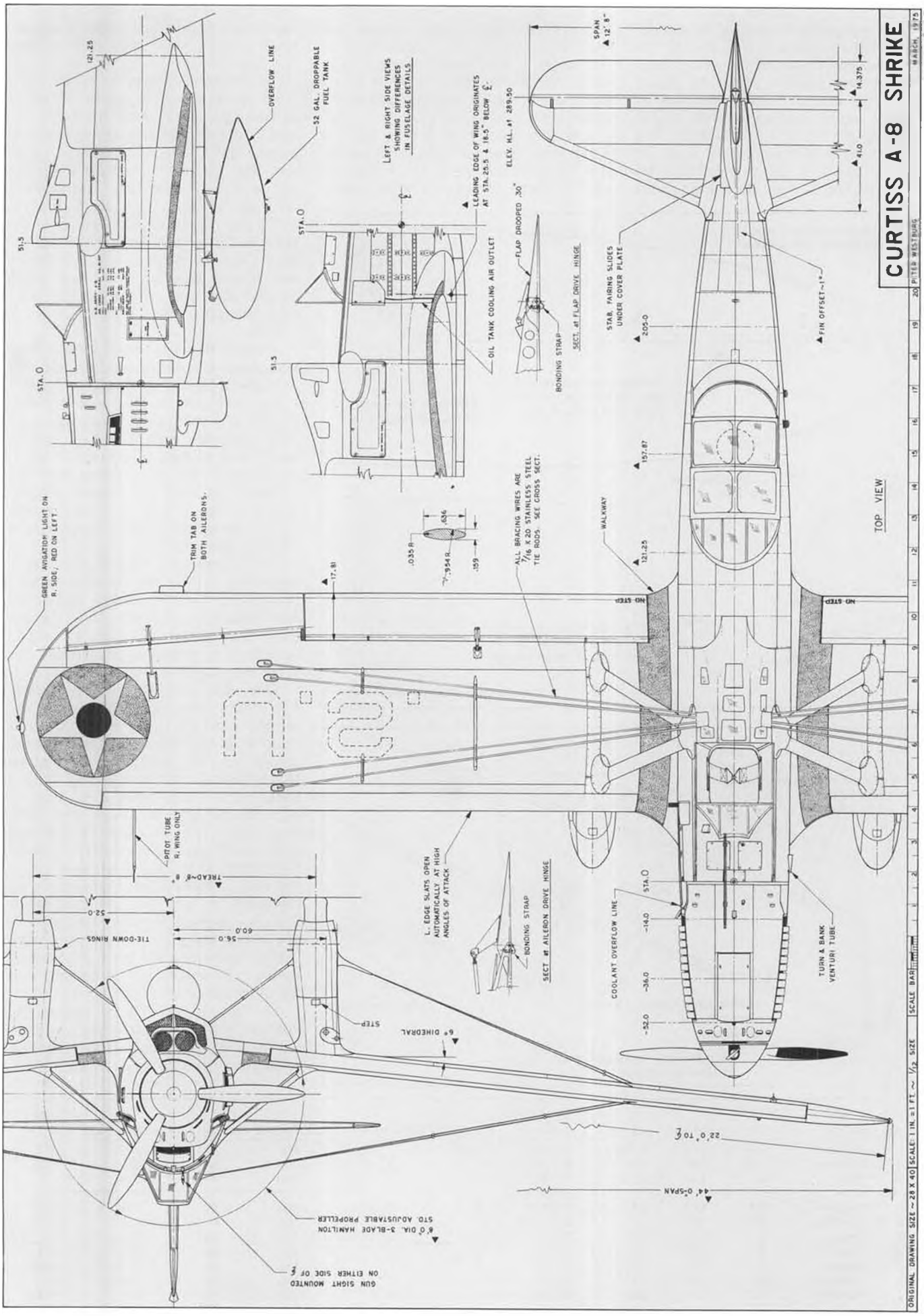
For the spoiler blades themselves, Bob uses Formica (that's right, countertop material). The undecorated side can be sanded smooth and covered with

Continued on page 91





PLACE	NAME	COUNTRY	SPAN	WEIGHT	AIRFOIL	LOADING	DIHEDRAL	AILERONS	AIRBRAKES	BALLAST	ASPECT RATIO
1	Trondle	D	118	3.4 lbs.	E-174	7.2 oz.	7°	No	Yes	400 g.	14:1
3	Schiborr	D	100	3.1	E-374	8.8	2°	Yes	No	650 g.	13:1
5	Noss	D	130	4.2	Eiffel 400 (mod.)	9.5	2°	Yes	Yes	Yes	?
6	Dallimer	GB	127	3.5	Clark Y	7.6	Poly	No	No	Lots	17:1
9	Bannister	GB	127	3.6	Orig. 10%	9.5	2°	Yes	Flaps	Yes	20:1
10	Stunz	D	110	3.8	Orig.	6.9	2°	No	No	500 g.	?
13	Keim	N	115	3.3	E-387	7.9	6°	No	No	280 g.	14:1
14	Scholz	D	118	3.3	E-174	7.3	7°	No	Yes	500 g.	14:1
17	Lohmann	D	145	5.3	Orig.	10.1	2°	Yes	No	300 g.	18:1
18	Allner	D	115	4.4	Go 795	12.6	2°	Yes	Yes	Yes	16:1


CURTISS A-8 SHRIKE
SHEET 2 OF 3
MARCH, 1975
PETER WESTBURG
TOP VIEW
SPAN 42' 8"
ELEV. H.L. at 289.50
LEADING EDGE OF WING ORIGINATES AT STA. 25.5 & 18.5" BELOW ℄
LEFT & RIGHT SIDE VIEWS SHOWING DIFFERENCES IN FUSELAGE DETAILS
52 GAL. DROPPABLE FUEL TANK
OVERFLOW LINE
OIL TANK COOLING AIR OUTLET
FLAP DROPPED 30°
SECT. at FLAP DRIVE HINGE
BONDING STRAP
STAB. FAIRING SLIDES UNDER COVER PLATE
FIN OFFSET-1°
GREEN NAVIGATION LIGHT ON R. SIDE; RED ON LEFT
TRIM TAB ON BOTH AILERONS.
ALL BRACING WIRES ARE 7/16 X 20 STAINLESS STEEL TIE RODS. SEE CROSS SECT.
WALKWAY
PITOT TUBE R. WING ONLY
L. EDGE SLATS OPEN AUTOMATICALLY AT HIGH ANGLES OF ATTACK
SECT at AILERON DRIVE HINGE
BONDING STRAP
COOLANT OVERFLOW LINE
TURN & BANK VENTURI TUBE
TIE-DOWN RINGS
STEP
6° DIHEDRAL
8'0 DIA. 3-BLADE HAMILTON STD. ADJUSTABLE PROPELLER
GUN SIGHT MOUNTED ON EITHER SIDE OF ℄
22'0" TO ℄
44'0" SPAN
ORIGINAL DRAWING SIZE ~ 28 X 40 | SCALE: 1 IN. = 1 FT. ~ 1/2 SIZE | SCALE BAR

While at Barksdale Field, Louisiana, the 13th Attach Squadron A-8 Shrikes were devoid of all markings except aircraft number on fins. Note Curtiss Falcon (Jan. and Feb. 1976 MB) in background.

CURTISS A-8 "SHRIKE" PART TWO (Conclusion)

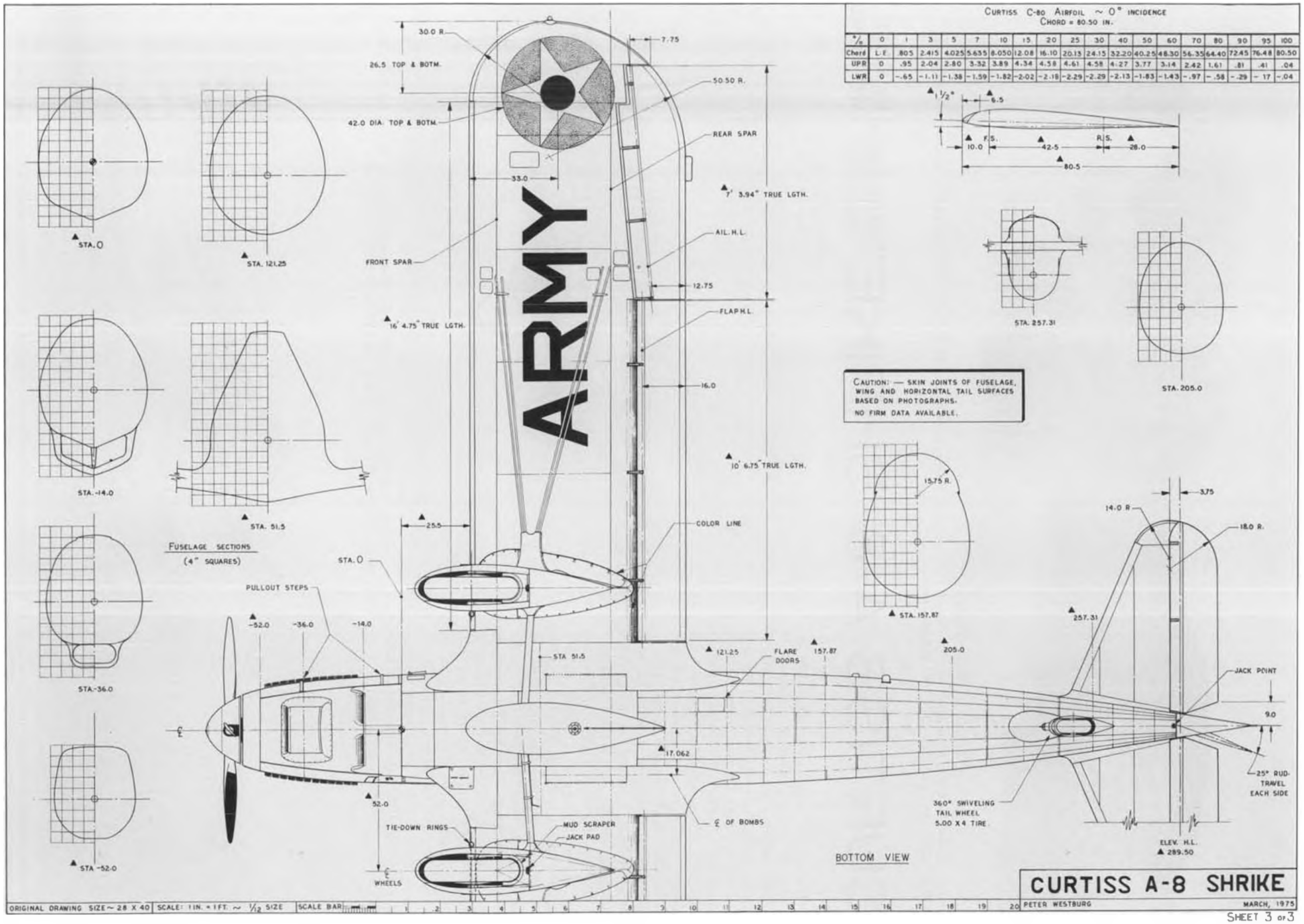
By PETER WESTBURG

ALL PHOTOS COURTESY OF PETE BOWERS

• During its long career, the A-8 appeared in many different markings. It began service with the 3rd Attack Group, comprised of the 8th, 13th and 90th Attack Squadrons, the only attack squadrons in the Air Corps, at Fort Crockett, Texas, which also flew A-3B Falcons. Early in 1935, the group was transferred to Barksdale Field, Louisiana, where it was soon outfitted with the new A-12's. Nine surviving A-8's then went to the 37th Attack Squadron at Langley Field, Virginia, and of the five survivors from that squadron, two went to Chanute Field, Illinois, and the remaining three went to the Command and General Staff College at Fort Leavenworth, Kansas. The XA-8 prototype also went the route of Fort Crockett, Langley and Chanute where it was finally scrapped with 878 hours to its credit. The YA-10 served honorably in the air mail crisis of 1934, went to Fort Leavenworth and was scrapped at Chanute with 2119 hours in its log.

The geared version of the Conquerer, in this A-8A, had reached its peak at 675 hp. Forty-six subsequent Shrikes were powered with the 690 hp Wright Cyclone radial.

The Shrike was the Air Corps' first all-metal airplane. Fixed rear canopy on this prototype XA-8 was a tight squeeze for the gunner. Looks like you'd have to put on your parachute AFTER you bail out!



The 600 hp Conguerer was famous for running hot, and additional oil cooling was had by making the ten gallon tank flush with the fuselage contour and adding an air scoop. Note how much more advanced the airplane looks compared to the cars.

The Navy was also interested in the Shrike, though not as an operational aircraft. It was interesting in the fancy new wing, and bought a Shrike with a 625 hp Wright Cyclone, calling it the XS2C-1.

Originally the color scheme of the A-8 was the standard olive drab and yellow, but a July 10, 1934 Air Corps directive required that all new and refinished aircraft have the olive drab replaced by blue, and some Shrikes were finished in this color. The three A-8's at Fort Leavenworth had the pylon and fairing modified and faired into the rear cockpit, and they had the YA-10 had blue fuselages and red and yellow checkerboard discs on the wheel fairing, and a similar diamond pattern on the spinner.

To some, the A-8 was an ugly airplane with a mean, pugnacious look, but to this writer, it had the classically beautiful lines of a fighting airplane tough enough to take on any opponent.

Late in service life, the pylon and rear canopy were modified. This one at Command and General Staff College, Fort Leavenworth, Kansas.

The 13th Attack Squadron at Fort Crockett, Texas, with black-trimmed white blazes.

USAF MUSEUM PHOTO

Completely equipped test pilot, with clipboard on leg, ready to test the YA-8A at Wright Field. Geared engine and other mods added 500 pounds over weight of A-8. Nose of this lone geared Conquerer was smoother than regular model.

A LOOK AT *MODEL ROCKETRY*

By DOUGLAS PRATT . . .

No more or less of a toy than model airplanes, model rocketry continues to grow in popularity and stature. The FAI conducts world competition. Let's investigate.

• Okay, so I'm on the defensive. Model rocketry has always been considered a "kid's hobby" . . . a concept supported by the larger manufacturers. Rockets are simple, compared with model planes; just about any thrown-together model can make a flight, at least. This makes it attractive to young, impatient types, like the author ten years ago. But there's more to it than toys, as I'm still learning after better than fifteen years of playing with the fool things.

I'm quite willing to grant superiority to the guy with the full-house RC that took him three months to bring to flight status . . all I ask is that he show a bit of interest, or even respect, for my 8-month old scale Scout B, or my attempts to wring a sonic boom out of 80 newton-seconds of total impulse.

I hope that this doesn't sound too hostile. I have tremendous respect for all modeling hobbies; I just tend to feel a bit browbeaten after a while. Model rocketry owes model aviation a lot . . . our basic construction techniques all come from it. We pay back the debt a little by attracting those 8 to 12 year-olds, and often passing them on model aviation; for there are many areas where our hobbies blur into each other. The construction idea that I submit for your consideration with this article is a prime example of this; it is also something that may persuade you experienced types to give rockets a try. This interesting hybrid is called a "boost-glider," since it must be capable of two modes of flight; a straight boost under rocket power, and a stable transition into a glide. Consider it for a moment, folks; especially you sailplane types. We can offer you the power, in a reliable, cheap package, and a wide range of impulse and thrust duration. I recently watched a home-built sailplane, powered by an F7-6 rocket engine made by Flight Systems, Inc. The engine carried the bird to about 1500 feet during its nine-second thrust duration. The parachute ejection charge built into the engine released the power pod, the chute blossomed some feet to the rear, and the bird levelled out to spend many minutes free flight soaring on the available lift. The whole thing was my idea of poetry in motion.

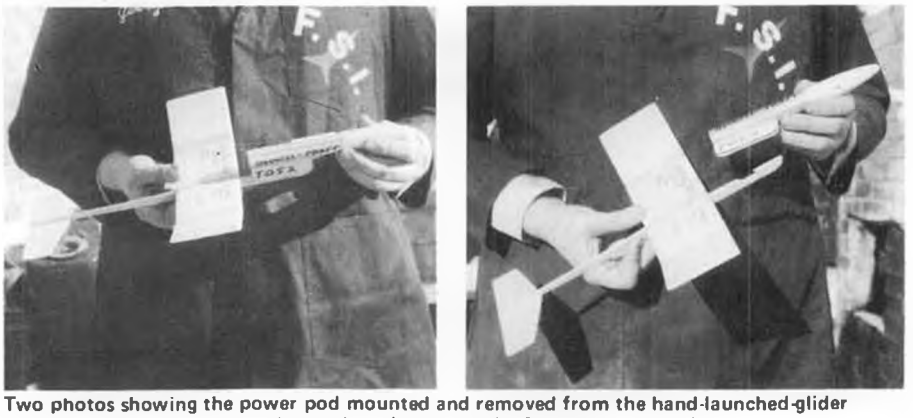
This idea was designed for the conversion of a Jetco Thermic 18 Hand-launch glider, but the basic design can be adapted to just about any glider design. If the glider is trimmed for a circular flight, with a slightly tipped stab or little trim weight on the underside of one wing, you can get a really beautiful flight with it. The power pod shown is designed for FSI engines, because most of them feature long, slow thrust; perfect for gliders. High thrust engines can reach that magic constant, the "speed of balsa," and fill the air with a cloud of little pieces. You can get a catalog of FSI products from Flight Systems, Inc., 9300 East 68th St, Raytown, MO 64133. Especiall recommended are the D4, D6, D18, and E5 engines; they will all fit this pod.

The pod itself can be built from either Centuri or FSI parts. More hobby stores carry Centuri, so I have included their parts numbers on the drawing. The launch lug runs along the top of the

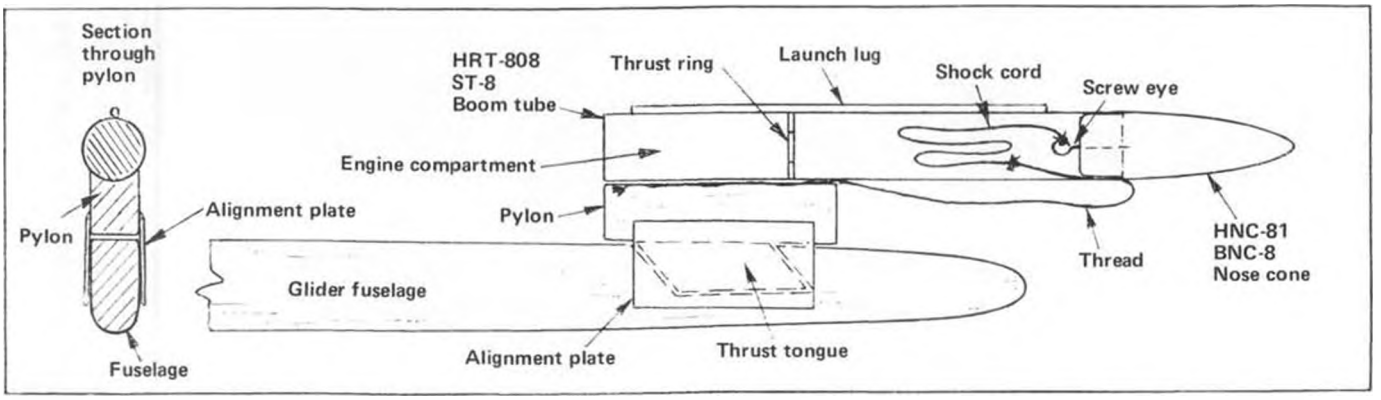
Continued on page 86

PARTS LIST

1. HRT-808 (FSI) or ST-8 (Centuri) body tube
2. TR-1 Thrust ring
3. Launch lug (1/8")
4. Screw eye
5. Shock cord
6. HNC-81 (FSI) or BNC-8 (Centuri) nose cone
7. Balsa for pylon (same thickness as fuselage)
8. 1/8" Plywood for alignment plates



Two photos showing the power pod mounted and removed from the hand-launched-glider fuselage. Most any glider can be used . . . just move the fin to the bottom!



THE PROFILE GUARDIAN

By BILL MELTON . . . The Guardian has been a long-lasting favorite in Navy Carrier, and if contest results are any indication, the profile version could continue to dominate in that class.

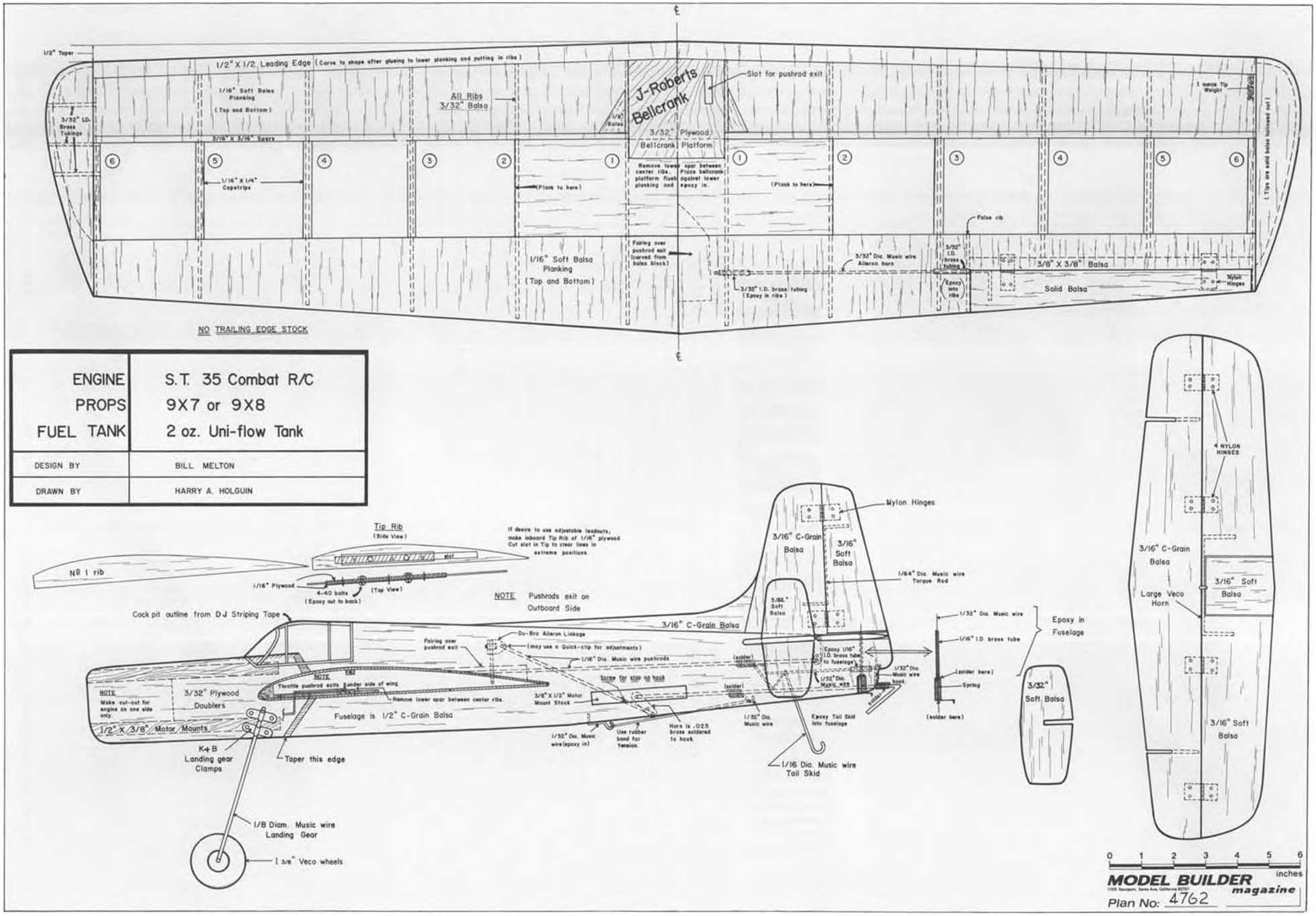
• When the profile carrier event first started, everyone was quite happy with the relaxation of rules on the design of the planes. A common statement was, "Now we can see something other than Guardians". I was also kind of tired of Guardians, and started a series of planes based on the Airobonita. Three or four of these were built and none of them were really successful.

About this time, I realized that there were no profile Guardians flying in the area, and so in order to do something "really different", I designed my first profile Guardian. The original was really loaded with all sorts of moveable surfaces, automatic adjusting-line sweep and all other features I could think of. The plane was an immediate success and lowered our low speed times by 3 to 4 miles-per-hour. However, over a period of time, the flaps were glued up, rudder movement was limited, the inboard aileron was fixed, and the automatic line sweep mechanism converted to simply an adjustable line sweep as usually encountered on stunt planes. A few other changes were made in moments and airfoils but the basic design was unchanged.

Since that time, there have been 25 to 30 copies of this plane built in the area. It has been a winner in almost all area contests. High speed is generally in the 75 to 80 miles-per-hour bracket (or as fast as your engine will run), with low speeds around 18 miles per hour. Our record official low speed was 14 miles-per-hour by Fred Malone, of Albuquerque. Fred also missed the deck on this flight. This is really not too bad when you figure we are flying at elevations of 4000 feet and up. The final compliment for the design occurred at our July, 1975 contest, when all

The Guardian is simple, uncluttered, and very competitive.

The profile Guardian fleet. They all look the same, but no two are alike.

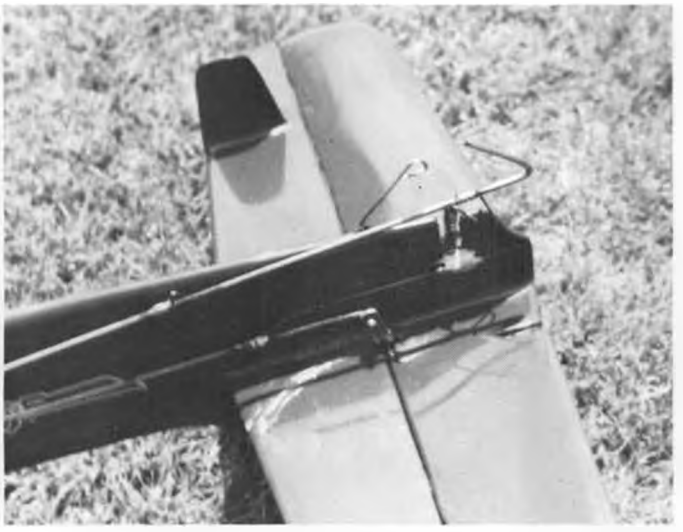


ENGINE	S.T. 35 Combat R/C
PROPS	9X7 or 9X8
FUEL TANK	2 oz. Uni-flow Tank
DESIGN BY	BILL MELTON
DRAWN BY	HARRY A. HOLGUIN

MODEL BUILDER magazine

Plan No: 4762

Arresting hook and release mechanism. Rudder deflection release gimmick also shown.



Another view of arresting hook mechanism. Instructions in text give all details.

profile carrier entries were this profile Guardian. I think I should start hunting a new design.

Construction is really simple, and I am sure the entire plane could be built in less than a week, if required. The flat-bottom airfoil really simplifies this part of the construction. The first requirement is for a warp-free building board.

Engine and tank installation.

The building sequence of the wing is as follows: The leading edge planking is pinned to the board. The spar is glued along the edge. The leading edge is glued on the leading edge of the planking with a 1/2 inch sweepback. While this assembly is drying, the ribs can be cut out. The tip and root ribs are traced onto 3/32 plywood and cut out to serve as templates. Balsa rib blanks are sandwiched between these templates, bolted together . . . and with a little carving and sanding you have a set of ribs.

The trailing edge planking is then pinned down parallel to the leading edge, and with the proper spacing between leading and trailing edges. The ribs are notched for the spar and glued in place. The trailing edge is trimmed off, allowing about an 1/8 inch margin behind the ribs. The spar between the center ribs is removed and the 3/32 plywood bellcrank mount epoxied in place. The top spar can now be added. Care should be taken at this point to make sure the wing is still flat on the building board. The spar for the aileron should be installed at this point, as well as the control horn for the aileron. Make sure the bearings for the control horn are well epoxied to the supporting ribs. The trailing edge planking can now be cut to shape and glued in place.

The wing is removed from the building board, the excess leading edge planking trimmed off, and the leading edge carved to conform to the curvature of the airfoil. I generally install the J-Roberts bellcrank, complete with leadouts and stub pushrods, at this point. Care should be taken to get the bends in the throttle pushrod correct and to make sure it does not bind in the slot cut in the bellcrank platform. It is then a simple matter to plank the leading edge, the center section, and add the capstrips.

The aileron is carved to shape from solid 1/2 inch balsa and installed with nylon hinges of the pinned type. Epoxylite putty is used to put in all hinges and control horns. Care should be taken to insure that the pivot point of the hinges is in line with the pivot point of the control horns.

The tips are cut to outline and glued on. These should be made from very soft balsa. If the adjustable leadouts are desired, the inboard tip rib mechanisms should have been installed during the wing construction. The inboard tip must be hollowed to clear this mechanism. The leadout position shown is about right for 90 percent of the flying, but it is nice to have the option of adjusting the leadouts for different planes and for different flying conditions. If the details of the adjustable

Continued on page 64

Let's fly carrier! Here we have a Guardian for each class. They're a tough airplane to beat in this event.

Arlie Preszler and his Sig P-51 that has been described in detail in this and an earlier issue of MB. Plane is gold (bronze powder in clear K&B Superpoxy) with black and white trim. Power is a Veco .19. Preszler photo.

Control line

By "DIRTY DAN" RUTHERFORD
PHOTOS BY THE AUTHOR

• In last month's column, I suggested that you go to your favorite hobby shop and pick up on several items that make a neato control horn (control bolt?) assembly. If you were unable to figure out what to do with all those little pieces, a couple of the pics with this month's column should help out some. The picture showing a 4-40 bolt running through ply doublers on the elevator is made up with Rocket City No. 69 (2 ea. of swivel and clevis sets) and assorted Du-Bro items. The other set-up, with the white nylon base, is an item from Royal Products. It works OK, but I'm not sure if it is available.

We already have adjustable control horns, so you may wonder why I feel like going to the trouble of making my own. That's easy to answer . . None of the existing control horns have a real tight range of adjustment. One hole on the horn will give too much control and the next hole up won't give enough. The set-up shown eliminates this problem and allows you to really get a plane "dialed-in" just like you want it. With the assembly made from Rocket City and Du-Bro parts, there are 13 more settings available to you in the gap between the holes on a normal control horn.

I first felt the need for this type of

The strong arm of big John Ballard after a 5:58 in Goodyear at the KOI. He has rep for undetectable whipping. Who'll argue! Rush photo.

The "Warsaw Warrior," Bart Klapinski, static judging at the Nats. Checking for smooth filleting. Picky, picky! Rush photo.

horn when we started putting together some really good .049 Combat planes. These planes are very touchy and have to be right on, or you are going to unintentionally stall them out in a tight match. Also, our .049 planes really tighten up the loops when flown downwind in a mild wind. For days like this, I crank in some more control and go nuts doing itsy-bittsy loops right next to the ground. Anyway, I have been using the control horn set-up shown on all of my Combat planes and have yet to have a failure of the clevis, the bolt, or anything else. However, I do recommend that the bolt go through 1/32 ply doublers on the top *and* bottom of the elevator, to keep the bolt from tearing out of the elevator.

A Du-Bro Swiv-Link (Stock No. 113) can also be used to make a trick control horn, but the clevis is kind of brittle and you have to be very careful with it when making adjustments. Other than that, it works fine.

* * *

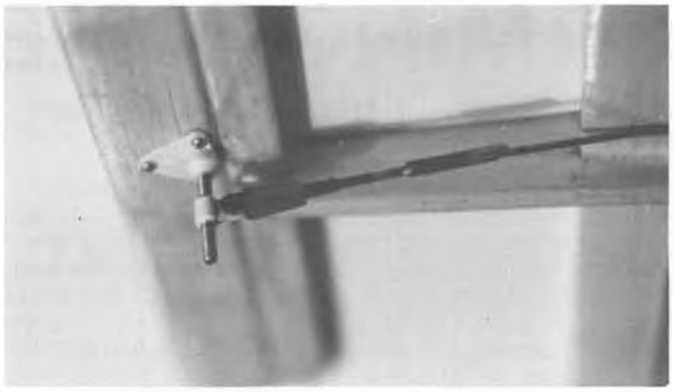
The Col. (Howard Rush) was in town for a week or so recently and he laid some good pictures on me. The one of John Ballard, in this issue, is one of them. This was taken right after Ballard had done 5:58 in "Badyear" at the KOI. That's right, 5:58, Badyear Freaks! That is really honkin', especially when you remember that a typical G/Y is powered by a little ol' .15, and is a very dirty airplane when compared to a Rat.

Bart's at it again. This time he's checking the height of the numbers on Phil Granderson's Slow Combat ship. Phil bought the pavement with it later. End of Cinderella story. Rush photo.

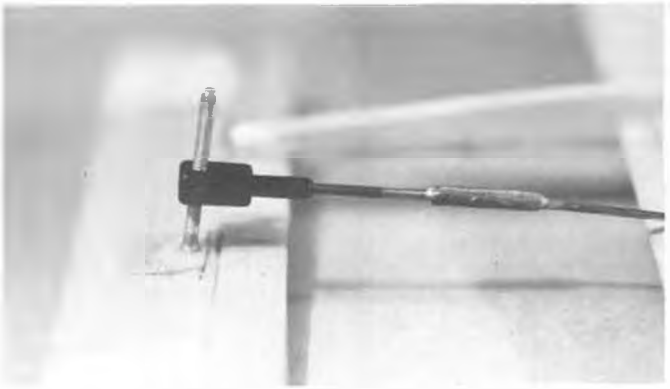
Here I am working on Project Goodyear and hoping to run in the high 6 min. bracket . . mid-6's maybe . . and Ballard whips off a high 5 min. run. (If the previous sentence was too subtle for you, go back over it again!) Kinda makes me feel like giving up Racing, when somebody goes that fast in an event where I have yet to go under 7:30 for a Final!

Speaking of Project Goodyear, I am still working on it, and we should be able to get started on publishing some worthwhile material in the next couple of months. As mentioned previously, the first plane will be John Kilsdonk's Falcon Spl. No. 10. This plane was first drawn up by John in '66 and was published in AAM in the Oct. '68 issue. John was good enough to up-date his original drawings for me (the plane has to be beefed-up to withstand current airspeeds and shut-off loads) and then send along a set to build from. As AAM has gone away, the original plans of the

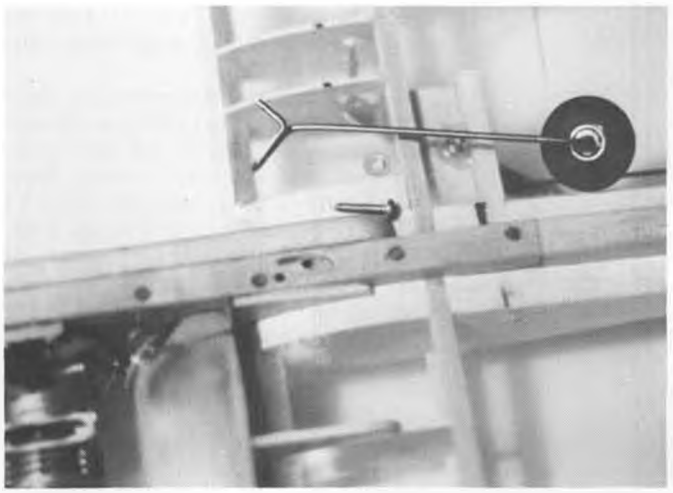
Continued on page 66



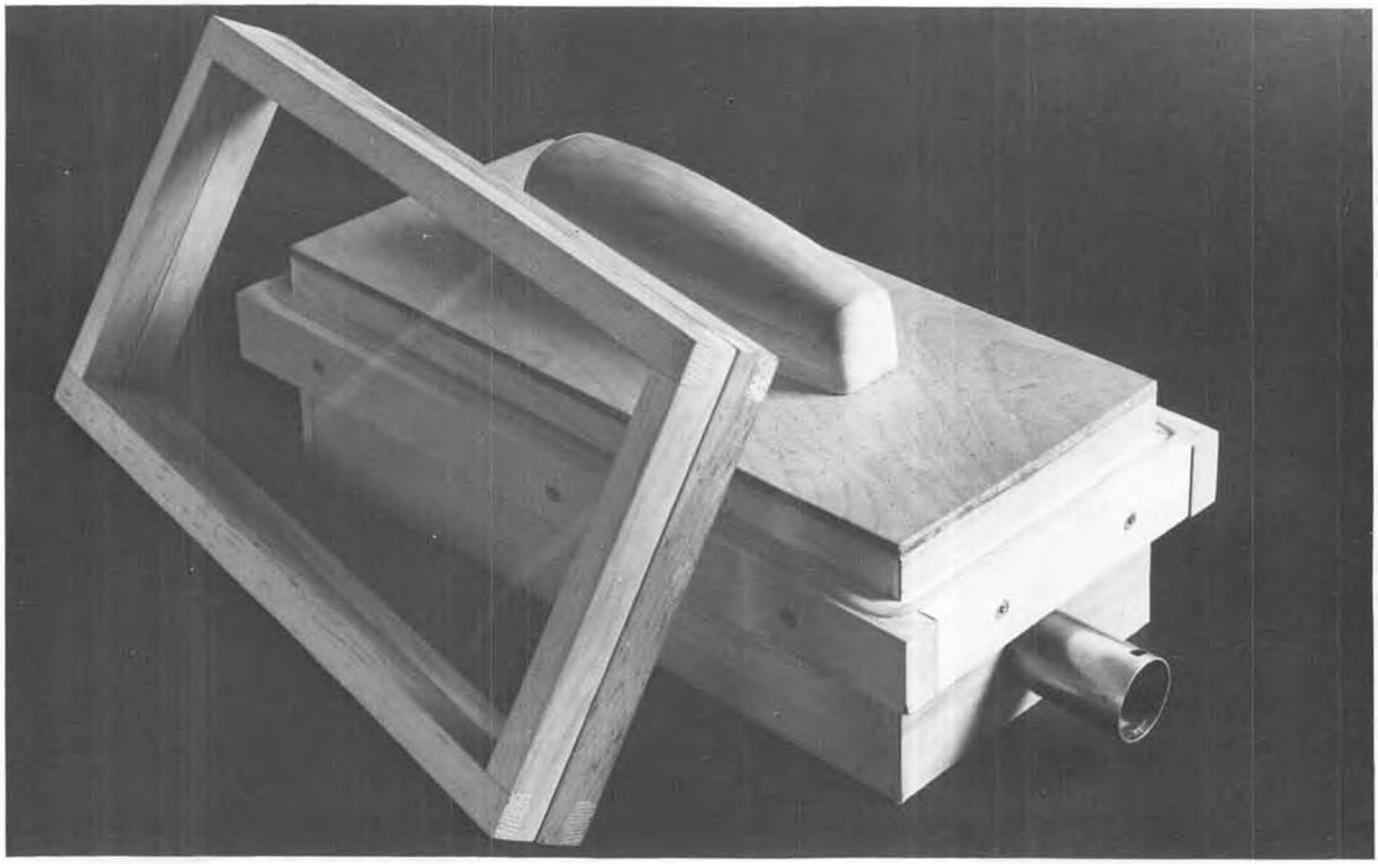
Close-up of Royal Products control horn, as mentioned in text. Works fine. Photo by Dirty Dan.



Control horn made from Rocket City and DuBro parts. Mentioned in text. D.D. uses this rig on all size combats. Allows fine trimming.



Two photos by D.D. showing his landing gear mounting method for Slow Combat. Reinforcing dowels in motor mounts also show well. Airplane is Dirty's as-yet-unnamed design. He'll call it something after he finds out how it flies . . . perhaps unprintable!

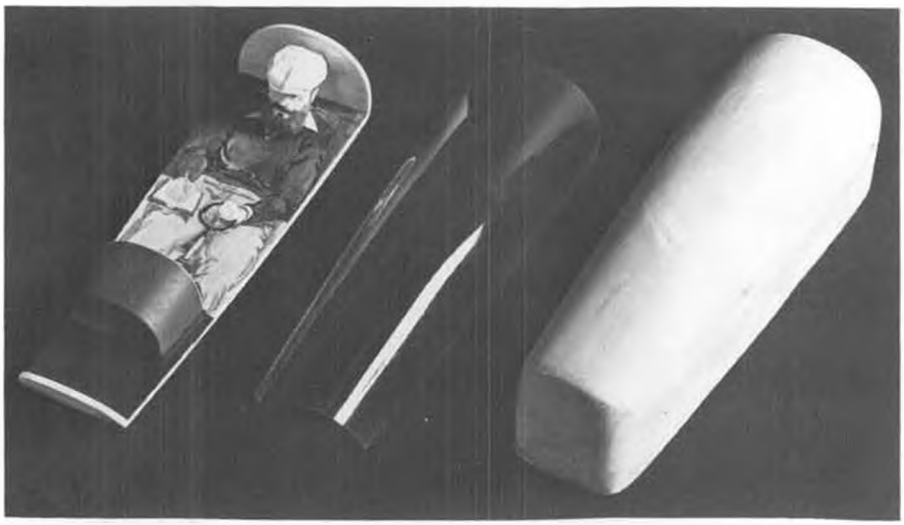


PHOTOS BY THORNEY LEIBERMAN

MAKE YOUR OWN VACUUM FORMING TABLE

By RON WILLIAMS . . . At last! An easily-built vacuum former for odd cowls, canopies, wheel pants, and whatever. Change dimensions to suit your own requirements, but don't make it one inch too small!!

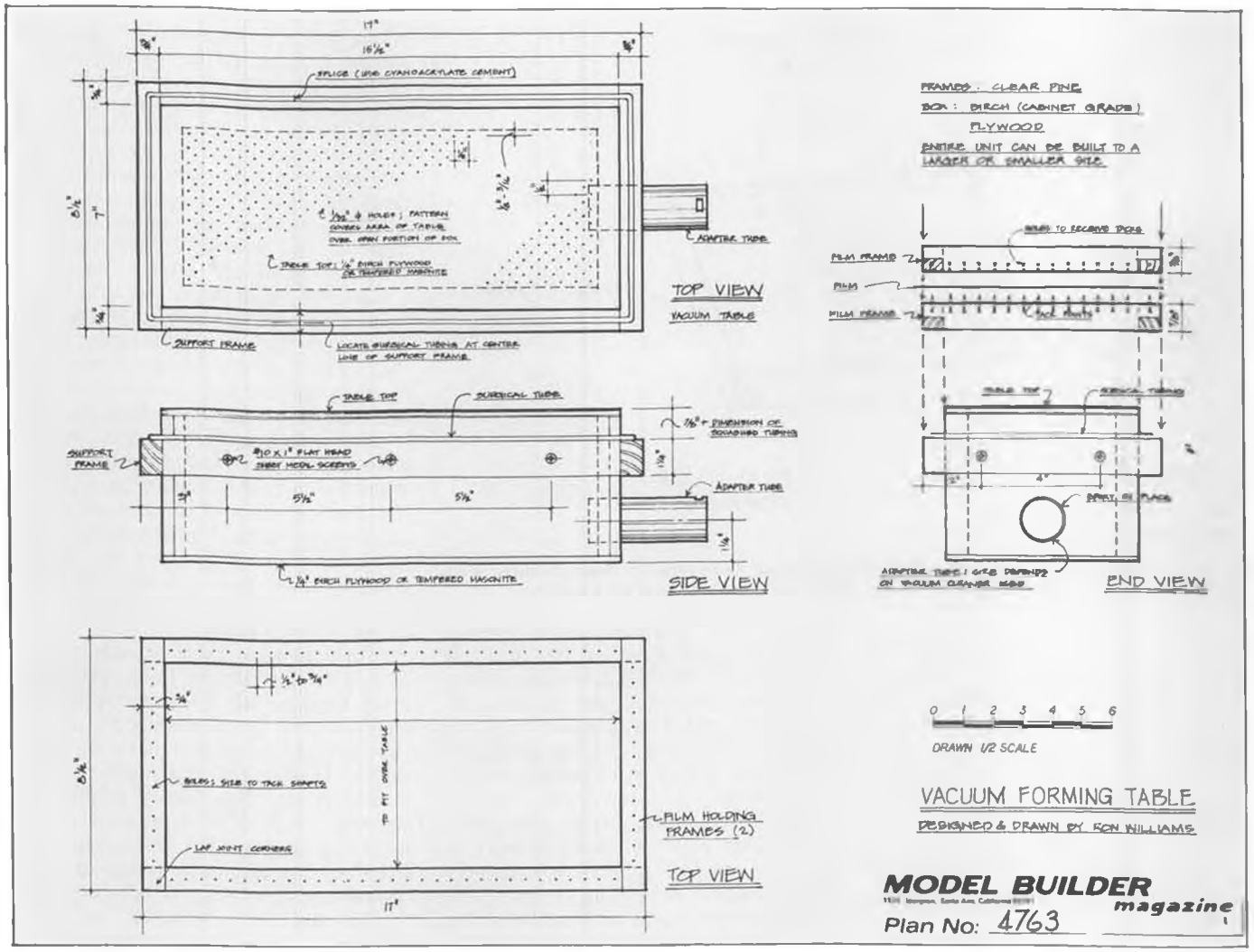
• One has but to read a few how-to articles on U/C or R/C scale (or semi-scale) to realize how often the question of canopy, cowl or wheel-pants comes up; free-flight scale often requires light weight wheels and canopies as well. What to make them of . . a thin, light plastic shape; but how to get it? Articles often mentioned "vacu-forming" the part. The Mattel Toy Company manufactured a "vacu-form" toy some years ago which has become a valued tool for many free-flight scale modelers (see Bill Hannan's column in the December 1975 issue of MODEL BUILDER). This toy had a small hot plate next to a vacuum chamber with a frame that hinged between the two. Small sheets of plastic held in the frame could be heated on the hot plate, flipped over to the vacuum table and pulled and formed over a small object by a hand-pumped vacuum. It was quite well designed and works very efficiently. For builders of larger models, however, the Mattel unit has limited capabilities due to its small table size (approx. 3 x 5 inches). Canopies and cowlings for a large stunter or R/C job require more "formidable" equipment. There is also the growing problem of finding Mattel units in working condition.



Sailplane canopy, the plug it was formed on, and the crazy pilot it will cover. Plug is 2-1/2 by 2-1/2 by 8 inches. Plug carved to shape on model, and then material added for trimming.

We will explore the process of vacuum-forming at home with the vacuum table described here. Look the drawings over to see what's what. Most canopies for larger models are about 12 to 14 inches long by 2 to 4 inches wide. SIG mail-orders 8-1/2 x 17 sheets of heat formable plastic (styrene, I think). These dimensions seemed reasonable for the development of a useful unit. Smaller sheets of plastic can be handled by bringing them up to the larger size with the addition of heavy bond paper taped to the small sheet.

I decided to start with our family vacuum cleaner. It is a G.E. tank type of unknown vintage. I have seen similar



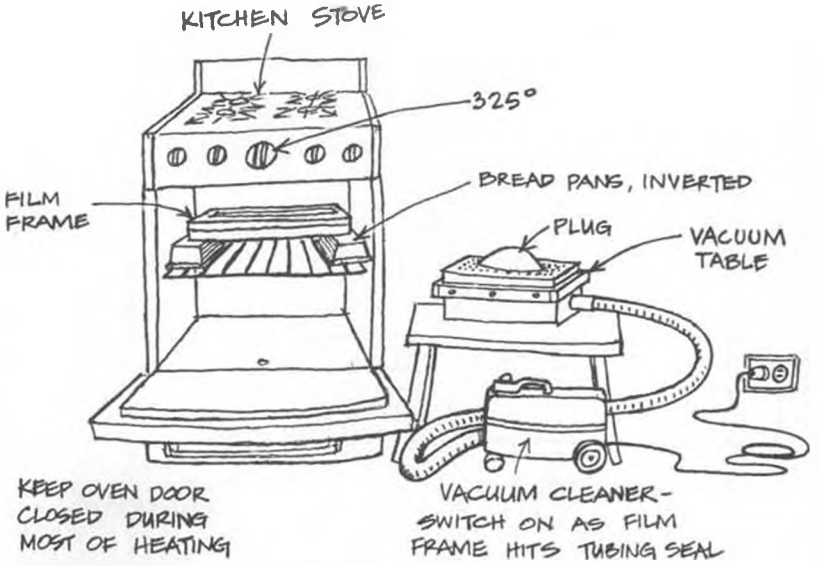
FULL SIZE PLANS AVAILABLE – SEE PAGE 94

machines for $30 in local repair shops, second hand of course. Your local repair shop should also have an adapter tube (Fig No. 1) which, though not entirely neccessary, will facilitate the attachment of the cleaner hose to the vacuum table.

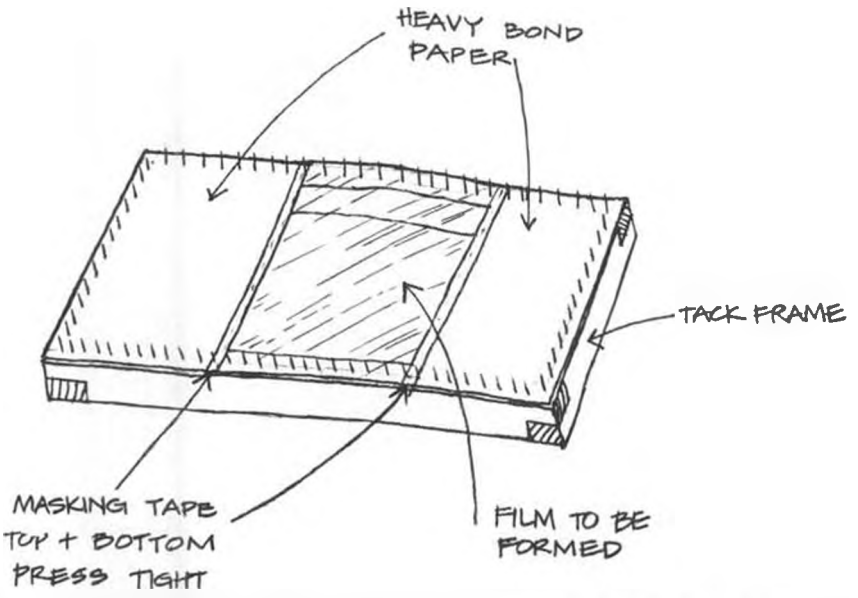
The vacuum table was made with scraps of birch plywood and masonite found in the cabinet shop's throw-aways. Some straight clear pine is also required. The box sides were made with 3/4 inch birch ply, the top with 1/4 inch birch ply, the bottom with 1/4 inch masonite (tempered) and the frame members with 3/4 inch clear pine ripped to 7/8 of an inch wide. Tite-bond glue was used, and the frame supports attached with 10 No. 10 flat-head sheet metal screws, 1-1/2 inches long. Some 50 thumb-tacks are required (they hold the plastic film in place in the film frame). I used 1/8 O.D. surgical tubing (about 54 inches long) as a vacuum seal between the film frame and the support frame.

Tools required are a few 1/32 drills, a drill the size of the tack shafts, and one half-again as large. It's nice to have more than one of the 1/32 drills, as they are likely to break what with all the holes to be drilled. A high-speed drill like the Dremel Tool is a great time-saver; a pin-vise is suggested for masochists. Gluing is facilitated with an assortment of clamps, but if they are not available, the joints can be screwed as well as glued. Don't leave the glue out, it acts as a vacuum seal.

Begin construction by cutting the wood to size. Lay out the hole pattern on the table top (plywood or masonite) and drill the holes. My table top had 578 holes; the Dremel Tool enabled me to finish the drilling in 30 to 35 minutes. I broke one drill in the process. Sand the top very carefully after drilling, smooth to 600 paper, and clear all the holes. Glue the outside frame of the box together, making sure the top and bottom surfaces of the frame are flush



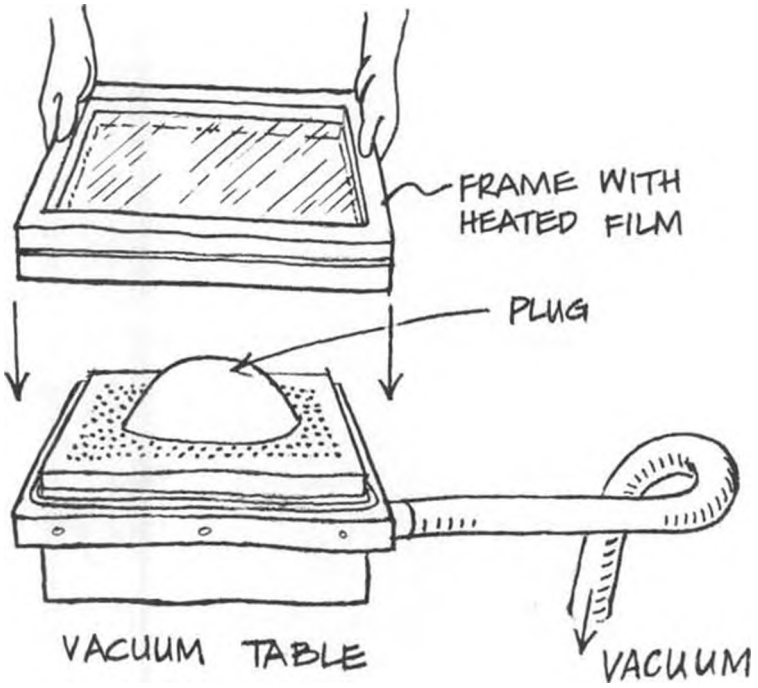
Typical kitchen set-up for vacuum forming. A foot-operated switch on vacuum cleaner comes in handy during operation!



Set-up for making smaller parts. Heavy bond paper is taped (both sides) to sheet plastic to bring it out to tack frame. Basic frame dimensions can be changed to suit your expectations.

(even) as possible. Glue the top and bottom onto the frame, pressing them to the frame so that the joints will be as air-tight as possible. If you haven't yet drilled the hole in the end of the box for the vacuum cleaner adapter, do it now. The hole should be such that the adapter can be epoxied or Hot Stuffed into place firmly and tightly. A hole which is a snug fit for the tube on the vacuum cleaner hose can be substituted for an adapter tube, tape being used to seal it.

It is essential that the film contact the vacuum table top when its frame is pressed upon it. Squash the surgical tube between two pieces of wood and measure the thickness when pressed firmly by hand (lean on it). Add this dimension to the 7/8 dimension of the pine frame material; the resultant dimension is the measurement from the vacuum table top to the top surface of the support frame. Position the support frame pieces, drill and screw them to the box. Loosen the screws, glue generously, then re-screw. Use Hot Stuff to glue the surgical tube to the support frame. Locate the tubing at the center of the support frame so that the tubing can spread freely when the film frame is pressed upon it. Spot-glue the tubing at first to locate it, glue the splice, and then glue the rest of it in place.



Pressing frame down on vacuum table. For proper removal of plug after forming a part, plug sides must be straight, or taper toward a wider base. Undercuts will stick in finished part.

Make the film frames from the rest of the 3/4 x 7/8 pine pieces. The frames should be able to be slipped snugly, easily. . . *easily* down over the table and onto the support frame. Keep the faces of the frames as flush (in a single plane) as possible by matching the pieces before gluing, and by planing and sanding carefully. Mark the two surfaces which match best when the frames are held together, and on one of them, mark off the positions for the tacks.

Cut the heads from 50 tacks. Drill holes which will leave about an 1/8 inch of the cut tack shaft protruding from the surface of the frame. A piece of masking tape wrapped around the drill can indicate the depth to which the hole is drilled. Rub some balsa dust, microballoons or baking soda into the holes, insert the tack shafts, point up, and add Hot Stuff. It occured to me that a more satisfactory method might be to drill holes the size of the tack *heads* and drop the entire tack into the hole, then point up and back fill the holes with epoxy or wood filler.

When the tack frame is ready, put it against the second film frame and press them together so the tacks mark the second frame. Drill holes slightly deeper and a half-size larger than the tack shafts, at each of the marks in the second frame. The frames should fall together easily. The assembled frame should drop over the table onto the support frame no matter which way it is turned (up, down, right or left).

The table is now ready to begin forming. It's time for a dry run. Hook up the vacuum cleaner; it should fit snugly. Tape the connection to make it air-tight. Lay a couple of sheets of bond paper on the table top and turn on the cleaner. The paper should be pulled tight to the table. Seal any joints of doubtful air-tightness with masking tape, rubbing it down tight. Fill the corner joints of the frame support.

When you're ready to form film, start the oven (heat source). About 325° F. is good for forming the type and thickness of plastic likely to be used here. I place the box to the immediate right of the oven door (I'm right handed) on a low (24 inch high) table. The vacuum cleaner is placed where I can start and stop it with my foot on the switch. The oven shelf goes in the middle of the oven and two bread loaf pans are positioned upside down at either side of the shelf to support the film frame.

Stretch the film in the frame by placing it on the side with the holes and pressing it firmly against the tack frame until the tacks are through the film and the two frames fit tightly together. This can take quite a bit of pushing with .040 film. With the frames together snugly, run a piece of 1/2 inch, or wider, masking tape around the frame to seal it air-tight.

Position the plug to be formed on the vacuum table after warming it slightly in the oven (not too hot to touch and hold).

Put the film frame in the oven and while it's heating test the vacuum cleaner, on and off.

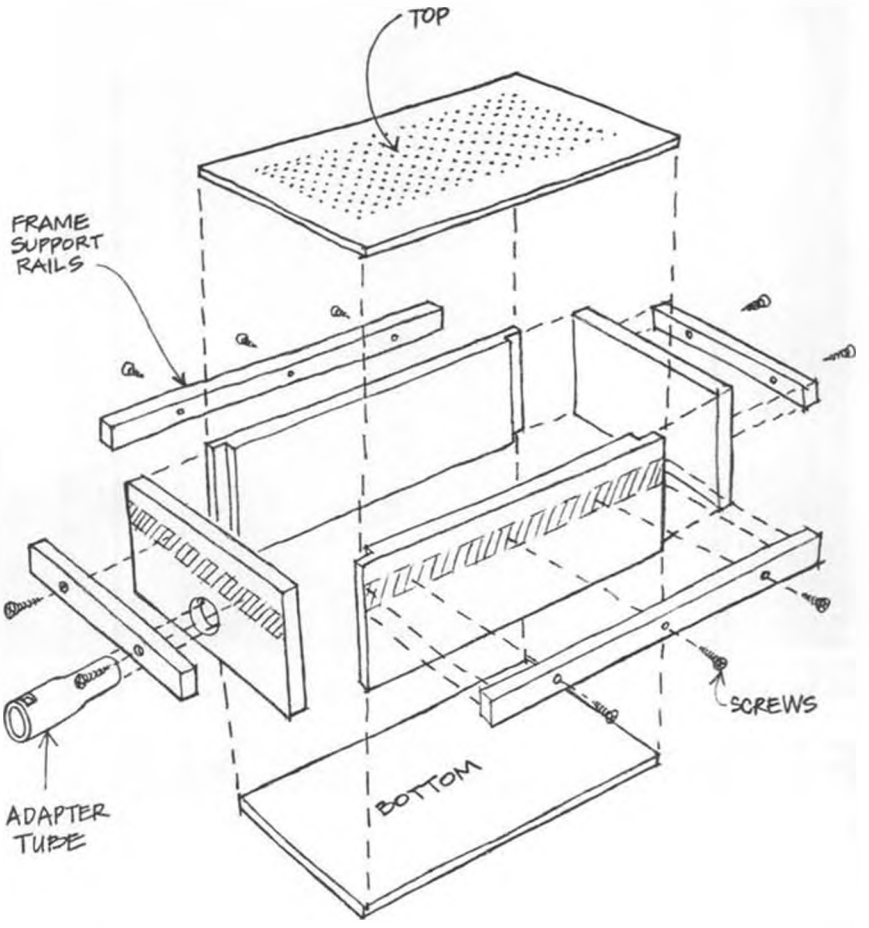
Open the oven door after about 30 seconds and take a peek at the film. It will buckle and sag, steam and pull tight again. When acetate steams or "smokes" it's about ready to form. I find that about 50 seconds at 325°F. with the oven door open and closed a few times, works fine with .030 acetate. Experimenting with other film types and thicknesses will improve technique. Remove the frame from the oven and swiftly press it down over the form and table onto the support frame. As the film frame is pressed against the surgical tube seal, kick on the vacuum cleaner. The film will be sucked down upon the table top, shwop, and voila, the canopy! Wait 20 or 30 seconds for things to cool, and after turning off the vacuum, lift the frame and remove the plug from the plastic. The plastic can now be removed from the frame and cut to fit the model.

Easy, eh? Not really so. The most time consuming and fussy part of each forming job is the preparation of the core, form, or plug used to make the final plastic part. The plug should be wider at the bottom than the top, having no undercuts which make the film difficult to remove from the plug. (fig. 2) It should be very flat and smooth on the bottom. The plug should be higher than required for the finished object so the formed film can be trimmed exactly to fit the model. See Flying Scale Models of WWII for instructions on how to extend the plug for the canopy of an ME-109. Wheels, wheel-pants and other symmetrical parts have to be formed in two pieces and cemented together to form the whole part.

Plugs can be made of balsa, pine or bass wood. The finish of the final plastic piece will only be as good as the finish on the plug. The wooden plug can be finished with Hobbypoxy formula 2 glue, sanded to a 600 paper smoothness, or smoother with steel wools. Do not use wax on the plug.

Another type of plug can be made using plaster. This is done by pouring model casting plaster into a plastic form made from the original wooden plug. The plastic form should be well supported to prevent deforming by the heavy wet plaster. Tap the plastic form rapidly and gently to prevent bubbles from forming on the surface of the plug. After removing from the plastic form, the plaster can be finished with sanding, and details can be added with tapes and carving.

Four plastics are generally available for vacuum forming. They are, in order of their formability, butyrate, styrene, vinyl and acetate. Butyrate is fuel proof, somewhat unstable over long periods, hard and clear. Styrene is usually hard to find, tends to be fragile . . smells like vomit. Acetate and vinyl are tough, but are susceptible to some fuel ingredients and cleaning solvents. Acetate tends to fog when cooled too quickly or not heated enough; it tends toward brittleness. Vinyl is obnoxious (an unclear description, but if you use it you'll know) and the original dust collector, but is more resilient than the others; it requires lower temperatures.



Exploded view of vacuum table. This looks like what will happen if you don't fasten the parts together and then hook it up to the wrong end of the vacuum cleaner!

Smaller objects and pieces of film can be accomodated by adding heavy bond paper edge-to-edge to the smaller plastic sheet. Use masking tape on both sides of the joint, pressing the tape firmly to make a strong connection. More than one small object can be formed on the table at the same time. Just leave a generous space between each object for clean forming and ease of trimming.

Small parts can be formed from .0075 to .015 film, and larger parts can be formed with .020 to .040 film. Film of up to .050 thickness can be formed, but it is difficult to work with. However, the results can be outstanding on the larger size model. The maximum pull I've attempted with the unit described here is about 3 inches, with a 2 by 8 inch plug, and .040 film. Experience is, as usual, the best teacher.

Craft shops sell glass cutters for cutting bottles. These can be used to cut glass bottle bottoms off for making cowl forms. After making the first plastic form, make a plaster plug. Remove (?) words like "Coors", "Rheingold", or "Olympia", add details, and re-form. The possibilities are quite extensive. I'm about to do some compartmented trays for small parts, my wife would like a few original Christmas tree ornaments, and the kids have thoughtful looks when they watch me pull canopies.

So, there it is. All those planes that looked promising for a building project but for the wheel-pants, fillets, cowling, etc., etc. are suddenly possible . . Well, not so suddenly, but the forming process itself does seem to be anti-climatic; it all happens very quickly. Look through the heavy-scrap box, pick-up what's necessary, inject a bit of ingenuity and improvisation and . . . Pop! . . . Voila! ●

PHOTO BY THORNEY LEIBERMAN

Super indoor Peanut Waco SRE by Ron "Vacuum Table" Williams, built from Micro-X kit parts to plans from Mooney (MB), Berkeley U/C kit, old Waco newsletter. Japanese silk-tissue, clear nitrate, plasticized dope, 8.2 grams. Best flight 45 seconds. High scale points at Glastonbury.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Last month I discussed my method for finishing a model using Floquil paint in nitrate dope. Now, I would like to discuss detailing techniques, using both Floquil and enamel paints.

First, there is always need to mask a model for different color separations, lettering, or simply for detailing. This is OK for the most part, but regular masking tape could destroy a model's covering, particularly if it has been covered with Japanese tissue. One solution is to use drafting type masking tape. This kind of tape has a low amount of adhesion compared with regular tape. It can be applied directly to the tissue without fear of tearing. However, you never want to leave any tape in place for long periods of time, because it will dry out and become extremely difficult to remove. So masking should be done only when you are ready to paint, and as soon as the paint sets up, the tape should be removed. In the event that you cannot remove the tape from your model safely, use some cigarette lighter fluid (naptha) The naptha will soften the "stick-um" part of the tape without leaving any trace, or damaging the painted surface.

Many modelers use masking tape to make stencils. I would say that in a pinch it is fine, but the biggest drawback is that the tape is too thick. This really shows up after the painting is completed and the tape is removed. One solution to this is to rub the painted edge carefully with rubbing compound so that the edge becomes "feathered". Another solution would be to refrain from spraying too much paint along the masking tape to prevent paint build-up. With Floquil, this isn't too much of a problem, because it covers so well that you don't need to repeatedly keep going over an area.

PHOTO BY JOHN HARRIS

Pietenpol Sky Scout to 1 inch scale by Jim Gerz, Chicago, Ill. Construction from 1933 Flying and Glider Manual. Real plane at EAA Museum, Hales Corner, Wisc., owner Forrest Lovely.

An item that many of you may not be familiar with is Frisket paper (available in art supply stores). Frisket can be used in place of masking tape for making stencils. It really isn't a paper product, but a very thin vellum or mylar material. It comes with a paper backing, and when you're ready to use it, you peel the frisket from the backing. There is no sticky backing on the frisket, but rather, it appears to cling to a surface by static electricity. The advantage to using frisket is that it is very thin. Therefore, you do not end up with thick painted edges. It is very easy to cut a stencil from it, particularly with a knife like the Uber Skiver.

Whenever you are ready to paint over the stencil you have made from the frisket, it is recommended that you brush on a coat of clear dope to seal the edges just like you would for masking tape. Then you can spray the color or even brush over the stencil without fear of having it bleed under the edges. It is always a good idea to spray perpendicular to the stenciled surface, not at an angle, so as to minimize the possi-

This is Ron Williams month! Built from Peck-Polymers kit, this Pietenpol is covered in yellow, black, and red (letters) tissue, silver struts. Weight 14 grams, almost twice the Waco! Photo by Thorney Leiberman.

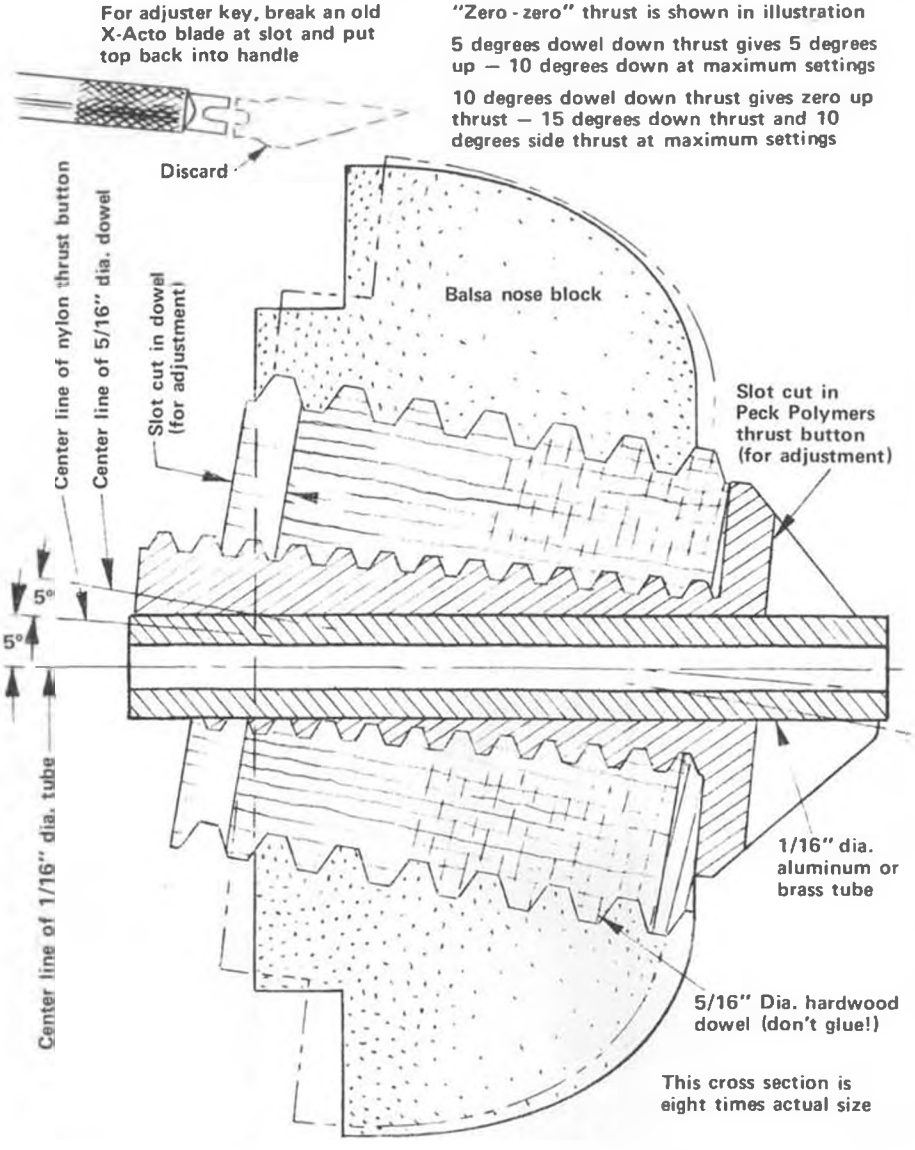
bility of the paint bleeding under the stencil.

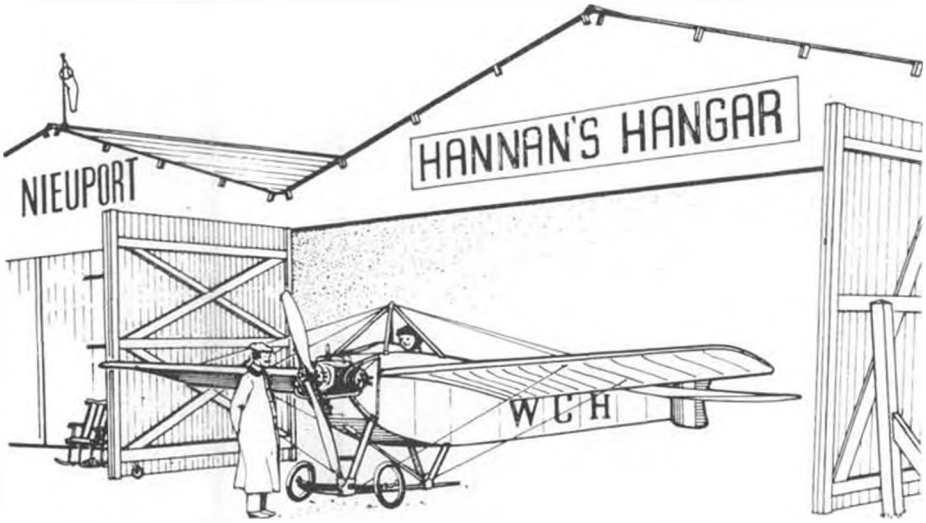
Frisket paper is really an item you should have on hand for special jobs, but it does have a few disadvantages, which can make it unsuited for some detail paint jobs you may have. The biggest disadvantage is that it *will not* lay flat over any kind of compound curved surface. That's why I won't use it to make roundels on top of wings . . there are just too many curves involved. I've tried making a stencil of an entire set of registration numbers with poor results. After the letters and numerals were cut, it was nearly impossible to lift the frisket from its backing without tearing the stenciled portion. So, you have to do this a letter at a time, and on a flat surface!

One trick I use with frisket is for painting the very innermost circle of a roundel . . the bull's-eye? I usually use a ruling pen, compass type, filled with paint. Then I paint or scribe (I guess that's what you would call it) two concentric circles of, say, the color blue. Then I fill in between the two circles with a paint brush using the blue paint. I repeat the same procedure using the different colors. Typically, by the time you get to the bull's-eye, it's so small that it is difficult, or nearly impossible, to scribe with the ruling compass. So, I take a piece of frisket and draw a circle, with a regular compass, the diameter of any of the outer circles. With my circle cutter, I make a cut-out the size of the inner most circle of the roundel. I use the drawn circle as a centering guide to locate the frisket paper. A quick blast with the airbrush, and the job is finished. This same template can be used several times.

Incidentally, in order to prevent punching holes in my covering when I use the ruling pen compass, I use a very small piece of servo tape. Servo tape is a foam product that is about 1/8 inch thick and is sticky on both sides. I cut a piece about 3/16 square and place it in the center of what will be the roundel. This gives a good foundation for the point of the compass. One thing to re-

Continued on page 82





"If the good Lord had meant engines to be flat, Pratt & Whitney would have built them that way!"

● This month's lead-in line was swiped from the International Antique Airplane News, whose reporter appeared to have overheard it during an antique fly-in.

THE EDITORS

This month we doff our hats to all the aviation magazine editors, who seldom receive their due recognition. Somehow, readers have a tendency to view a magazine editor's job as a soft touch. After all, they can attend contests and trade-shows on company time while getting paid for it, right? And, most are world travelers who jet overseas to report on the exciting international events, serve as judges, or simply party-it-up under the guise of doing their jobs, correct? Not quite.

The relatively unseen side of the coin presents a totally different picture . . . the one which separates the strong from the weak, the wheat from the chaff, the men from the boys, and the pigment from the hair! Back in the January, 1973 MODEL BUILDER, Hannan's Hangar documented the trials and tribulations of Bill Northrop, guiding helmsman. Since that time, Bill has gained a staff of dedicated assistants (more unsung heros), but we're willing to bet that he is still, as ever, under as much pressure to maintain the magazine's high standards and meet printing deadlines.

Yes, with editors, there is *always* another deadline. One month's issue finished only means another number to start. Without distractions, the schedule would be plenty punishing, but add an almost non-stop series of interruptions, phone calls, and a plethora of assorted flak from disgruntled readers, and you gain a more realistic picture of the *real* editor's life.

We would like, here and now, to salute them all, and single out one for special treatment, on the occasion of his retirement. In company with Doug Gillies and Georges Chaulet, your scribe was fortunate enough to pay a visit to Maurice Bayet, Editor of *Le Modele Reduit D'Avion*, in his Paris office. This fine, modest gentleman is one of the real veterans of the pioneer aviation scene. Although his publication deals primarily with model aircraft, his personal interest and knowledge is encyclopedic and encompasses all French aeronautical activities. He was closely associated with many of the early flyers and aircraft constructors, and his memory of them is razor sharp. His archives are remarkably comprehensive. As Georges put it: "I won't say he has historical documents, but he has a confidential book containing the unlisted telephone number of Leonardo da Vinci!"

The late Ed Franklin, popular modeler from New Jersey, with his AMLA r.o.g. Old Timer. See text for more. Photo via Dave Stott.

The offices of the magazine constitute a veritable museum in miniature, displaying all manner of aviation artifacts, paintings, photos, and models. M. Bayet explained that his publication now enjoys the distinction of being the oldest of *all* French aero magazines, model OR full-size, having been founded in 1936.

Madame Bayet and one secretary, with the aid of outside contributors, produce the M.R.A. magazine, and appear to enjoy their work. The range of subject material includes everything from gliders and rubber-driven models through scale types and rotorcraft, including R/C.

Models on display in the offices

Volmer Jensen in his 8 hp Go-Kart - powered hang glider, 20 inch prop, over El Mirage dry lake. Photo by John Underwood.

Tribute to Maurice Bayet, retiring M.R.A. (model aircraft mag) editor. Jill Peck and the Demoiselle she researched and built from scratch.

included solid-scale and flying examples, such as a classic Antoinette, which had been constructed circa 1937. The clock on the wall was encased in a cast-metal reproduction of a radial air-cooled engine, and even Bayet's coat-hangar was distinctive, having apparently been sculptured from an exotically-grained block of wood some six inches thick!

In a back room we were shown such relics as a propeller from the original Pou-du-Ciel (Flying Flea), presented to M. Bayet by the designer, Henri Mignet, himself. And a nameplate from the Voisin factory . . . a gift from Gabriel Voisin. Not to mention stacks and stacks of aviation books and magazines of every description. A visitor is not aware of any visual separation between models and full-size aircraft lore. Quite simply, this place is alive with *AVIATION*.

Maurice Bayet is an alert, voluble, volcano of information, with enthusiasm and energy rather unusual for a man of his seniority. Doug attempted to photograph him, and found him too fast for his camera shutter . . . the result was a supersonic blurr of motion. Georges' masterpiece of understatement was: "Il est bien vivant." (He is very much alive). For many years, in addition to his editorial responsibilities, Bayet was president of L'Association des Amis du Musee de l'Air (friends of the French air museum), where he contributed a great deal toward supporting the activities of that splendid institution.

By way of comic relief, in the midst of our frantic efforts to exchange information, in two-and-a-half different languages, we flew one of our tiny helicopter models and the Escondido Mosquito in the editorial office, to the accompaniment of applause from the staff! It was indeed with great reluctance that we took leave from this marvelous place, but not before being presented with an autographed copy of M.R.A., in the fine hand of Maurice Bayet, editor extraordinare!

Since learning of M. Bayet's retirement after our return to the U.S., we made an effort to obtain a photograph from the great man, via our "French Connection", Georges Chaulet. The following is a transcript of a portion of that attempt, from a phone conversation.

For Sale: One genuine 1936 racer, the Marccoux-Bromberg Special. See text for more information. Photo via Rudy Profant.

Bayet: "An article about me? No, no, I am not worth enough!"

Chaulet: "But Bill Hannan was pleased to meet with you, and wishes to publish your photo."

Bayet: "M. Hannan is very kind and sympathetic, but I hope he will not be vexed if I say it would be better to publish the photo of an aircraft, instead of an old man like me!"

Chaulet: "You are too modest, Mr. Bayet!"

Bayet: "Well, I don't like when people speak about me. For instance, last year I was given the Medal of Aeronautics and I said nothing about it in M.R.A."

Chaulet: "I repeat that Bill would be happy to speak a few words about you and the M.R.A. . . ."

Bayet: "Well, just a very few words, and perhaps he may put the picture of a Peanut?"

Although we are disappointed not to have a photo of M. Bayet to share with you, we offer instead, per his suggestion, the photo of a Peanut. Appropriately, we have selected a French Peanut, the Demoiselle, constructed by an American Demoiselle, Jill Peck.

INDOOR NEWS AND VIEWS

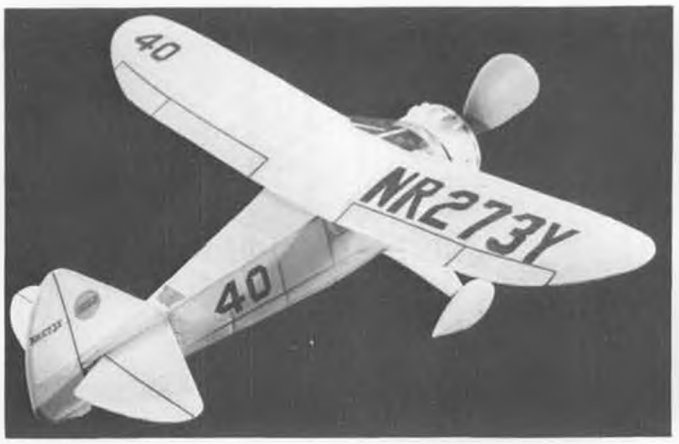
Bud Tenny, Box 545, Richardson, Texas, 75080, publishes a newsletter which is virtually the sole "lifeline" of serious indoor model fliers. If your interest is microfilm, paper stick, or indoor gliders, this is a must. Typically, 3-views of model designs and technical analysis are featured, along with contest calendars and record reports. International in scope, this publication merits your support. Membership in the National Indoor Model Airplane Society, including a subscription to News and Views, costs $3.50 per year, surely a bargain these days. Or, if you wish only the newsletter, it is available for $2.50 per year (U.S., Canada, or Mexico). Overseas modelers may obtain a subscription for $3.50 (surface mail rate), or $5.06 (air mail rate).

WANNA BUY A RACER?

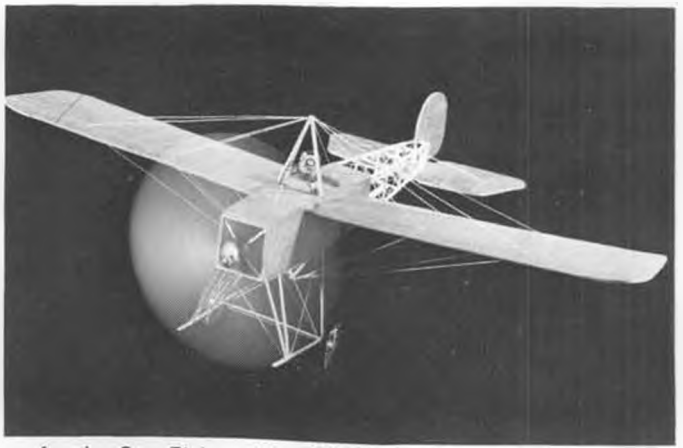
Not a model, but the real thing! Rudy Profant, of 4060 West 158th St., Cleveland, Ohio, 44135, has decided to sell his Marcoux-Bromberg Special, a fabulous plane of Racing's "Golden Age". One of our photos shows the machine as it appeared during 1936, as the Gilmore No. 54. Originally numbered "9", it appeared at the 1934 Bendix Trophy Race, but did not participate. In 1935, it flew, but didn't place.

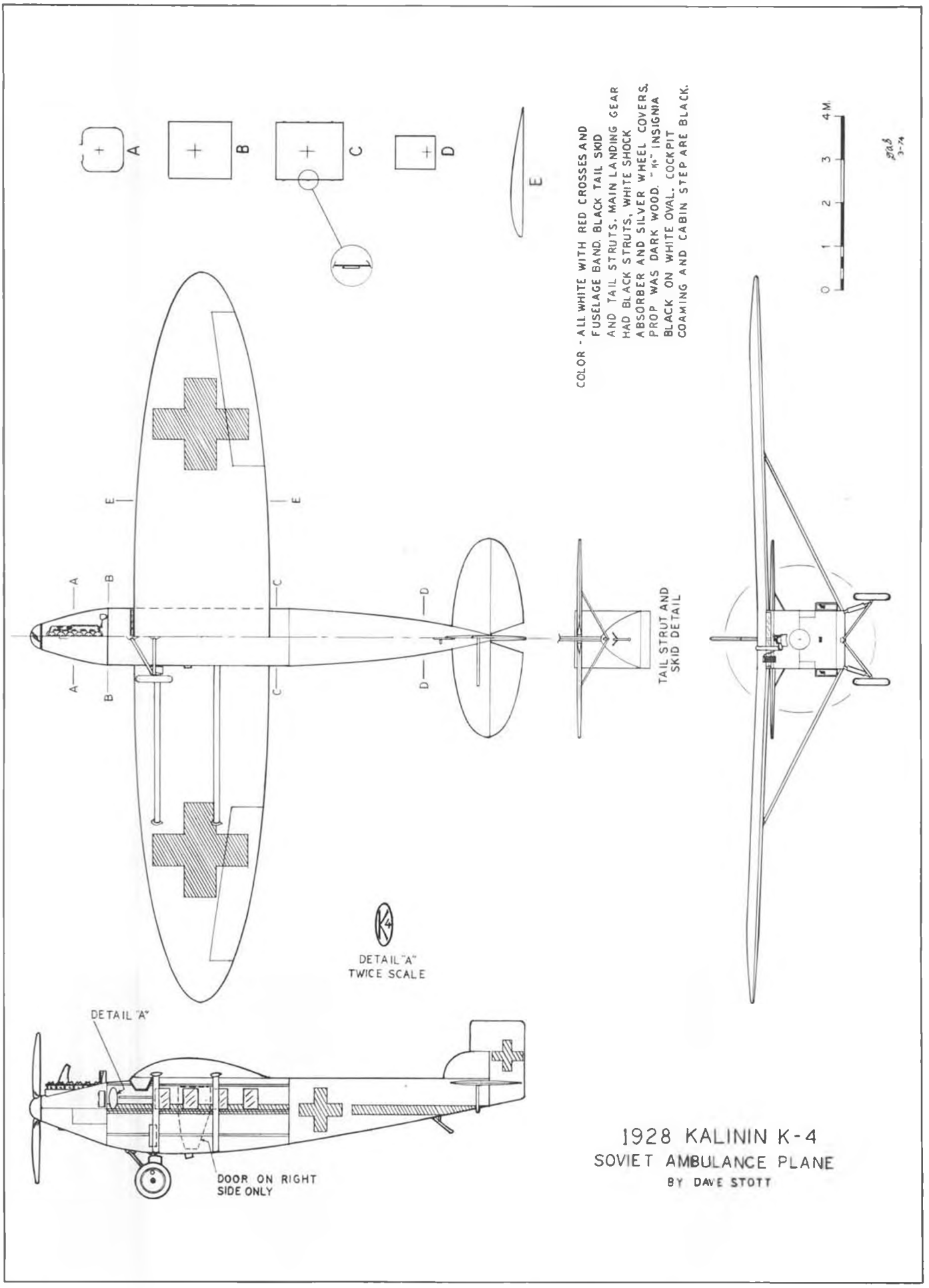
By 1936, things were looking up, as it placed 2nd in the Thompson Trophy Race, and repeated that performance in the 1937 Bendix. During 1937, it snared

Continued on page 79



"Mr. Mulligan," constructed by Stan Fink, Eugene, Oregon, from MB plans by Hank Nixon. Photo by Carol Cogswell.


Another Stan Fink and Carol Cogswell combined effort, Castaibert IV from Walt Mooney's plans in MODEL BUILDER.


A
B
C
D
E
COLOR - ALL WHITE WITH RED CROSSES AND FUSELAGE BAND. BLACK TAIL SKID AND TAIL STRUTS. MAIN LANDING GEAR HAD BLACK STRUTS, WHITE SHOCK ABSORBER AND SILVER WHEEL COVERS. PROP WAS DARK WOOD. "K-4" INSIGNIA BLACK ON WHITE OVAL. COCKPIT COAMING AND CABIN STEP ARE BLACK.
0 1 2 3 4 M.
TAIL STRUT AND SKID DETAIL
DETAIL "A" TWICE SCALE
DETAIL "A"
DOOR ON RIGHT SIDE ONLY
1928 KALININ K-4
SOVIET AMBULANCE PLANE
BY DAVE STOTT

Peanut SAAB MFI-17 SAFARI

By CHARLES ROTH . . . No, it didn't stop too suddenly, the Saab Safari was designed with swept-forward wings. A good chance to break in that vacuum former described in this issue!

• SAAB has long been synonomous with innovation and quality. Bjorn Andreasson has been identified successively with fine, small aircraft and with SAAB. One of Bjorn's better-known efforts was his acrobatic Andreasson Biplane, well represented in the Peanut world by Peck-Polymer's fine kit. In fact, the Peck Andreasson did the best flying of my entries in the first annual MODEL BUILDER Peanut Proxy Contest.

The basic design of this SAAB was done by Bjorn Andreasson in 1958. SAAB pursued what they call the MFI series through the MFI-15 when, according to the SAAB Handbook, in the 1968 time period, they built some Taildraggers which differed from the current MFI-17 only in the landing gear configuration. The MF-17, with its tricycle gear, is better known, but the excellent flight characteristics of the Taildragger remain a matter of record, and it was shown as late as the summer of 1974.

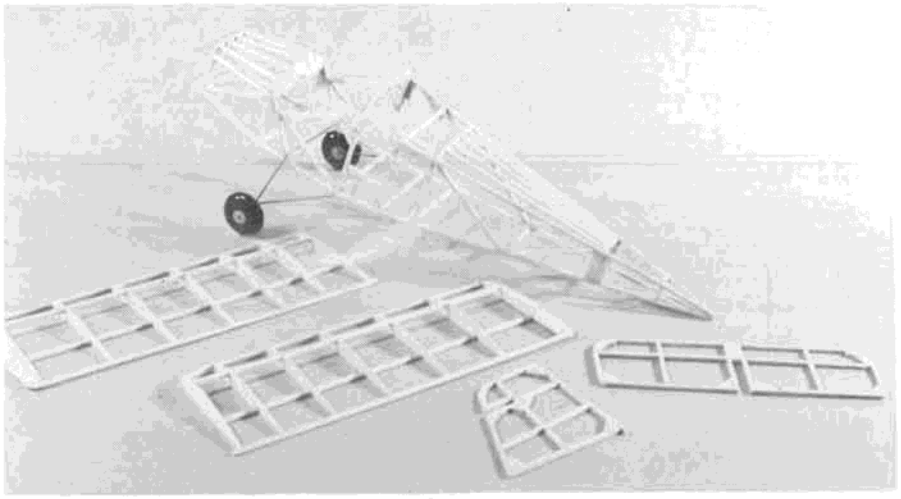
The design of this SAAB is both simple and interesting. The absence of multiple struts and wires and the constant chord wing are a blessing in any factory or modeler's workshop. The spacious cockpit/canopy gives excellent visibility, and virtually forces the builder to a molded canopy, while the negative sweep on the wings is seldom seen. From a Peanut builder's view, the SAAB looks attractive, with lots of fuselage and room for a fairly big prop, even on ROG.

Monty Groves heard me going on for months about Peanuts and finally joined the ranks by sending me a construction drawing for the SAAB. After staring at the drawing off-and-on for several more months, I finally broke out the balsa, and what you see is what I got.

For some reason, I always start with the fuselage, but whenever you build it, the following comments may be helpful. Build the two sides identically in your favorite way . . . two on pins, or cardboard jig them . . . but do not glue in the landing gear gussets until you have installed the gear wire. After cutting the cross braces, glue the tail posts together and next the plywood cockpit bulkhead and bottom cross member. This gives you enough strength and rigidity to get the fuselage well lined up and the rest goes together quickly. Note that the stringers rest on top of the bulkheads and butt join to the tail cross brace.

Bend the landing gear from 1/32 wire. The forward portion was made in one piece, including the axles. The aft legs are then soldered to the forward ones, just above the axles. The assembly should be thread-wrapped and glued to the fuselage, then install the gussets on both sides of the fuselage. It's your choice on wheels. But, after I decided on a big prop, I switched to laminated balsa because of weight considerations. If you have a set of hollow brass punches (maybe they're really gasket makers or leather working tools) the wheels, tires and hubs go quickly. Short 1/16 aluminum tubing to fit the axles, finishes the main wheels. I used a small plastic wheel at the tail. The local hobby store had a sale on model car stuff, and some of these wheels are quite nice. In any event, wait until you've finished covering the fuselage to glue the tail-wheel assembly in place.

Continued on page 90



Skeleton view of the Saab reveals a simple but rugged frame. Get busy on Ron Williams' vacuum table, and you'll be all set to pull a canopy for the cockpit area.

Scale Struts 1/16"X 3/32" Sand to streamlined shape

Construction note: Use 1/20" square, & sheet balsa throughout except where noted.

Scale Dihedral 1/4" at tip rib

Scale tip shape

MFI-17 Panel Glue to F-2

Canopy: Carve balsa male mold, fit to fuselage. Pull heated 0.010" plastic sheet over mold until it hardens.

F-1

F-2

F-3

F-4

1/20" Sheet

1/16" Square hard leading edge

1/16" square bottom wing spar

W-1

W-2

Cross Members bottom only

Trailing edge 1/16" square or 1/16"X 1/32", your choice

Make F-1, F-2, F-4 from 1/16" sheet

12 Required W-1

2 Required W-2

Make gap 3/32" to change decollage

Solder aft leg to forward strut

Add fairing after Stab installation

Sanded 1/16" or 1/20" sheet

1/16" Hard

Thread wrapped gear wire-front

Hardwood Plug

1/4" Soft

Light 1/32" Sheet Tissue covered

1/2" Wire stub, thread wrapped

1/20" Hard

1/16" Square Do not glue to fuselage

Color Scheme: Military Olive Drab White Lettering

F-3 1/32" PLY

Ailerons, Flaps & Rudder outlines marked with dashed lines

SAAB MFI-17 SAFARI

PEANUT SCALE

DESIGNED AND INKED BY M.B. GROVES

12/29/75

Scale note: SAAB has produced the MFI-17 both in tricycle and taildragger configuration

Charlie Martin and his "Slow Poke" FAI power model, featured in this month's 3-view . . . the airplane, not Charlie.

FREE FLIGHT

By BOB STALICK

• I've always been of the opinion that people took up the building and flying of free flight model airplanes because they enjoyed the challenge of designing and assembling devices that would fly just a bit better or glide just a bit longer than their previous efforts. There are others among us who enjoy building for the sake of nostalgia . . witness the growth of the old-timer movement. Still others collect kits and engines and the like.

When free flighters arrive on the field of competition, there still exists the friendly rivalry, the sportsmanlike efforts which allow one to assist another, even at the expense of losing out. It's this sportsmanship that makes the hobby more appealing and stimulating than many other so-called sports. Additionally, there is just enough of the luck element in free flight to allow even the rank beginner the chance of beating the established expert. This adds an element of modesty to the entire affair, since no one likes to get caught with his foot firmly planted in his mouth.

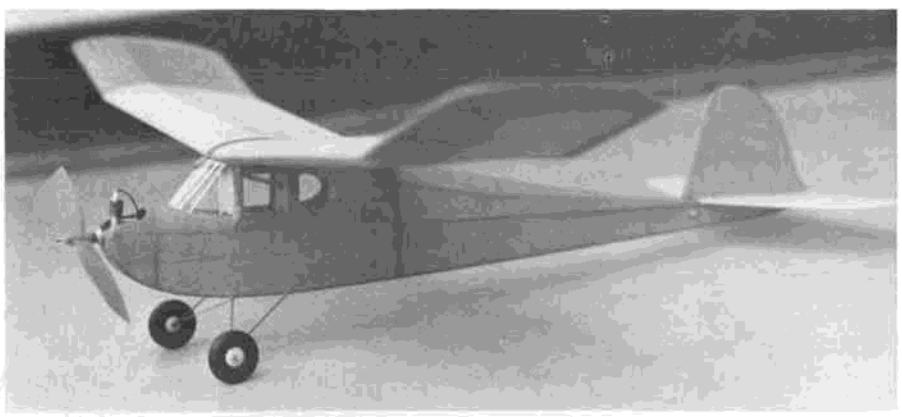
Sometimes, free flighters get involved with the politics surrounding favorite events or candidates for AMA office. Too often, the political movements arrive as a result of actions which have already taken place, such as the recent vote on the issue of V.T.O. This example proves out what many Free Flight Contest Board (and other contest board) members have known ever since there was such an animal as contest boards . . there is little interest in giving opinions and evidence regarding rules changes until the rule has been changed.

It is an interesting paradox of American ways to leave well enough alone until the proverbial ox has been gored . . . then the screaming and carrying on do begin with a vengeance.

Unfortunately, the effect on many of us is to spoil the entire hobby. No one likes a sore loser, everyone likes a gracious person . . win or lose. The contestant who loses his temper, who shouts and carrys on, serves to downgrade the entire sport, not just for him but for all concerned.

Last winter, the Free Flight Contest Board voted to ban V.T.O. Beginning in 1976, only hand launching would be permitted for gas-powered AMA class models. The vote to change was 7 in favor to 4 opposed. This represents the minimum necessary vote to effect change. In other words, a 6 to 5 vote just doesn't do the trick.

One member of the board who voted for change was Mel Schmidt, from Distric X. Now, I've known Mel for a number of years, and he has always seemed like a decent sort of a fellow. In fact, he even wrote this free flight column before I took it over. Can't get much more decent than that, I figure. However, it also seems Mel's vote has caused a fair



How about indoor old timer rubber scale? This is Clarence Bull's 18 inch span Buzzard Bombshell which he flew at a recent WMC indoor meet. He's from Eugene, Oregon.

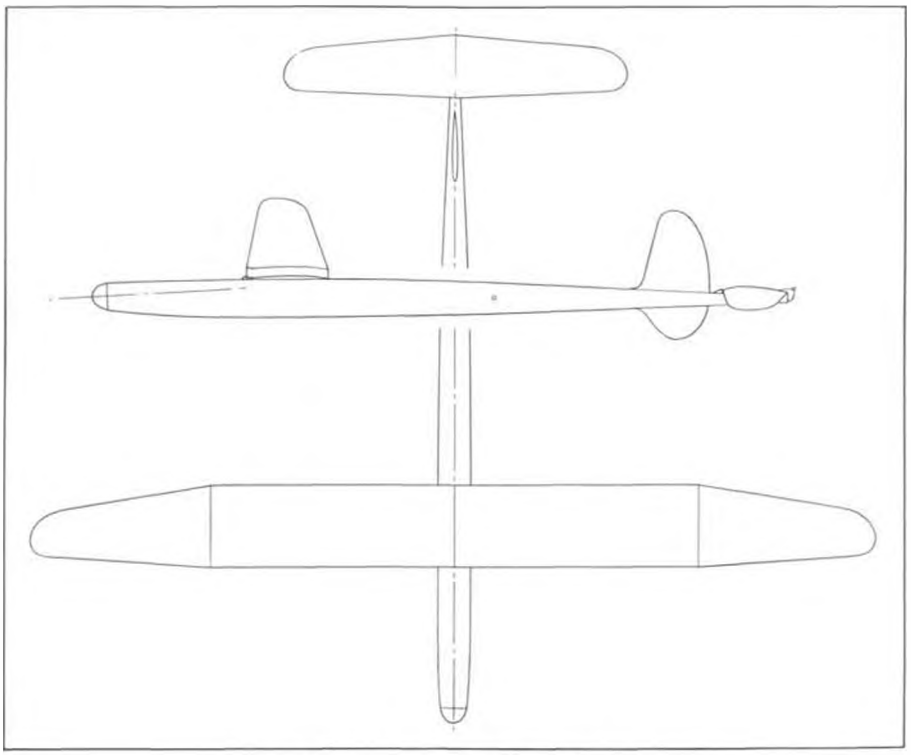
number of free flighters in the Southern California area to get pretty excited. It's all Mel's fault that there's no more V.T.O., so the complaint goes. Just as though Mel has cast the deciding vote. Just as though the other 6 members of the F.F.C.B. hadn't voted. In a democracy, the constituents do what any constituency would do . . they petition and criticize. Only problem is: This isn't a democracy. This is a representational government. In that form of government, the one who is accused of not representing usually steps down from his post. Mel has done this.

Should be the end of it, right? Wrong. The petitioners now want the balloting declared invalid. The reason being that Mel didn't represent the wishes of the majority. Could be? However, as is usually the case in matters of this sort, the majority seldom makes its wishes known until it has been slighted. Mel's original position was to follow the wishes of the majority as he was able to identify it at the time.

Since it is not the position of this writer to continually speak out on matters political, I intend to address this topic at this time and promise not to get into the habit of debating issues of this sort via the pages of MODEL BUILDER. I should also add that the following statements are the opinions only of this writer and do not represent the thoughts of this magazine or any other body. At this point in time, whether Mel Schmidt represented the majority of the free flighters in his district is of little consequence. He voted as he believed he should vote. So did six others who voted as Mel did. The other four also voted as they believed.

That's how the process works. When Mel voted, his vote was valid. He was the F.F.C.B. representative for District X. His vote cannot be declared invalid. Such a movement would destroy the entire rules-making process. The rules change has been made and it will stay that way . . in fact, it must stay that way. Mel has fulfilled his duty . . rightly or wrongly, and he has been replaced. The rules change must not be replaced.

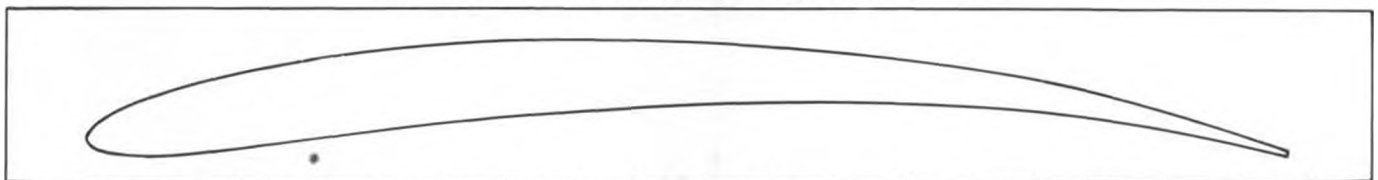
For those who are lamenting and gnashing their teeth over the change, your charge is clear. Propose the addition of V.T.O. for the next rules change cycle. That is also how the process works. Keep in mind that it may



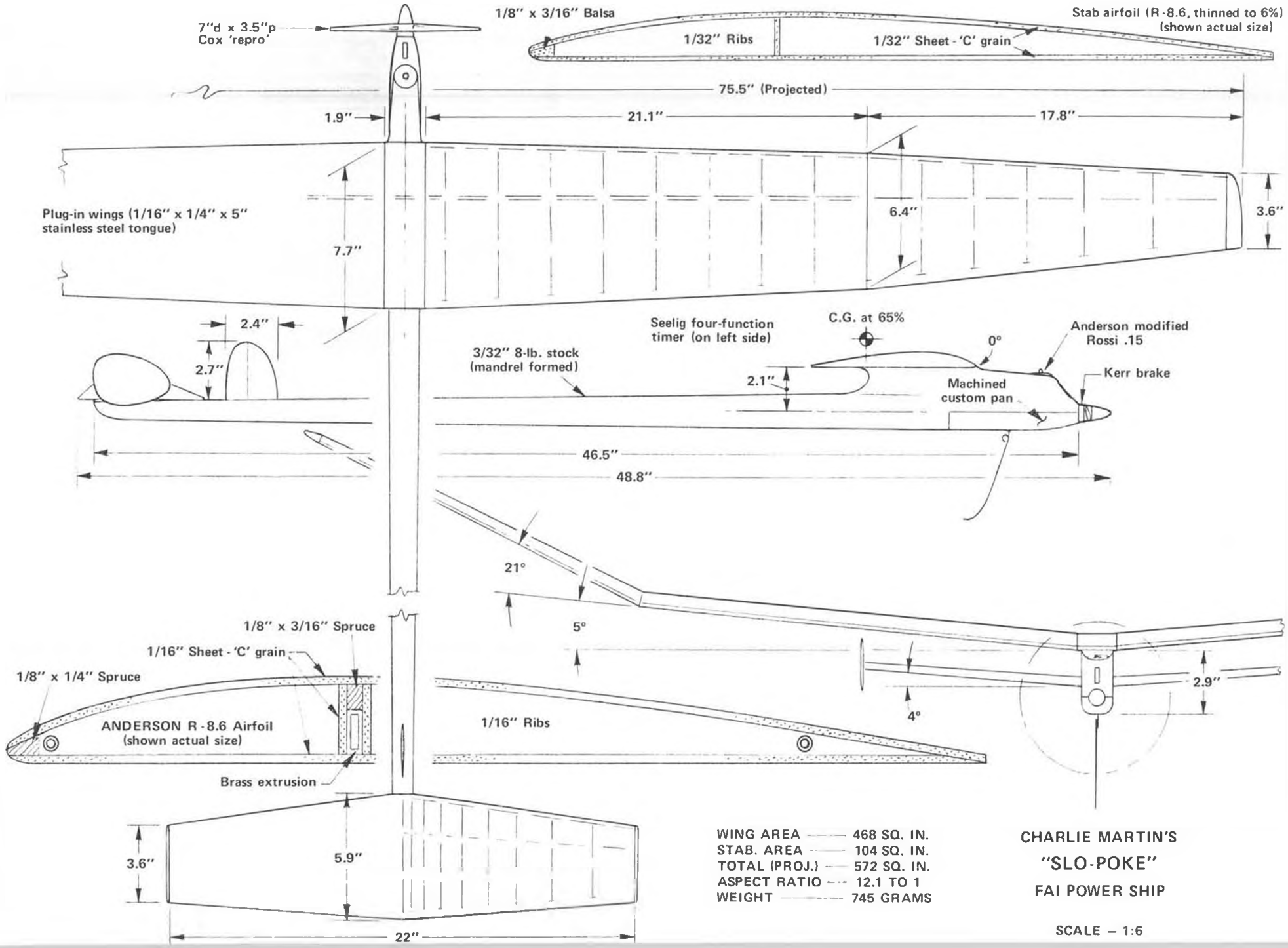
APRIL'S MYSTERY MODEL

At the Heart of Dixie F/F Champs, in Oct. '75, District V AMA Veep Jim McNeill launches his Coupe. He was high point winner of the meet. All H-of-D photos via George Batiuk.

DARNED GOOD AIRFOILS – LINDNER 'STAB'



STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	1.3	2.8	3.5	4.8	5.55	6.2	7.45	8.1	8.9	9.3	9.7	9.45	8.85	7.75	6.1	3.9	0.4
LOWER	1.3	0.5	0.25	0	0	0.2	0.95	1.6	2.25	2.9	3.7	4.3	4.5	4.4	3.7	2.2	0



WING AREA	468 SQ. IN.
STAB. AREA	104 SQ. IN.
TOTAL (PROJ.)	572 SQ. IN.
ASPECT RATIO	12.1 TO 1
WEIGHT	745 GRAMS

CHARLIE MARTIN'S

"SLO-POKE"

FAI POWER SHIP

SCALE – 1:6

Brian Webster, Tullahoma, Tenn., launches his Half-A. He placed fourth in Open Class, at Heart of Dixie Champs.

Jim Lewis, College Park, Ga., former Dick Black and Mulvihill trophy winner, launches his Coupe for 1st place.

not fare any better next time around. Such is representative government.

Petitions are out of place . . now. Now is the time to fly with the no-V.T.O. rule. You may find out that you like it.

Speaking personally, I hate to see V.T.O. go. I enjoyed it. I enjoyed using it and watching it. But it is gone. At least for now, it is gone. But more than hating to see V.T.O. go, I hate even more the poor sportsmanship and the character assassination that has been heaped on one individual for the way he has voted. I would venture to guess that the vilification that has taken place since Mel's vote has done more around the country to draw people to Mel's support than any other thing that could have happened. That's my reaction. That's the reaction I have heard from numerous other free flighters.

So, rather than take your models home and sit in the corner and suck on your thumbs, why don't you get together and write up a new proposal for V.T.O., then try to solicit support for your cause from all of the F.F.C.B. members across the country. Maybe the next time, things will go your way. In the meantime, let's accept the defeat with a little grace.

For some reason, the rules change doesn't seem to indicate that the world is ending.

DARNED GOOD AIRFOILS . . . LINDNER STABILIZER SECTION

In the early days of A/2 flying, most of the models had comparitively low aspect ratio wings, with good old standby sections, such as the NACA 6409, and flat-bottomed stab airfoils. In the 1954, a fellow by the name of Rudolf Lindner changed all of that. With the addition of a high lift, undercambered stab section, he reasoned, one could reduce the area on the stabilizer and put more in the wing, thereby increasing the wing's efficiency, without destroying any of the stab's ability to recover from upsets due to rough weather, poor launches, and the like. In fact, with a more powerful stab, it was possible to have both . . . better glide duration *and* recovery. Thus, the Lindner stab section was developed. It, and an improved wing section, changed the world of A/2 flying for its day, and changed it as dramatically as the current circle tow systems have changed current practice. Historically, it is this stab airfoil which brought about the change. Worth a try, wouldn't you say?

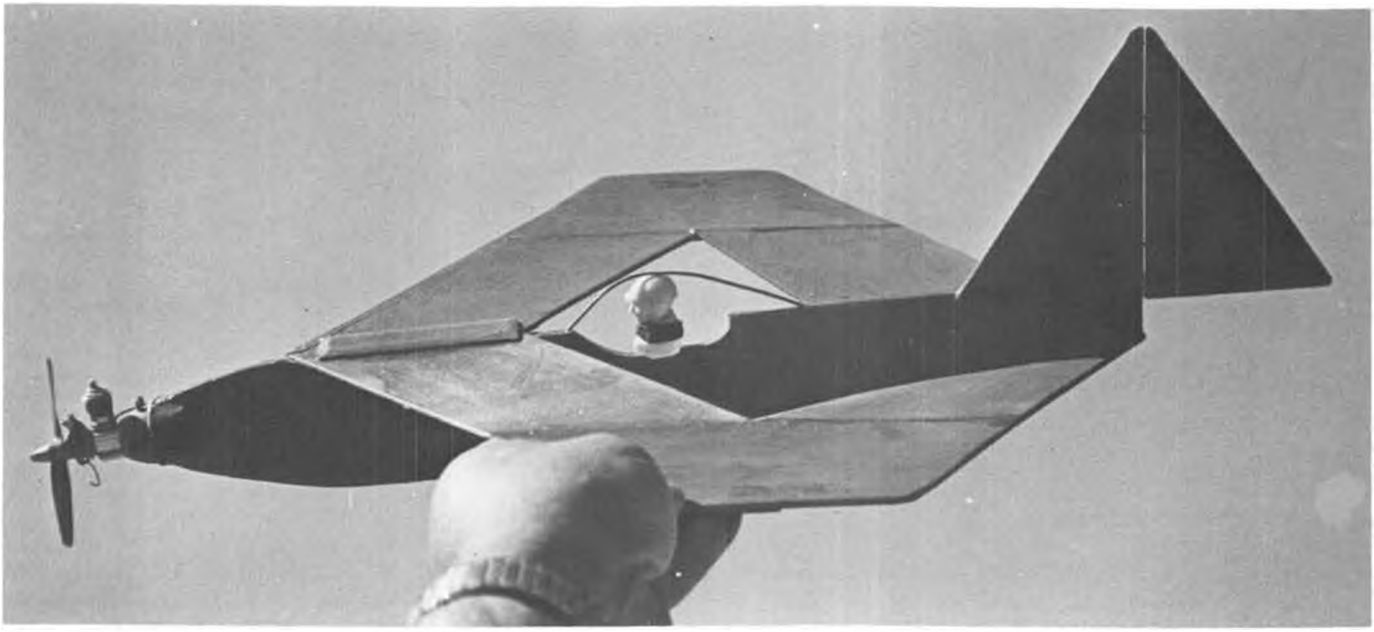
MYSTERY MODEL FOR APRIL

This one should give little trouble to

Continued on page 81

Al Dodson, Contest Director for the Heart of Dixie Championships, is doin' the sittin', while assistant Ray Deep does the standin'.

H-of-D reporter George Batiuk Sr. VTO's (maybe for last time) his 1/2A-A ship.



THE FLYING DIAMOND

By KEN WILLARD . . . Whet your designing appetite on this interesting configuration that's been around for many years, but has never received the recognition it deserves. One evening will do it.

• Fifty years ago, a young English aircraft designer, Norman Hall-Warren, experimented with models and found that the rhomboid planform for wings, if properly configured for angular settings between the forward wing, which sweeps back, and the rear wing, which sweeps forward, was not subject to stalls or spins. He patented the concept, and set about getting backing to build a full-scale test craft. He was unsuccessful. It is amusing to note that at one point in his efforts, he received a communication from the British Air Ministry, in 1937, which said, "There is no future in swept wing aircraft." How about that!

Even though he persisted, Norman Hall-Warren could not get sufficient backing, for various reasons, for his concept.

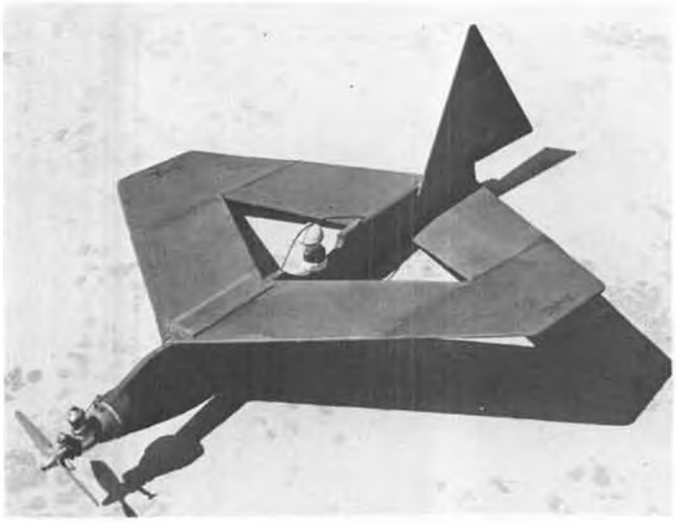
Articles have been written through this time-span regarding the rhomboid concept, and about six years ago I was intrigued, and, together with my friend Bob Andris, built a radio controlled version. It was completely successful, and we turned our test results over to Hall-Warren for whatever use he could make of them.

Nothing happened . . .

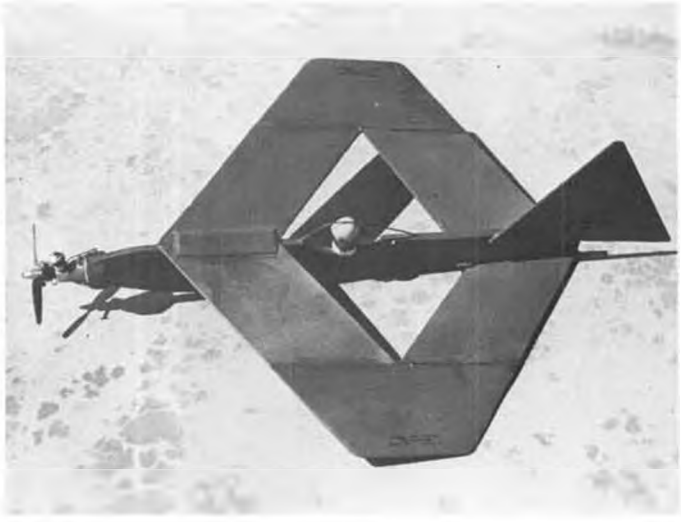
Then, recently, the National Aeronautics and Space Administration announced that they would be studying some "advanced aircraft designs," such as an "unusual double-wing configuration." An artist's concept was distributed to the press, and it was published in *Aviation Week and Space Technology*, a prestigious trade magazine.

People familiar with the concept were quick to point out the long history behind it. It will be interesting to see what future actions take place.

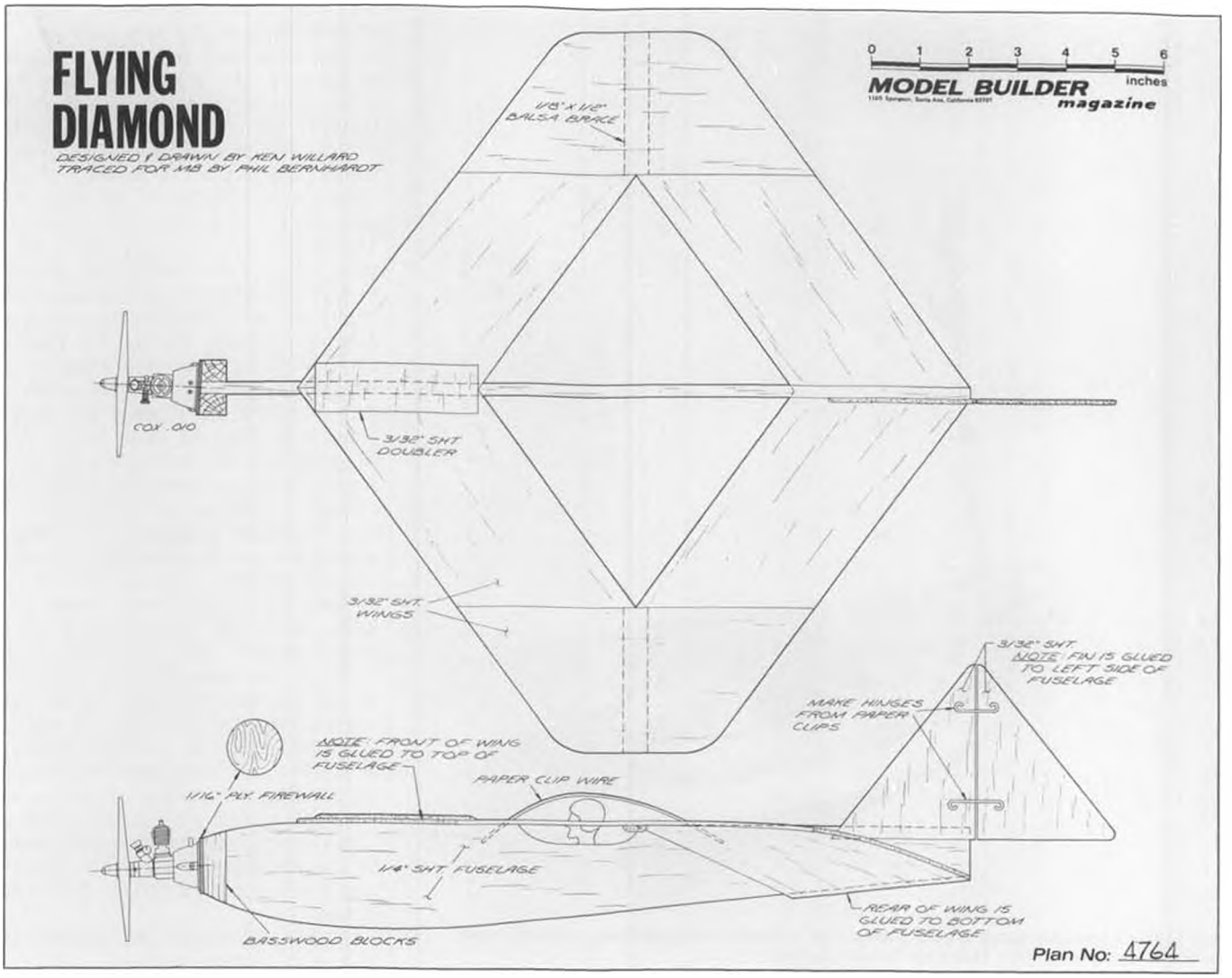
Meanwhile, I thought some of you model experimenters might like to try flying a simple free flight version. So, with a few pieces of balsa, some paper clips, a small block of hardwood for an engine mount, and some five-minute epoxy, the Flying Diamond came into



All sheet construction makes this little experimental ship a one-evening project. R/C possibilities are interesting.



Dig that fresh-air canopy . . . first one we ever saw that could rust! Diamond wing/tail is built in one piece and sprung into place.



FULL SIZE PLANS AVAILABLE — SEE PAGE 94

being. With a Cox .010 up front, it will spiral up almost out of sight with a full tank of gas, and then glide back in a gentle spiral to land. The upward spiral is to the left, and the downward glide turns to the right . . . just like a good old fashioned sport free flight . . . except it won't stall. Mush, yes, but no stall. And if you adjust the rudder correctly, it doesn't mush, but climbs up and out in a solid climbing turn. Incidentally, it is just a bit sensitive on the engine thrust setting, requiring right thrust and downthrust to avoid a steep spiral glide when the engine quits.

Building the Flying Diamond is a breeze. As you can see from the drawing, the wings, fin and rudder are cut from 3/32 sheet balsa, 3 inches wide.

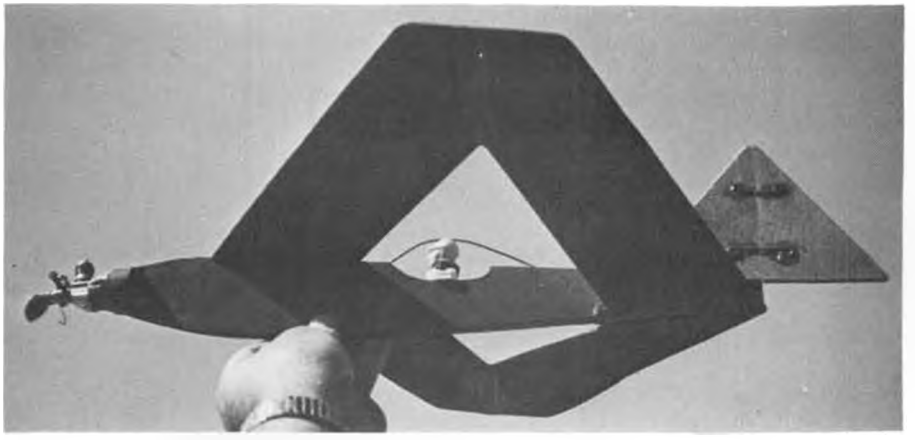
Butt join the center line of the forward wings, and epoxy the 3/32 doubler in place. Don't join the rear wings.

Cut out the fuselage from 1/4 inch sheet balsa. Epoxy the hardwood (I used basswood) engine mount block to the side of the fuselage, and shape to fit the backplate of the integral tank on the .010.

Epoxy the fin right to the side of the fuselage. If you're a purist, you can cut a slot in the top of the fuselage and epoxy the fin in the slot so it will be on the center line. It's not critical . . . nor is the shape, so long as you keep close to the overall area.

The fin and rudder are joined with light paper clip wire epoxied to the surfaces. This wire is soft and makes it easy to adjust the rudder setting. Use the same wire to form the "canopy."

Now you are ready to mount the wings. Epoxy the forward center line to the fuselage and let it harden. Be sure the center ends of the rear wing are below the tail of the fuselage while the front end is drying in place. They can't be put there afterward! You will note that due to the twist in the rear wing, the leading edges at the center don't quite meet. No problem. Just epoxy the wings to the fuselage at the tail so they are right in line with the bottom of the fuselage. That gives the right alignment for flight. *Continued on page 91*



One thing sure . . . the pilot can't complain about ground visibility when landing! Soft wire on rudder holds trim setting.

Hull of this Friendship Sloop is constructed in an interesting way. See text. Built by Frank Hansa, Staten Island, N.Y. Photo by Richard Surving.

STRICTLY SAIL

By ROD CARR

• While pursuing the trail of the Friendship Sloop, I was lucky enough to run across an advertisement by Replica Seacraft. A quick response from them put me in touch with Richard Surving. He has developed an idea for boat model building which imitates that of ferro-cement construction. It provides a mini-training course to the homebuilder who may be contemplating making a full-sized boat for himself. He offers display kits of the following:

19' Cape Cod Catboat. . .9-1/2 inch model, at $9.95 plus postage

23' Prudence Sloop. . .17-inch model, at $14.95 plus postage

25' Friendship Sloop. . .15 inch model, at $12.95 plus postage.

As you can see from the photos, the boats turn out with an excellent scale appearance, and with the joy of real scratch-building, as these are definitely not plastic "snap-together" models. Yet 5th grade students have used them as class projects with complete success. Maybe we have an alternative to the plastic quickies which seem to abound on all the hobby shop shelves. The assembly manual is very clear and could be used as a basic approach to R/C yacht building as far as hull construction. There is also a neat collection of building tricks hidden in the manual which I've tucked away in my head for later use. A compendium of such tricks is made available to kit owners as part of a model builder's sketch book. For further information on Replica Seacraft's offering, send a 13c stamp to them at 44 Pommer Avenue, Staten Island, New York 10304. And when you do, tell them that MODEL BUILDER sent you.

I'd like to thank Mr. Surving for his unselfish sharing of materials with me, and would highly recommend dealing with a firm that makes such an outgoing effort in support of model yachting.

The next step up the scale ladder brings us to the Friendship Sloop hull being offered by Heritage Marine, 36 Hawthorne Ave., Needham, Mass. 02192. The hull is 34 inches overall, with a generous full form which should allow easy installation of the usual R/C gear, winch and associated batteries. The directions for completion are a guide rather than a step-by-step treatise, so I would recommend that as a minimum, one arm himself with a copy of American Sailing Yachts, by Howard Chappelle and use the chapter on Friendships to help fill in the details of deck outfitting and rigging. This boat is unusual in that the main boom overhangs the transom, preventing the use of a permanent backstay. By leading the shrouds somewhat more aft than is usual, a tripod arrangement of shrouds and jibstay can be effected to properly support the mast. The producer is not pushing for racing these round little gems, but I would suspect that if two or more happen to light on the same chunk of water, the competition is inevitable. At the moment, the boat can be registered within the Open Class of AMYA. The Open Class secretary has come up with some non-racing events that will be on the Regatta schedule, and it would seem to me that a Friendship, with all that sail area and the big rudder, would be just the ticket to take home some of that silver, and look pretty while doing it, too.

I have two of the hulls tucked away and must confess to thoughts of drawing the bowsprit out only far enough to make the boat 35-7/8 inches LOA, putting up 600 square inches of 2 oz Dacron and just seeing what something like that would to in the 36/600 wars that are scheduled for the 1976 season. Might be that she would be a good light air performer with the right attention to overall displacement.

For specific information on availability and prices contact Heritage Marine directly. They are also stocking a limited selection of books pertinent to model yachting and you should ask for their listing.

Got some clear photos of yet another period model from Bill Nussbickel of Yonkers, New York. Bill has since replaced the sails on his model, but the "before" shots make a couple of important points. First, notice that in the water shot the jib leech is quite loose. This is a result of having leech tension controlled exclusively by sheet tension. As the jib sheet is let out, the downward component of its pull, which tightens the leech, gets smaller and smaller. As a result, the jib clew lifts, the leech slackens and the jib spills the air instead of providing power. This can be easily remedied by offsetting the jib club attachment point to the boat's deck about one

Prudence Sloop under construction, same method as Friendship. Full size plans with each model. Photo courtesy Rudder Magazine.

Bill Nussbickel's gaff-rigged sloop with new sails and some recommended rigging changes. See "before" photo below.

inch aft of the front of the club. Alternatively, a vang can be fitted, but the specific arrangement on Bill's boat would require a little thought.

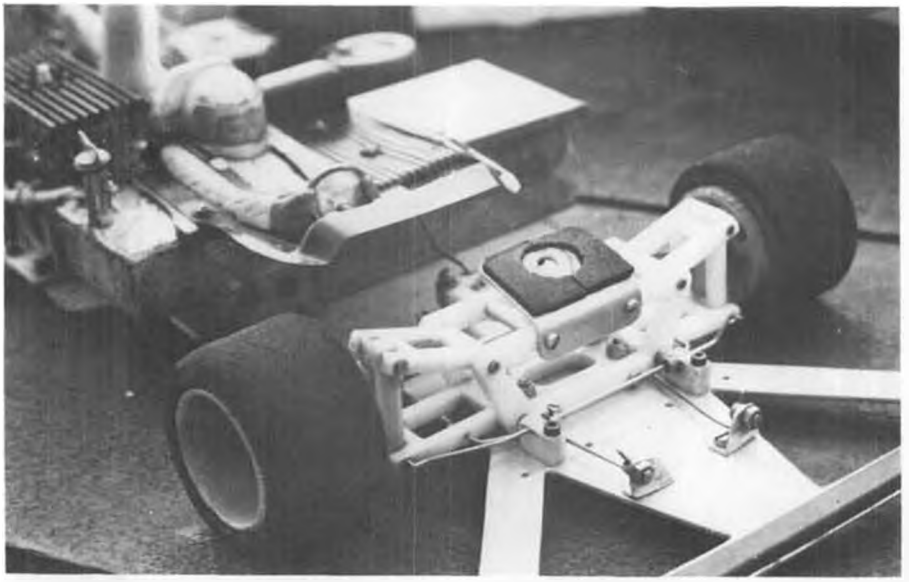
Second we observe the main leech to be slack, and the main boom lifting severely. If the wind were blowing from you down your line of sight, the pressure would be felt on the port side of the lower after mainsail, and on the starboard side of the upper part of the sail. This does not spell e-f-f-i-c-i-e-n-c-y. It does spell a need for a simple vang which might be fitted with a little fiddling. Such adjustments can be made, and made in such a manner that the appearance of the vessel is not damaged. Yet the performance of the boat will improve, and its appearance under sail will improve. No prototype ever let its main get into that configuration. It takes only a little more effort to insure that your scale sailing vessel looks scale when underway. We also have a shot of Bill's boat with the new sails on it, and must thank him for the opportunity to use his fine little craft as an example of sail set and trim techniques. I might add as postscript, that just as in a racing boat, a forestay which is connecting the masthead and the bow should be left as loose as possible if its presence is re-

Continued on page 84

"Before" shot of Bill Nussbickel's gaff-rigged sloop. Both photos taken by Bill.

Heritage Marine's 34 inch LOA Friendship Sloop hull. See March '76 Classifieds.

Lon Hocker built and took photo of this 6 ft. Massasoit coastal schooner. See text for more.



Independent suspension car belonging to Ronny Ton of Holland. Future article will cover European suspension systems, with pictures and notes courtesy of Tom Martin, from England.

R/C AUTO NEWS

By CHUCK HALLUM

• Once you have a car built and track-ready, what do you do to get it going reliably, and at top performance. There are really three things to consider; radio, engine and car. The radio has to function properly or else you'll be afraid to put your car on the track.

Radio reliability and repeatability will allow you to 'shakedown' (set-up) a new car without questioning whether it was the car or radio which caused something to happen. Obviously, if the engine isn't running right you won't learn what your car is capable of doing. So before attempting to fix or improve car handling, the radio and engine must be functioning properly. There is nothing more frustrating than to have radio or engine problems when you want to get a car set up.

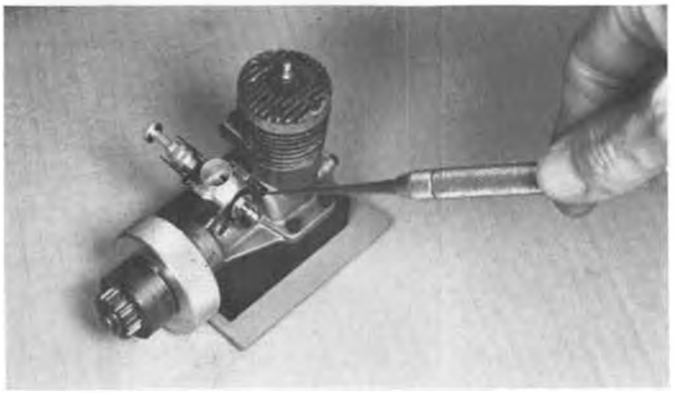
A reliable radio is probably the most important thing to have if you want a good performing car. To most people, the radio is just a magic box (or several). Even though you don't understand how these magic boxes function, there are a number of things you can do if there is a problem. Just keep your cool and go after the problem in a logical way. There was a very good article in the January 1975 issue of MODEL BUILDER, "Digital Radio Trouble-Shooting", by Victor Baney. I found the article very helpful and logical. The trouble-shooting flow chart is reproduced here. In going through the flow sheet I find that I have done many of the things noted by Mr. Baney. Here are a few excerpts from the article, which help explain the flow chart and point out important items.

"First of all, if you don't already have a volt meter, I recommend the purchase of a low cost volt, ohm, and milliamp meter, usually referred to as a VOM. While there are many on the market, the one I recommend to the average non-electronic R/C'er is the Micronta Model 22-4027 handled by Radio Shack. It sells for about $5.95 and the small size (3-1/2x2-1/4x1) makes it ideal for the field box.

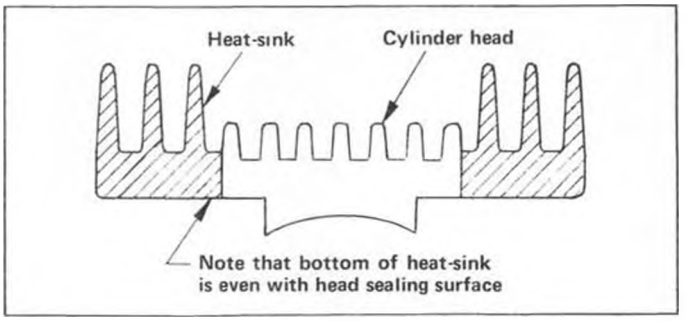
"The next test instrument is your TV set. It can act as a large screen oscilloscope to view the RF pattern of a properly functioning transmitter. In fact, as shown on the flowsheet (insert) this is a good test for a transmitter. It does not matter which frequency you are on. Just extend the transmitter antenna fully, place the transmitter near the TV, and flip through the channels until you find one that is obviously "blitzed" by your signal. Harmonics of your transmitter occur all through the VHF (channels 2-13) and UHF (14-83) bands. Adjust the Vertical Hold knob on your set until the lines across the screen stop moving. You will then notice that if you move one of the controls on your transmitter the spacing between the lines changes: in fact, this is how your transmitter generates information to the receiver and servos. The point is, if you cannot find a station that is "blitzed" by your transmitter, it just isn't putting out an RF signal, or possibly a very weak one.

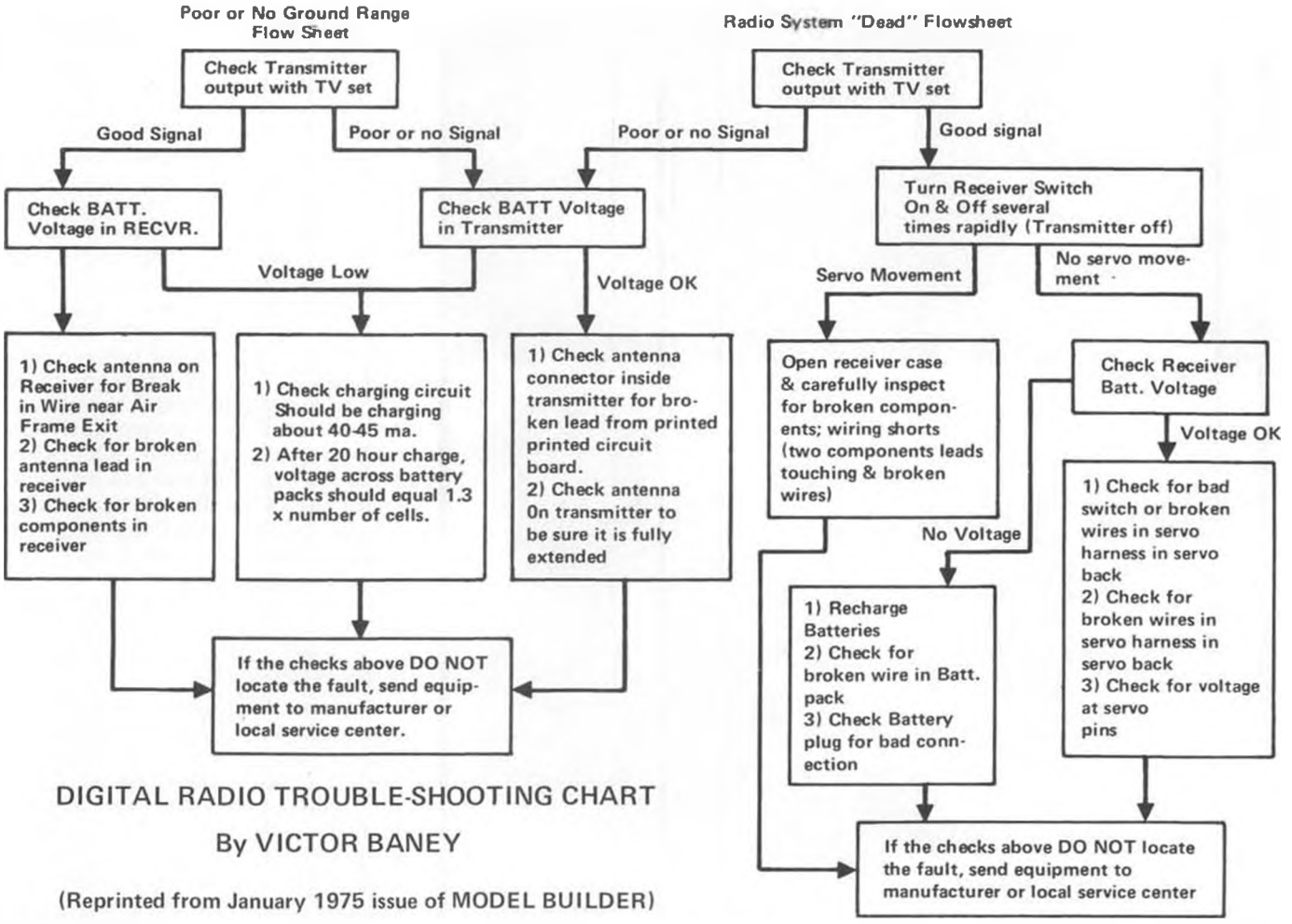
"Switches, connectors, wiring, and batteries are the most prone to failure; therefore, these are the things that we concern ourselves with primarily. Nickel-cadmium batteries have a cell voltage of 1.3 volts per cell when fully charged. With this bit of knowledge, we know that a four cell receiver pack should measure 5.2 volts immediately after charging. If you should measure less than this voltage, you can assume that there are one or more defective cells. Again, a simple test with your VOM will locate the bad cell or cells. You may replace them, or you can find a friend who is handy with a soldering iron. (Replace with same type of cell, such as G.E. with G.E. etc.)

"Wires are always subject to pulling, turning, twisting, and vibrating. The end result will be a broken wire. Careful inspection of the wiring in a receiver/servo arrangement will generally produce a few connections which are "hanging" by one or two strands of wire. This is an accident looking for a place to happen! This situation commonly produces a non-operative or intermittently operative



On stock Veco .19 carburetor, the bleed air adjustment (pointer) controls idle fuel/air mixture. Clockwise rotation richens.





DIGITAL RADIO TROUBLE-SHOOTING CHART

By VICTOR BANEY

(Reprinted from January 1975 issue of MODEL BUILDER)

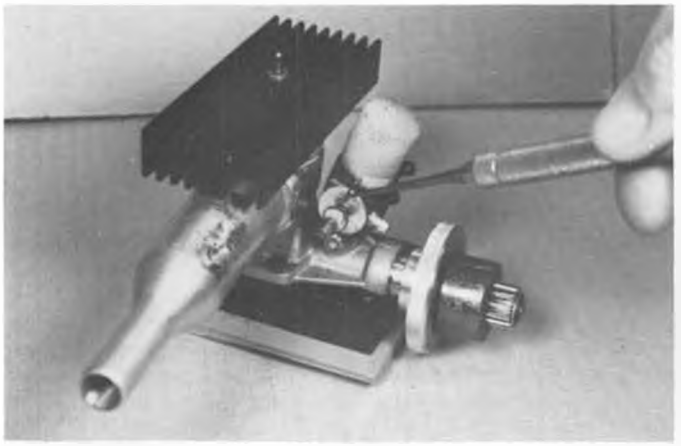
radios, and can cost you an airplane (and maybe more) if not caught early!

"Switches and connectors are exposed to dirt, oil and general pulling and tugging. Again, this can result in intermittent to complete system failure, with time. Careful inspection is the key here also. Frequent spraying of denatured alcohol on these parts is recommended. The alcohol does not harm the plastic used in servos, switches, and connectors, and does cut the dirt and oil from these troublemakers".

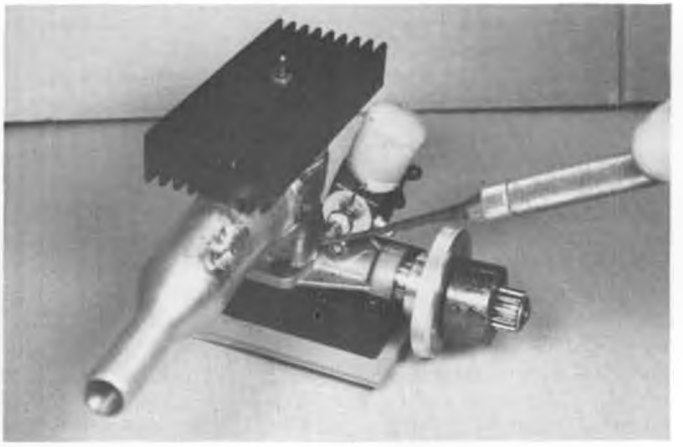
(Copies of the January 1975 issue, containing the complete trouble-shooting article are still available at $1.25, postpaid.)

With cars, there a few more radio problems to worry about than in airplanes and boats. In cars, most of the parts are metal, and the antenna leads can short to the chassis, or metal parts . . . so check this when the table indicates possible receiver antenna problems. Also, on some radios, the antenna uses a tuned "choke" to cut down on antenna length. Be sure that the choke and all antenna are at least a 1/2 inch away from metal parts. Vibration in cars is much worse because wood instruction in aircraft and boats absorb and damp quite a bit of the vibration! *(also, air is a little smoother than water and terra firma. wcn)* If the radio equipment is mounted too solidly, vibration can cause early fatigue failure in wires. I've had wires break in the receiver, servos and battery pack. Connectors will also come loose, if not tied together.

Vibration, and the constant servo motions required in cars, can also cause the servo feedback pots to get dirty in a short time. When the feedback pot gets dirty, the servo jitters a lot near its normal operating position. To clean the pot, carefully take the servo case apart. The pot is connected to the output of the gear-train, and the pot rear cover is



Perry carb idle disc (pointer) controls idle fuel flow. Clockwise rotation decreases fuel flow, leans out idle mixture.



Perry carb main needle valve (pointer) controls full throttle mixture. Clockwise rotation decreases fuel flow, leans out mixture.

normally held down with two screws. Mark the cover position and remove the two screws and cover. Spray the resistor and wiper contacts with TV-type electronic spray cleaner and wipe with a clean rag. Then spray again, let dry, and reassemble.

Cars also drain the receiver/servo battery at a relatively rapid rate. Quite often, the steering motion and brake action will be sluggish because the battery is partly discharged. If you note a trim shift (to keep the car going straight with the control released) or the steering being slower in one direction than the other, chances are that a cell in the battery pack is failing and will have to be replaced. Sometimes vibration causes wires to fatigue so that only one or two strands complete a circuit, or cause a joint to partially separate. When this happens in the battery or power stage of a servo, the servo speed many also be slower in one direction than the other when under load.

Now let's get to the engine set-up. Here the engine idle and full throttle mixture will have to be set and then we can see if these settings remain consistent through a tank of fuel. Before starting the engine, turn on the radio transmitter and receiver and check that the carburetor throttle barrel is almost closed and there is slight rear wheel braking action when the throttle control is released. Next, move the throttle control to the "full on" position and check to see that the carburetor is wide open, and brakes fully released. Adjust the linkages as required and be sure that there is no binding or restriction of throttle servo motion.

Most carburetors have instructions which describe nominal settings for engine idle and full throttle. Put the settings on the carburetor and start the engine. There are a few things to check for if you're having trouble starting the engine: glow plug and starting battery, cranking engine in the right direction, and fuel (sometimes old fuel can be a problem). If you still have problems starting the engine, note if there is any fuel mist coming out the exhaust. If the fuel mist is noticeable, the idle mixture is probably too fuel rich and should be leaned out a little. In a Perry carb, turn the idle disc to the right, slightly, to cut down on idle fuel flow. On a stock Veco carb, open the idle air screw to allow more idle air flow, or as a last result, follow the directions for your carb! If the exhaust is dry, you may have to richen the idle a little.

OK, now the engine is started. Don't disconnect the starting battery yet, but adjust the idle mixture for the fastest engine speed, then richen the mixture a bit . . more fuel on the Perry and less bleed air on the Veco. If the idle speed seems too fast (or slow), adjust the idle speed screw until you get a smooth low speed idle. You may have to go back and reset the idle mixture again, and don't forget to leave it a little on the rich side. Now disconnect the starting battery from the glow plug. The engine should idle for at least 5-10 seconds without having to blip the throttle to keep it going. Quite often, engines load up a little when idling, and require the throttle blip to clear them out. If the engine dies quickly after the glow plug starting battery is removed, the plug may be improper for the engine/fuel combination. A hotter plug may be required. If the engine stops when the engine is blipped, the full throttle mixture may be wrong.

When you hit full-throttle from the idle position, with the rear wheels free, the engine should accelerate to full speed without sags or hesitation. If the engine quits, listen to the sound to determine if the mixture is rich or lean. Usually, when the full-throttle mixture is rich, the engine will four-cycle, load up and pop a few times before quitting. If lean, the engine will speed up some and the sound weaken as the engine quits, but the type of sound will not change because the engine stays in a two-cycle. Adjust the fuel-throttle needle valve about a 1/4 turn in the proper direction (if it was too rich, turn the needle valve clockwise . . to the right . . .to lean it down, or if too lean, turn the needle counter-clockwise to open the needle valve), and try again. Under

load, with the rear wheels on the ground, when going to full throttle from idle, the engine should speed up and hold the maximum load speed in a good two-cycle.

Once the full-throttle mixture has been set, go back and check the idle. There is a slight effect of the idle and full-throttle settings on one another, so it may take a couple of tries to get both set about right.

Now it is finally time to put the car on the track to see what happens. Start the engine and place the car on the track . . don't forget to turn the radio on. Just drive the car around the track once or twice, listening to the engine driving acceleration, full-throttle, and idle. Since the idle condition is unloaded, it probably will not be much different from the original setting. When going down the straights at full throttle, is the engine running in a four-cycle (fuel rich), or is it running in a two-cycle? Obviously, if it is always in a four-cycle you should turn down the main needle valve a little. When the engine always runs in a two-cycle at full throttle I would recommend opening the needle valve a little to be sure the setting is not too lean. Normally, I always like to practice with the engine top end a little rich so that there is a hint of a four-cycle. Only when getting ready for qualifying or heat races do I lean down the top end for maximum straight away speed. The engines last a lot longer that way.

If, during acceleration, the car surges ahead, then sags before picking up speed again, while the engine continues to run in a two-cycle, then the idle mixture is too lean. Just richen (more fuel or less air) the idle mixture and go out again for a few laps. If the engine loads and runs in a four-cycle before cleaning out and accelerating properly, the idle mixture is too rich. Cut down the idle fuel or let in a little more bleed air. Idle mixture settings on most carburetors are quite sensitive, so only make very small adjustments.

The next thing is to find out if the engine will hold these settings through a full tank of fuel, maybe two, to simulate a race. Usually the engine will have a tendency to lean out, either with time, or as the fuel level goes down. Some of this may be due to the engine overheating. If you have a heat-sink clamped on the head, be sure the contact is good, clean, and the alignment correct. The sketch below shows the proper alignment of the heat sink on the head to assure maximum contact area between the two. Quite often, I've seen the heat sinks clamped much too low on the head, so that only part of the surfaces are in contact. Of course, with an integral-head (one-piece) heat-sink, this will not be a problem. Next, be sure the engine, cylinder fins, and heat-sink are clean. Dirt and oil will not allow surfaces to transfer heat properly to the air, causing engine overheating. Clean engines and heat-sinks are particularly important for lay-down engine installations and engines fully enclosed in GT or sedan bodies.

Next, check to be sure that the brake releases fully by the time the throttle is about 1/4 to 1/3 open. If the engine has to work against the brake all the time, engine overheating will result. Sometimes engines do not hold settings because of a crack or hole in the fuel line, or dirt in the fuel filter or fuel tank. Again, these usually cause the engine to lean out. Check all of the above as normal race-day (or practice) preparation.

When the engine has a definite tendency to lean out as the fuel level goes down, the problem could be the fuel tank/carburetor combinations. The first thing to do if fuel level affects engine settings, is to make the idle and full-throttle settings when the tank is almost empty. In this case, make the mixture settings as lean as you think they should get. If the settings are much too rich when the tank is full, you may have to change the fuel system, as noted below. Correct size carburetors (stock or Perry 19) on 19 or 21 engines have good fuel draw and normally experience leaning out problems as the fuel level changes. Usually, the problem occurs with the big-bore carbs, 40's and 60's, when used on a small engine, because of poor fuel suction. Usually a constant pressure (slight vacuum) "chicken-hopper" tank will solve excessive leaning out problems on 19 to 40 size carbs. But with larger carbs, the fuel tanks must be pressurized (muffler pressure) or raised considerably to gravity-feed fuel. But if you're using a 60 carb, you probably are aware of everything noted here or you shouldn't be running a big bore carb. A pressurized fuel system can be used with 40 carbs but I don't think pressure should

be used on 19 carbs. Chicken-hopper tanks can and should be used in all installations. There was an article several months ago in R/C Auto News on chicken-hopper tanks and fuel systems.

With all the driving you've done to get the carburetor set, you've learned a little about how the car handles. We'll get into some of the most important things for car adjustments next month. In case you haven't got the article on fuel systems, or other important back articles, write to me c/o Model Builder Magazine, or P.O. Box 4658, Irvine, CA 92716.

Hope you can wait 'till next month to adjust the car . . just be sure the radio and engine work right. •

West'ner . . . . . *Continued from page 13*

peel pattern off. Use ply template to cut rib stacks of light C-grain balsa. Select unwarped 3/16 x 3/4 preformed trailing edge stock, mark rib positions, cut slots, and pin to plan. Position bottom 1/8 x 1/8 spars as ribs are glued and pinned in place. The leading edge is shimmed up to proper height with scrap, then cemented to ribs. Tips are cut from 3/16 long grained balsa (A sheet), observing grain direction, glue three pieces together then position and glue to bottom spars and front and rear edges . . add top spars after tips are in place.

Build a right and left panel.

Notice center section uses four ribs to give a double rib dihedral joint. Allow all panels at least 8 to 10 hours drying time before removing from plan.

Remove wing from plan, block up wing tip 3-1/2 inches, and sand dihedral angle into spars and ribs, using square table edge as is done with hand launch glider panels. Pin center section flat, block up tip 3-1/2 inches, and join with epoxy. Repeat with opposite panel. When epoxy is set, cut notches for ply dihedral braces and epoxy with 5-minute epoxy, holding them in position with clothespins. Add gussets and 1/16 x 1/8 cross pieces, sand leading edge and tip contour, and cut and carve center section front and rear fillers. The wing is now ready to smooth up and cover.

RUDDER

This may look overly sturdy, but remember, this assembly takes a considerable beating if the plane flips over on landings. The drawing is pretty much self-explanatory, just use light but firm wood. The hinges are not installed until after the model is doped.

STABILIZER

Use the tracing paper and Sprayment technique to cut out a set of outline parts from 1/8 sheet. Pin outline in place, cut spar as drawn (this should be hard balsa) and glue in position. Place center section fill before rib blanks. The ribs are pieces of 1/16 sheet scrap from wing rib blanks, be certain the piece is flat on the bottom and at least the height of the spar. After the glue has set over night, sand rough rib shape with 150 sandpaper in a block, *then* remove from plan and complete the contour with 220 paper. Try to sand in the direction of the rib grain. Take a little time and go slowly to avoid cracking the ribs. If you do crack one, Hot Stuff is great for repairing it.

FINISH

Sand everything with 220 paper, then give all structures 3 coats of clear dope, sanding lightly between coats. If this is your first go at silk, I'd suggest doing the wing first. Iron the silk to remove creases. Cut out 4 panels of silk slightly oversize with the grain running spanwise. Place first panel on the bottom of the wing, position and line up so the silk grain runs fairly straight, then spray lightly with water; I use an old Windex spray bottle. After the silk is wet, any wrinkles can be smoothed out by *gently* pulling at perimeter. When all is smooth, stick silk to perimeter with thin (5-50) clear dope. Do not feel rushed in positioning the silk, a little more water can be sprayed on to add working time. Trim edges against the wood with a new double edged razor blade (it's difficult to get a smooth edge out in space). Silk the top panel in the same manner, lapping over at L.E. and T.E. onto bottom panel. Trim to cover previous joint. The fuselage is covered in the same manner, making joints for four panels on top and bottom longerons. Tail feathers are done exactly like the wing.

The most annoying problem in doping silk is the tendency for the first coats to penetrate the weave and run down inside, leaving an unsightly smear. There is a way to avoid this; Knox Unflavored Gelatin. No, I'm *not* out of my tree. This really works! Just mix a package of the stuff as per package directions, then dope the silk with two coats of the warm gelatin. The first impression is rather startling (the model looks like a prune) but when the gelatin dries or sets (I'm not sure which it is), the silk tightens back and the weave is filled. The West-ner as pictured, has but three coats of clear dope, yet is well

CARL GOLDBERG

43"SPAN
29 1/2" LENGTH
390 sq. in. AREA

KIT G25 $13.95

THE ALL *NEW* CONTROL LINE

FLYING TIGER

P-40 STUNTER

FOR .19 TO .35 ENGINES

PLANS ALSO SHOW R/C VERSION,
FOR 2-3 CHAN. RADIO, .15 - .19 ENGINES

LARGE, EXCEPTIONALLY COMPLETE PLANS SHOW EVERY STEP

EASY TO BUILD - EXCITING TO FLY

Something new! The thrilling and historic P-40 Flying Tiger becomes a great control line stunt model! It even has optional wing flaps! Or if you're an R/C modeler looking for something to keep you on your toes - this is it! Talk about performance - you've never seen such fast rolls and tight loops! Kit has huge decal sheet with authentic insignia and markings, many carefully shaped and die-cut balsa and plywood parts, adjustable threaded pushrod and quality nylon fittings, etc. Large, exceptionally complete plans show every step, every detail, and various options so you can build the P-40 you want! Fly the Flying Tiger!

or best service, see your dealer. If not available, rite direct: add 50¢ per item ($1.00 outside U.S.).

AVAILABLE IN CANADA

CARL GOLDBERG MODELS INC.
4736 WEST CHICAGO AVE.• CHICAGO, ILLINOIS 60651

CARL GOLDBERG MODELS, INC.
4736 W. Chicago Ave., Chicago, IL 60651

I am sending 25¢ for 8 pg illustrated Catalog with Basic Explanation of R/C Equipment and Radio Control Definitions

Name _____

Address _____

City _____

State, Zip _____

sealed and looks like 20 coats done the old way. Use Polyester resin to protect front end from fuel.

After clear doping, the trim colors are added, using vinyl electricians tape for masking tape. Two coats of clear are applied to the joints to minimize leakage, then color coats are brushed on. Vinyl trim tape was used to delineate the joints.

The rudder is hinged now, since the danger of getting dope into the joint is over. I used white carpet thread in a figure-eight pattern. The radio gear should be rechecked for absolute freedom with *no* binds as per Ace instruction book. Install receiver and battery with foam.

The windows are glazed from the inside, using cement to hold to the perimeter. The windshield can be shaped by taping into position, then warming with a hair-dryer until the plastic just begins to buckle. Repeat until the plastic stays in place without help, then cement into place. Complete assembly by installing motor, wheels, etc. Add weight, if needed, to get the center of gravity where it is marked. Beware a tail heavy model!

FLYING

What's to tell you? If balanced at the center of gravity shown, and no warps are present (steam them out if there are), the West-ner will fly free flight. In reality, I use the rudder to *interupt* the flights. This is essentially a free flight model with radio control used to keep the model inside the perimeter of the flying site. *(And that's really what it's all about! wcn)*

A word of caution, a full tank will get this little dude gosh awful high. I use 2 to 3cc for about a 50 second motor run. Park your "West-ner" in a thermal and have a ball!

One last thought: Is a 60% "Westerner" a mid-westerner? At least a guy should hyphenate the name! ●

Guardian . . . . . *Continued from page 35*

leadout mechanism is not clear, I would suggest that you refer to some of the recent articles on stunt designs, as about 99 percent of the recent models employ adjustable leadouts. Brass tubing was used for leadout guides on the originals. About 1 ounce of tip weight was also used. Sand wing to final shape with 320 and 400 sandpaper.

The fuselage is cut from 1/2 inch C-Grain balsa. The motor mounts and plywood doublers are epoxied in place. The hook mounting is simply a short piece of 3/8 x 1/2 motor mount stock epoxied into the location shown on the plans. The fuselage should now be carved to shape (roughly an egg shape), the plywood edges rounded, and the tail end narrowed from a point behind the elevator control horn to about 1/8 inch thickness. Do not thin out the area in which the stabilizer is to be mounted.

The rudder, stab and elevators are now cut out and shaped to an airfoil section. I like to install the control horn in the elevators before putting in the hinges. This seems to help me get things lined up easier. It should also be noted that the control horn is not centered between the elevators, but is offset to the outboard side. After installing the hinges, the entire horizontal tail surface can be sanded to remove any small errors due to alignment.

The torsion rod for the kickover rudder is formed from 1/64 music wire. Remember that the angles of the bends you put in this rod determine the amount of movement you will have. We generally use about 20 degrees of rudder movement. The sub-rudders (or whatever they are called on the Guardian) are cut from 3/32 balsa. I like to attach them to the stab before assembly to the fuselage.

Assembly is simply gluing the pieces together. I use epoxy for all wing-to-fuselage joints and for the stab and rudder-to-fuselage joints. Care should be taken to insure accurate alignment of parts. Note . . . there is a little negative incidence in the wing. This should help a little on the top end without decreasing low speed perfor-

mance.

The tailskid is installed by cutting grooves in the fuselage as shown on the plans, bending the wire accordingly, and then epoxying the wire into the fuselage. The slot in the wing for the pushrod going to the elevators should be large enough to prevent binding and then faired over with a balsa cover. The gadget that holds the rudder in neutral for the high speed portion of the flight is simply a piece of 3/32 O.D. brass tubing onto which a spring has been soldered, and a piece of 1/32 music wire (to catch the hook) is then bent and soldered to the spring. Sufficient wire is left sticking out of the top to insure catching the rudder. Allow at least a 1/4 inch of the wire to show when the spring is depressed by the raising of the hook. To install this gadget in the fuselage, first drill a hole from the bottom to the top at the location shown on the plans. Then, with a Dremel tool, enlarge the bottom portion of this hole to clear the spring. The assembly can then be installed into the fuselage with epoxy. The top of the brass tubing should be flush with the surface of the fairing between the elevators. Make sure the portion of the wire bent to catch the hook is long enough.

All fillets are made from Sig Epoxylite putty. This material should be mixed according to directions, smeared on the area involved, and shaped with a moistened finger. Almost perfect fillets can be made in this manner, and only a small amount of wet-sanding will be required for finishing. Care should be taken to fair in all joints. Those sharp changes in shape can cause a lot of drag.

For finishing, I paint the fuselage and tail surfaces, and Monokote the wing. First, mask off at least a 1/2 inch of the planking in the center section of the wing to provide a place to stick the Monokote. Apply two coats of Sig Lite-Coat dope to the surface of the fuselage and tail surfaces. Sand smooth. I then apply three coats of Sig sanding sealer and sand very carefully to remove most of this material, as it is quite heavy. Finish sand with 400 sandpaper. Fill scratches and dinks with "stuff" or spackling putty. Set the plane aside for about a week for curing and then spray two coats of Super Poxy on the fuselage and tail surfaces. To prepare for the Monokote, finish sand with 400 sandpaper, carefully blow off all sanding dust, and then go over the wing surface with a tack rag to remove any foreign material. About the only hints I can give on applying Monokote is to make sure you do not iron in any wrinkles around the edges when ironing it down. Shrink with a heat gun.

I usually start the final assembly by putting on the landing gear. The gear is made in two pieces and joined together in the center with a piece of brass tubing. The gear is held in place with K & B landing gear clamps. I have also used aluminum landing gears.

The engine is then mounted and the stub pushrod joined to the throttle with a Quick Link. The stub pushrod from the bellcrank is joined to the elevators using a coupler from Quick Link. The hook is bent to fit and a horn soldered onto the hook to work the aileron. A spacer is generally necessary on the outboard side of the fuselage to provide working space for the horn. The horn is connected to the aileron control horn by use of aileron connectors commonly used in RC and a pushrod with two Quick Links. One end must be fixed to prevent the pushrod from making its own adjustments. A short pushrod is then soldered to the elevator pushrod (underneath the stab) and run through a short piece of brass tubing for a bearing. This bearing is epoxied to the fuselage side. A loop is then soldered to the hook of a length appropriate to hold up the hook and to provide enough upward movement of the spring on the rudder holder to engage the rudder and maintain it in a neutral position. The wire which holds up the hook is then trimmed so that a certain amount of down elevator will release the hook. Additionally, two small hooks are fixed to the hook and to the fuselage to hold a rubber band. The rubber band provides tension to hold the hook in the down position and to activate the aileron.

A workable table of weights should go something like this: Completed wing should weigh about 4 ounces, the fuselage 4 ounces, the rudder, stab and elevators 1 ounce, and the assembled structure about 10 ounces. The finished plane should weigh 24 to 26 ounces.

We have used Supertigre engines almost exclusively, especially since the stock engine rule. I am still using an old Supertigre Stunt RC, although most people are using Supertigre Combats. A careful, and long, break-in is required on these engines for best performance. I use K & B 100 fuel with added lubracin, and a 9 x 6 prop clipped to 7 inch diameter. The run-in consists of at least 25 two-minute runs. I start flying on K & B 100 and gradually work my way up to K & B 1000. Some are running hotter fuel, but I can have enough trouble with this combination. We have tried various 9 x 6, 9 x 7 and 9 x 8 props. My choice is a Rev-Up Pro Series 9 x 7 clipped to about 8-1/2 inch diameter. The tank is a 2 ounce Veco converted to Uniflow.

Flying is the real important part of profile carrier. The competition is close and every little thing counts. The potential top speed of most planes in this area is within 3 to 4 mph of each other. One of the common mistakes is to take off too steeply. A smooth, level takeoff is worth 3 to 4 mph. Other than this, just hang on and hope your combination of motor, prop, fuel and plane will give you an acceptable top end.

The low speed is the real fun part. It is usually described as flying on the edge of disaster. The best approach seems to be to get the plane in a nose-high, semi-stalled attitude and then fly with the throttle. Practice is the real key to low speed. I generally goof off most of the winter and then, when the time comes to get serious, I feel lucky to get 23 to 24 mph. However, after just a few flights, I am usually under 20 mph and then into the 18-19 mph bracket. The work really begins when you try to go slower.

The Guardian will certainly furnish you with a good start toward enjoying this enjoyable event. I have had more fun flying these planes than probably any that I own, yet I have won less. The closeness of the event makes it one of the best we have. I hope you enjoy your Guardian as much as I have. ●

C/L . . . . . *Continued from page 37*

Falcon Spl. are unavailable, but Kilsdonk will sell copies of the up-dated drawings for $2.50 per set (includes handling and first class postage), if you would like to build a good-flying and fast design for this year. Contact John at: 16159 Old Bedford Rd., Northville, Michigan 48167.

* * *

I've recently been playing around with a 35mm wonder-of-wonders, as you can see from some of the close-ups of one of my Slow Combat planes. The pics show my method of attaching landing gear to a Slow. The wire leg is of 3/32 piano wire, which is rigid enough if the gear leg is kept as short as possible. Two 3/32 dia. holes need to be drilled in the fuselage, which, in my planes, is the aft end of the maple motor mounts. The gear is plugged into one of these holes and a No. 6 x 3/4 sheet metal screw goes into the other and holds the whole mess on. This type of gear is very easy to make, light, and it works! Also, the gear is easy to take off, if need be, for packing planes into a car.

A first-hand quote from the Col.: "I am working on a new design for Fast Combat. It'll make a Nemesis look like a Ringmaster." Honest, folks, that's what he said! Howard went on to mumble about some "interesting" airfoils he had come across, flaps (maybe), and full adjustability of flying characteristics for sure. I let Howard mumble to a stop and then tried to get some specifics out of him about the new design. Nothing. All he would say is that it will be harder to build than a Nemesis, but a bunch easier to fly. Also, no suggestion as to when the new design will be flying, other than he will have it ready for the '76 Nats. The Col. is basically a little weird, but knows his stuff when it comes to Combat and the designing of good Combat planes. It is going to be very interesting to see what he comes up with.

* * *

In the Feb. column I let Arlie Preszler tell about his Sig P-51 Stunter and the mods he made to it. Arlie promised to let us know how the plane turned out and here it is, straight out of his very good newsletter, the *Headwind*.

"THE CONTINUING SAGA OF THE SIG P-51: I left off last time talking about the techniques I used to lighten the kit airplane. Well, it seemed to be turning out pretty good . . about 33 oz. without finish, but with everything else including 3/4 ounce of tip weight. Since it was coming along so

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 . . .

2 IN 1 Peanut Scale

EACH KIT MAKES 2 MODELS

Balsa and Tissue Construction.

Parts printed on fine quality balsa wood, density selected and sanded to micrometer tolerance-Strip Balsa, Colored Tissue, Scale Decals, Wheels, Propellers, Fittings, Contest grade Rubber Loops, Light-Strong Detailed Scale Plastic Parts-Clear-easy to follow step-by-step drawings and instructions-both models are fine flyers if built according to plan.

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).

RUBBER MOTOR WINDER

A MUST FOR RUBBER POWER MODELERS

Molded of tough virgin Nylon this five to one ratio winder is a must for long flights and competition endurance. Compact and efficient, the Sterling Winder is just perfect for models using up to three loops (6 strands) rubber motor. 2.95

STERLING MODELS • 3620 'G' ST. PHILA. PA. 19134

If no dealer available, direct orders accepted — with 10% additional charge for handling and shipping. (60¢ minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50¢ enclosed.
- ☐ "Secrets of Model Airplane Building", including design, construction covering, finishing, flying, adjusting, control systems, etc. 25¢ enclosed.
- ☐ "Secrets of Control Line and Carrier Flying", including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions 25¢ enclosed.

No checks. Only U.S. money orders or currency accepted.

Name _____

Address _____ City _____ State _____ Zip _____

Sterling MODELS INC. PHILA. PA. 19134 U.S.A.

well, I decided to blow some weight for the sake of durability. I covered the entire nose section back past the wing leading edge with 4 oz. fiberglass cloth and resin. I then put a K&B Superpoxy finish on the whole airplane, after sealing it with a coat of polyester resin wiped dry upon application. After ending up with a 1/2 oz. of additional tip weight and an added ounce to the nose, my Mustang now weighs the amount stated on the box . . 41 ounces. That's 12.4 ounces per square foot, which is still competitive, and the Veco .19BB does a good job of hauling the freight around . . to me, it has more power than most Fox 35's.

"I get lots of compliments on how good it looks . . I painted it gold with black and white trim after an Air Racer that flew at Reno a few years ago. The air racer was wrecked when the pilot tried to do aerobatics with it at another air show . . I hope that is not an omen for my model.

"My airplane 'hunts' in level flight, so this week I get the 'pleasure' of sanding my leading edges still blunter, and ugh, refinishing them. I won't blame the hunting on the design, though . . it comes from having no slop at all in the elevator control, and from not making the elevator even thicker. Overall, I am pleased with my airplane, and I'm sure it will end up being competitive. It would probably turn out to be a 48 or 50 ounce brick if built out of the box by anyone who is not a Stunt Freak . . What do you think, Dirty Dan? I wish Sig had kitted a 575 square inch version of a 'Stiletto,' or a 'Genesis,' or a 'Stunt Machine,' or a 'Mirage,' or a 'Quasar,' and ad infinitum. It sure is pretty, though!"

To answer Arlie's question . . I don't! I have no idea how much my P-51 weighs, although it doesn't seem to feel very heavy, and flies OK. Next time I'm at Don Shultz's house, I'll weigh the plane I built so we can see if it really is as heavy as Arlie claims it must be.

As to the kits Arlie suggests, Midwest has already agreed to kit the Genesis, and M&P should have already (by the time you read this) released their kit of the Stiletto 35. This plane was designed by Les McDonald, who has a second (1975) and a third (1974) in the Nats, plus a spot on the FAI team, using this design. Price of M&P's Stiletto is just under $30.00. The first 200 kits are supposed to have some exceptional wood, so check with your favorite shop; they may have just what you've been looking for in a Stunt ship.

* * *

Bob "Stunt" Hunt sent along one of his new Stunt handles, and it is really neat! I've been using it for a month or so now and have flown both Stunt and Combat planes using this handle. It is heavier than the usual E-Z-Just, which I thought would bother me, but it is a bunch lighter than some Custom handles I've seen. But the C.S.C. handle is so comfortable that I have yet to worry about the excess weight it has, compared to what I'm used to. In fact, the first time I used the handle, I forgot I even had a handle in my hand, until, after the flight was over, somebody asked how I liked it. I couldn't answer the question, the handle felt so nice and comfortable that I completely forgot about it! With any other kind of handle, I am constantly aware of it and continually shifting my grip (holding it like a bear, letting it slip to the tips of my fingers, etc.) in an effort at getting just the right feel on the handle.

In addition to being comfortable to fly with, the C.S.C. handle features in-flight adjustment. Get the adjustment in the ball-park before take-off and then simply dial it in to where you want it while you are flying. I've waited out many a flight with a Stunt plane just so I could readjust my handle. And you're not even sure it will be right the second time up. No problem with this handle, you can change adjustment at any time. I often have trouble getting my inverted flight down and in the groove, so I adjust my handle with the plane inverted and flying. Once I get it right in this position, I've got it where I want it for all the other maneuvers.

Only very rarely do I make an unqualified recommendation of anything, but this is one of those times. Get yourself one of these handles, you won't regret it. Write to: Control Specialities Company, 205 Wood Ave., P.O. Box 268, Middlesex, New Jersey 08846. Or call (201) 469-1663 and ask for "Stunt" Hunt. Ooops, forgot to tell you that the C.S.C. handle goes for $9.95 plus 50c for postage. A very reasonable price for what you get, and the handle is even guaranteed for one year.

GET THE LEAD OUT . . . FRONT!

Continuing along with my campaign to educate C/L fliers about existing R/C-related accessories that they should

be aware of and using, let's look at several from Prather Products. The prop balancer has always been good, but has just recently been redesigned slightly, so that it is usable on any prop I can think of. This is probably the best prop balancer available.

I better quick get in something about lead, as that was my lead-in for this bit! When trimming out any kind of plane, nose weight is occasionally required, and it is a real problem finding a good place for it. The best place is way up front, of course, and if you use Prather's nose weights, you can put them on the front of the engine, as they replace the prop washer. Neat, huh? The nose weights are available in 1/2, 1, 1-1/2, and 2 oz. sizes, so one of them out to be just right. Also available from Prather is stick-on weight. This stuff is lead, and comes in adhesive backed strips. The sticks are marked in 1/4 and 1/2 oz. increments so you can tell how much weight you are adding. The adhesive is strong, allowing you to simply paste the weight on any convenient place. I use the stick-on weights to trim a plane at the field, and then bury any weight required in the structure when I get home and can do it right.

* * *

From "Patty's Pinkie," a very good newsletter out of Southern California, I see that Jed Kusik and Larry Jolly are gettin' it on in preparation for the upcoming World Champs. January 11, in the first of a series of Ten Kilometer races for FAI TR and Badyears, Kusik/Jolly turned 100 laps in 4:15.8 and 200 laps in 8:27.7 to win at both distances. Jed says they are going 97 mph in traffic and getting 43 laps with a front intake Rossi diesel. So they are putting this motor away, saving it for the W/C's, and are looking for a couple more. Seems that exceptional TR motors are hard to come by. I wish them luck in finding some good back-ups!

* * *

As mentioned in a previous column, the various advisory committees to the Control Line Contest Board have really made a difference in the quality of CLCB decisions. Now the advisory committees have had some time to work together, getting a feel for the best way to proceed on matters like rules, interpretations, etc. And they are now starting to get together proposals for the next rules cycle. A proposal made by the Racing Advisory Committee, for instance, will demand much more consideration than one from Joe Nobody in Somewhere, No Place.

John Kilsdonk is chairman of the RAC. He recently sent a copy of the RAC "shopping list" for new rules, and I want you to take a look at it.

1: Provide a unified set of Racing rules.

2: A .40 size Goodyear or Scale Race: 2-1/4 inch scale, profile, 1 inch

wing, .018 lines, .40 engines, no restrictions on engines, 70 and 140 lap races, otherwise the same as present 15 Scale Race.

3: Ban all exhaust extensions in Racing Events. No megaphones, tuned pipes, mini-pipes.

4: Ban internally connected lines. (Require 125 lb. cable or 1/32 wire)

5: Scale Race line size increase.

6: One ounce tank limit on Scale Racers. Or require more pit-stops.

7: Approved line construction technique.

8: Allow pressurized engines in Slow Rat. Possibly restrict venturi area to limit speed.

9: Limit fuel tank size in Rat, requiring more pit-stops to de-emphasize speed. Alternate would be to require more pit-stops with no fuel limit.

John put out the above list to generate some feed-back. How about giving it to him, so he can do as good a job as possible for you?

One suggestion, though. John surely doesn't have the time to answer a whole pile of letters, so how about simply giving him your views concerning the above and anything else that is on your mind? If you state your case clearly the first time and without making him have to answer your letter to figure out what you're saying, John can keep your views in mind when finalizing RAC proposals, without tieing himself to a typer night after night. Kilsdonk's address was stated earlier in this column. I am sure that the chairman of the other advisory committees are moving along with proposals for their various events, but none of them do as good a job as Kilsdonk in keeping me posted. Hint, hint!!!

The names and addresses of all the chairmen of the advisory committees were listed in this column in the Jan. 1976 issue. Contact them about your favorite event. Again, give them your views, but don't demand an answer.

* * *

By now you may have had a chance to look over the new AMA rule book, and if you happen to be a Carrier flier, you have possibly noticed that scoring of Carrier has changed considerably. You guys who are used to going for lots of top-end, better check your bag of tricks for a hand-full of bottom-end if you want to keep on winning. Oh yes, practice those landings until you *never* miss!

To illustrate my point, I am going to lift info from Rog Edwards article, as printed in "Patty's Pinkie," Vol. III, No. 1.

"How effective is low speed in the new scoring system? This can best be answered by comparing different combinations of high and low speeds under the two scoring systems. Some examples are given in the following table:

OLD

Class I and II

High	Low	Score
120	30	390
115	25	385
110	20	380

Profile Carrier

80	20	260
77.5	17.5	257.5
75	15	255

NEW

Class I and II

High	Low	Score
120	30	160
115	25	161
110	20	165

Profile Carrier

80	20	120
77.5	17.5	121.8
75	15	125

"It is obvious that a contestant who flies 5 mph slower on both his high and low speeds would *lose* under the old system and *win* under the new scoring system. The effectiveness of low speed compared with high speed under the old system was that an increase in high speed was 1.33 times more effective on

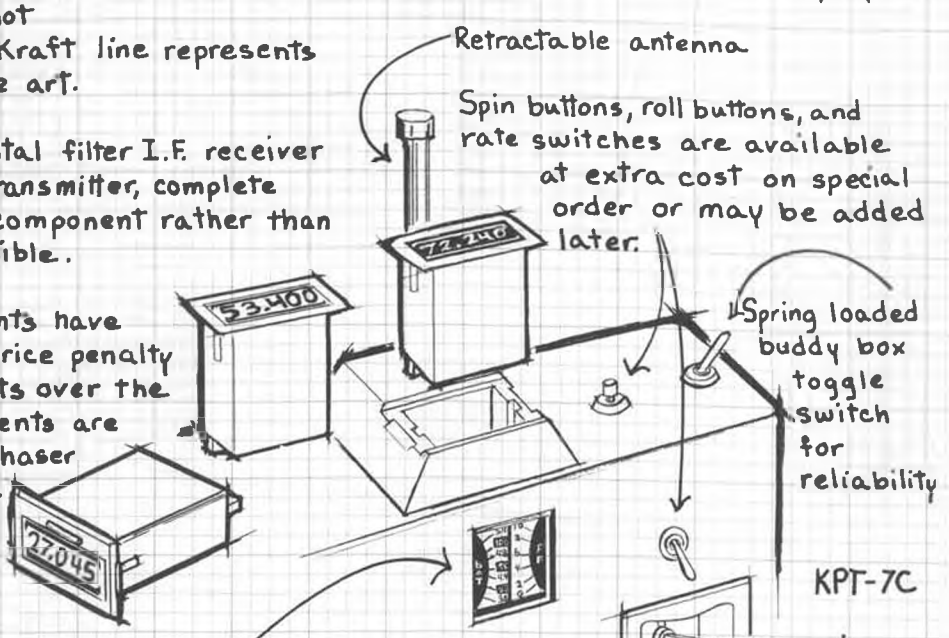
CONCEPT 76

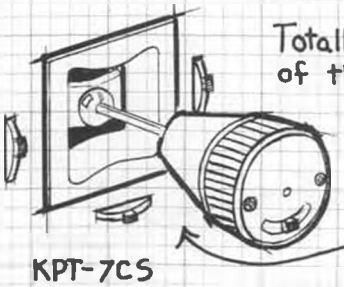
The Kraft Systems engineering group pioneered the concept of digital proportional control and subsequently created the innovations responsible for the level of R/C performance accepted as standard today. It's not surprising, therefore, that the new Kraft line represents a major advance in the state of the art.

Additionally, because the new crystal filter I.F. receiver does not have to be tuned to its transmitter, complete interchangeability is obtained and component rather than system merchandising is made possible.

To utilize this advantage, components have been priced so that there is little price penalty in purchasing individual components over the system price. For convenience, components are individually packaged and the purchaser may select items to custom tailor a system to his preference.

Some of the features of our Bicentennial Series are shown here.

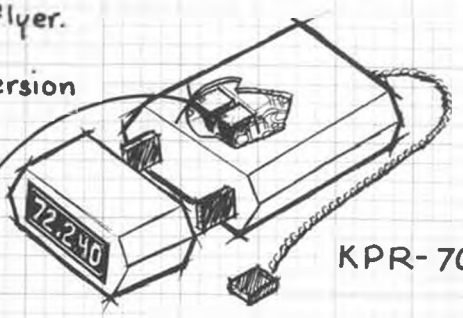




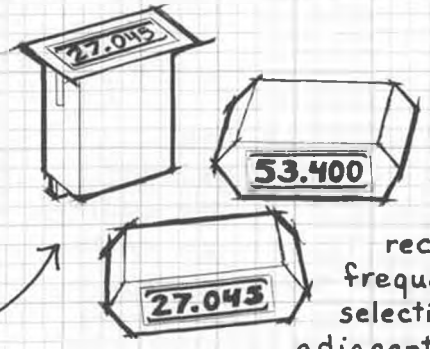
KPT-7CS

Totally new two-axis open gimbal stick assemblies are of the highest quality yet produced. This design eliminates any possibility of centering error and has excellent feel to satisfy the most demanding flyer.

A new open gimbal single stick version is available at no extra cost.

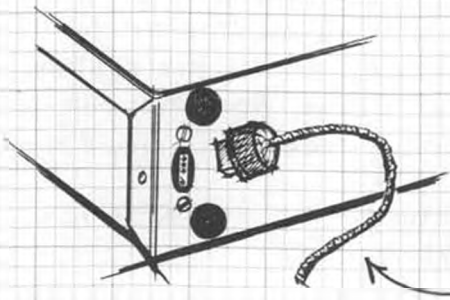


KPR-7C



Plug-in transmitter and receiver modules provide instant change between the 17 standard R/C frequencies.

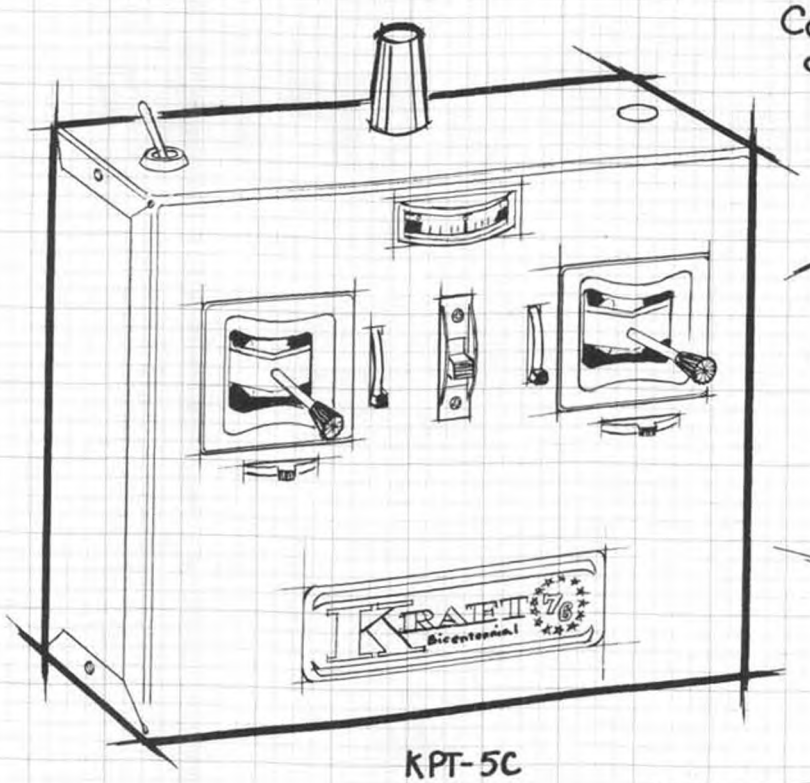
New solid state crystal filter I.F. receiver makes possible plug-in frequency modules and provides improved selectivity for better rejection of strong adjacent channel interference. An advanced design dual conversion plug-in receiver is available at extra cost.



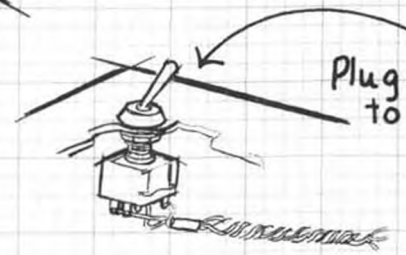
Cable interconnects battery test circuitry in transmitter to receiver charge jack. Receiver battery is tested under load.

KRAFT SYSTEMS, INC.®

Contest performance and reliability at a moderate price. A superior replacement to our world famous KP-5 Sport Series.

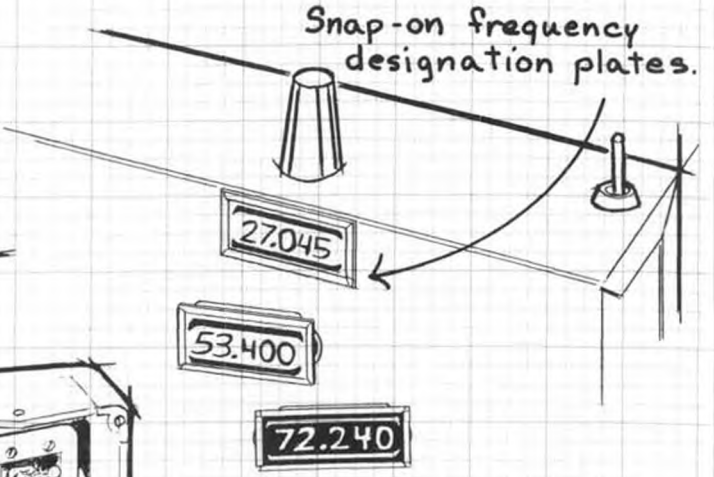


KPT-5C

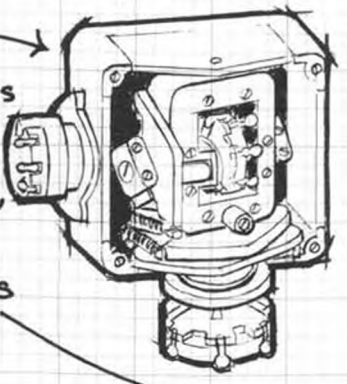


Plug-in conversion to optional trainer switch.

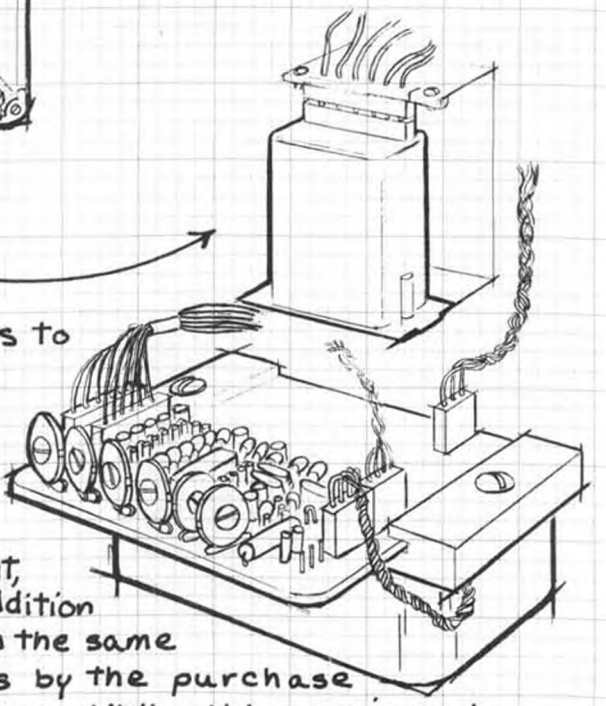
Snap-on frequency designation plates.



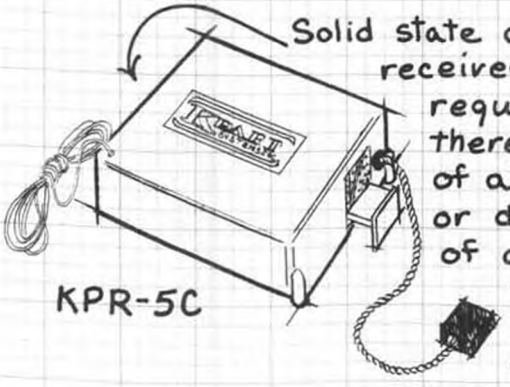
Super-precision open gimbal sticks as used for entire line. Wire-wound control potentiometers are used for superior linearity



Plug-in transmitter R.F. modules are accessible by removing transmitter back.



All models feature plug-in modular encoders as well as R.F. sections to provide standardization for improved quality and faster service.



KPR-5C

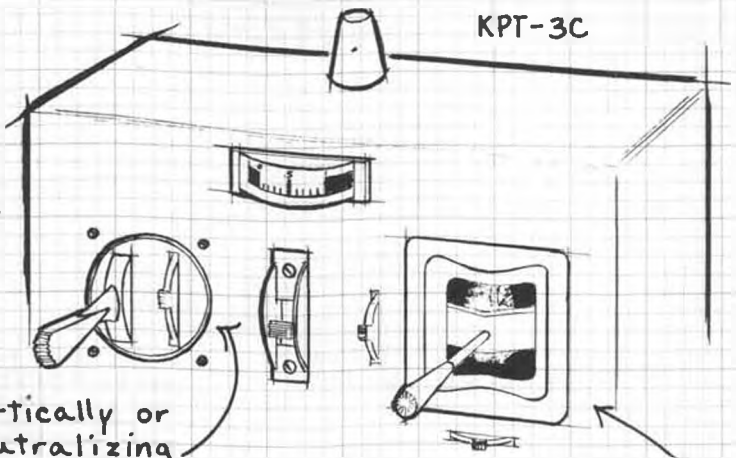
Solid state crystal filter I.F. receiver eliminates the requirement for alignment, thereby permitting the addition of air borne packages on the same or different frequencies by the purchase of off-the-shelf receivers. While this receiver does not have the plug-in R.F. module, its price is sufficiently modest to permit the customer to add a different frequency receiver to his system for greater flexibility. The list price for the plug-in R.F. section for the transmitter combined with a new receiver is only $74.90.

Note: If plug-in frequency conversion is desired with the KP-5C, the KPR-7C receiver may be substituted at a slight extra cost.

Our new 3 channel system offers greater utility than previous models because of the new control stick configuration.

Despite price advantages, troublesome unreliable dry batteries have been eliminated and all systems now include rechargeable transmitter and receiver nickel cadmium packs with charger.

The transmitter has plug-in R.F. modules accessible by removing transmitter back.



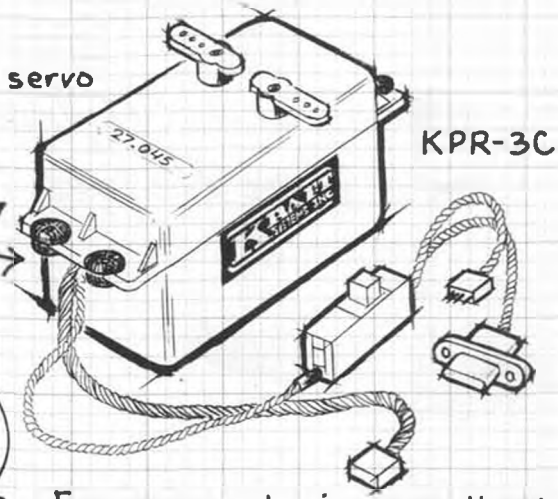
The left-hand stick may be mounted vertically or horizontally and may be either self-neutralizing or positionable with brake. For glider enthusiasts this permits rudder on the left stick, with aileron and elevator on the right stick.

Super-precision open gimbal stick. Vertical axis may be self-neutralizing or positionable with fine tooth ratchet.

Stick configuration can be easily changed by owner.

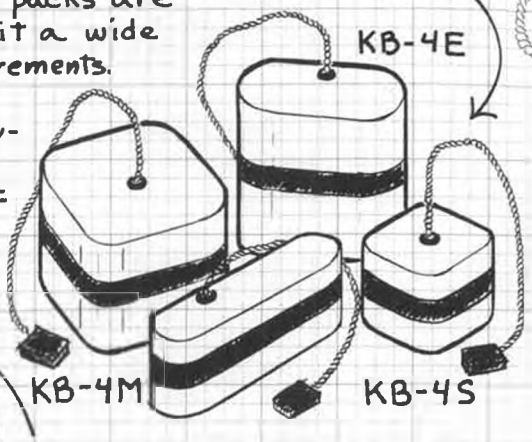
Integrated circuit decoder and servo amplifiers are now standard.

All new mechanics are smaller, stronger, and feature the rugged KPS-14II gear train.



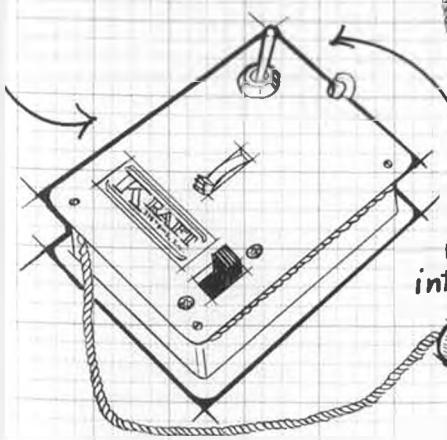
Internal reversing plug matches channel output to desired control stick configuration.

One 550 MAH battery pack and two compact, lightweight 450 MAH battery packs are optionally available to suit a wide range of installation requirements. For high current drain application, a 1,000 MAH heavy-duty pack is available at extra cost. KB-4F

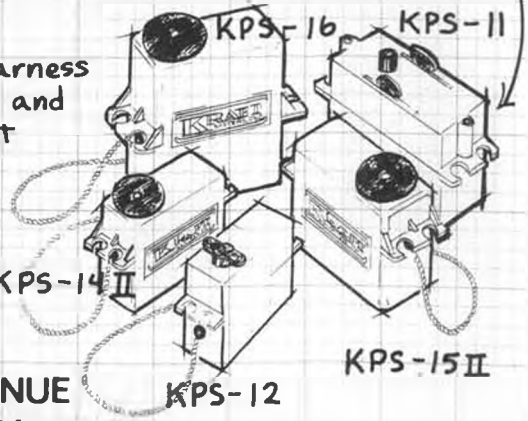


Four servo mechanics are optionally available to suit individual preference. All feature our exclusive integrated circuit servo amplifier for unequaled accuracy, smoothness, and efficiency. Special high torque and high speed servos are also available at extra cost.

DIRECT SERVO CONTROLLER



Plugs into charge jack of switch harness permitting operation of throttle and retractable landing gear without interfering with others or being interfered with. An indispensable accessory for crowded flying fields



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

the score than a similar decrease in low speed. In other words, an increase in high speed by 1 mph was worth 4 points and a decrease in low speed of 1 mph was worth 3 points. Under the new system, the relative effectiveness of changing high and low speeds varies depending upon the low speed. For example, in Class I and II, for a high speed of 110 and a low speed of 25, reducing the low speed would be 1.3 times more effective than increasing the high speed. For a Profile Carrier with a high speed of 75 and a low speed of 15, reducing the low speed would be 2.0 times more effective than increasing the high speed! It is apparent that the lower the low speed is, the more effective it becomes in increasing the score.

"How do the landing points compare with the speed points in the new system? The landing points vary between 0 and 100, where 100 is for a perfect landing. To make a comparison of how heavy the landing points weigh, some typical percentages have been calculated and are summarized in the following table:

	Old	New
Class I & II	30%	45%
Profile	22%	40%

"These results show that the landing points under the new system become very important. The reason for this is that under new system, the overall magnitude of the speed score has been cut in half. Thus making the landing points twice as important as under the old system. On this basis, one can no longer afford to lose 5 or 10 points on landing, without jeopardizing the chance to win.

"In summary, under the new system of scoring, low speed flying skill and landing skill are much more important. Some of the edge is taken off the high performance racing engine because a good, *reliable* low speed idle is now very necessary (A highly tuned Racing engine does not always idle very reliably). The new system should allow more engine/airplane combinations to be competitive. In addition, because of the low speed emphasis, larger and easier-to-fly models should emerge. A novice to the Carrier events has an easier opportunity now to become competitive."

Thanks to Patty for re-printing that article and to Rog for writing it. How about somebody in the Albuquerque Thunderbirds seeing that I get your newsletter?

Remember a few months ago when I suggested that Carrier flights take a long, hard look at Perry fuel pump/carb sets? With the changes to Carrier scoring in mind, one has to give very serious consideration to them now.

A stock K&B (used to be Veco) .61 R/C has pretty good power, right? By simply bolting on a Perry pumper and carb, this engine will put out approximately 20% more power, will be less affected by variations in fuel head or tank location, and will still idle slow and *reliably*.

Sound good, so far? There is more. Check out Clarence Lee's column in the Feb. '76 issue of RCM, page 10. Perry has come up with some trick porting for engines like the K&B 61. It is called Perry Directional Porting (PDP), and it has been patented. Addition of PDP to a K&B 61 is supposed to be good for an additional 500 rpm at the least, with some engines picking up 1,000 rpm. Super!

K&B is selling both its 61 R/C and the very popular 40 R/C with the Perry pump/carb factory installed, so your dealer probably has a very competitive Class I or II engine right there on the shelf! The K&B 61 sells for $109.95 and the 40 for $89.50. Not cheap, of course, but when was the last time you saw a competitive engine go for peanuts?

If you want to try a pump/carb combo on something other than a K&B, here is a list of the engines for which Perry is making pumpers: O.S. Max; Schnuerle 60F-SR, Goldhead-Blackhead and the 40. Supertigre; 51-56-60 ST series, G 60 and the G 40. Webra; Blackhead 60 and Speed 60. K&B; Veco 61 and Front Rotor 40. OPS; 60 R/C. Kraft; 61 R/C.

The pumps and carbs are sold separately, but are to be used in sets, of course. Price of a pump is $23.95 and the carbs go for $16.95.

When I first realized that the Perry pumpers would be available separately, I started thinking about using one, in conjunction with a regular needle assembly, on a Stunt engine. It may sound strange at first thought, but I think it would work great. Tank location would no longer be a problem, for sure. Turns out that one of our local Stunt Freaks is thinking along the same lines and is going to try it out with either an O.S. 40 or an ST 40. Neither of these engines

is very popular in Stunt, evidently because they don't "suck" too well! The pumper will take care of that little problem.

I have been asked to not say who is trying out the above combination, so I can't tell you that it is *Don Shultz*... Too bad ..I'm sure that a lot of you would be interested in hearing what tricks *Don Shultz* is up to now. Maybe in a future column I can let the word out.

* * *

A couple of weeks ago, I pulled one of my favorite tricks on a guy and thought maybe you would like to hear about it. I was at the R/C field in Portland, Ore. Lee Wyman and his wife were out flying and Lee was getting ready to fly one of his R/C helicopters, a Heli-Baby. I waited until Lee was ready to fire it up and then stepped over and asked, "Hey Lee, who's the better chopper flier, you or Ernie Ware?" (Ernie is another Portland 'chopper' flier, and he's good.) Lee didn't say much, but I knew I'd planted an idea in his mind, and he proceeded to put in a really super exhibition of flying skill... extremely low, high speed passes, controlled hovering any place he wanted it, the whole shot. If you want to see an impressive flight, you only have to ask, but you have to know *how* to do it and *who* to ask in the first place! *(Now you know how he got his knickname, "Dirty Dan." wcn)*

Larry Wilson, a N.W. Combat Freak, used to pull much the same thing at the C/L circles. With a Combat match between two of Larry's buddies in the offing, he would casually walk up to each of them and inform each of the others intentions to "cut your booms off". Now neither flier was considering doing this, but Larry made them think that the other was out to do him in, but good! These matches were always great crowd-pleasers, with both guys going for the other's booms and almost always ended in a great, splattering mid-air.

See what I mean? If you want action, you ask for it, but you do it very subtly, and with the flawless timing that only constant practice can bring!

* * *

Lots of talk goin' round about Rat and what to do with it. Here in the N.W., we have finally settled on a couple of Rat events to try in the next year or two. We have decided that regular AMA Rat is as good as gone for us, the interest just isn't there anymore. So we have decided to go with two new, slower Rat events. The first will be almost exactly the same event I described in the January column on page 84. It will be called N.W. Sport Race, and, to refresh your memory, will feature kit planes only (a list of 26 legal planes is part of the rules), plain-bearing engines, minimum 2-1/4 inch wheel, no shutoffs, fast-fills or hot-gloves. The claiming rule for engines was considered, but we decided that we don't need it in this area.

N.W.S.R. is, admittedly, what you call a "turkey event," but we wanted it simple and easy. Although the planes are going to be big and slow, we are looking for lots of participation and close racing, and that, folks is where it's all at.

For an event that will be fast enough to be satisfying, allow the pros some choice of airplane design, yet not be out of the reach of the novice, we have decided to simply adopt AMA Slow Rat, but to allow pressure feed. The only potential problem with this is that big planes don't usually handle too well at the speeds we'll be running (around 120 at first, maybe the high 120's after some development), but that is nothing serious.

Last month we ran out of space before telling you about the N.W. Regionals and what to expect if you come up for it. Just today I got a newsletter from Mike Hazel, of the Eugene Prop Spinners, and here is what he says:

"At the time of this writing, the sanction form for the '76 N.W. C/L Regionals is being made out. Date is May 29th and 30th. As always, we will put on a quality meet containing just about every control line event there is. Here is the

line-up: All classes of Carrier, Goodyear, N.W. Sport Race, N.W. Slow Rat, AMA Rat, Scale, Stunt, Fast and Slow Combat, and most all classes of Speed. And for the Speed events we don't have, there will be a "catch-all" Record Ratio for them."

Official entry forms and more information will be available the first of March from Mike Hazel, 738 West "M" Street, Springfield, Ore. 97477.

Next month I'll turn ya on to Arlie Preszler's super-stooge, which is just dandy for gettin' it off on grass . . Hey! Watch what you read into my stuff. The preceding simply means that Arlie's stooge is not designed for use on pavement! ●

Plug Sparks . . *Continued from page 21*

idea of the original event was to be able to fly a left hand circular pattern for one minute and then, on the next flight, a right hand pattern for one minute. In the recent event staged, the emphasis was on the attainment of a 60 second flight from the 60 second mark. No requirement was made to be able to fly in either direction.

Some events have been staged by the SCAMPS that are quite similar, notably a three-minute limit contest held about a year ago. However, this event could promote an international postal contest, as the emphasis is on precision (a true sport event) rather then being subject to weather conditions that determine the length of the flight.

In a quickie run down of the rules, here is what John Haggart had devised for this Bowden Event. All models must R.O.G., with a flight time of 60 seconds as the goal. Three flights with a maximum score of 180 determines the winner. The other miscellaneous rules are quite similar to the present SAM rules, and will not be repeated. One interesting feature is the ruling that the model must land in sight of the timer. Don't get any near-sighted timers, men!

According to Pete Fisher, the next Bowden Event will be held on August 8, 1976 at the old Warden Aerodrome (Shuttleworth Collection). All are welcome to compete. How about taking your next vacation to England and participating? Should be a real fun day!

KIT CHANGES

Received an interesting call from Sam Blumberg of Micro Models, who is producing the reduced versions of the Mercury and Miss America designs. In his advertisment, he claimed full conformance to all SAM rules.

However, he found that his sheet elevator and rudders are unacceptable under present rules and has since incorporated a change in his kits showing the option of built-up tails. For those who have purchased kits showing sheet tails only, illustrations showing the changes necessary to conform to the letter of the law, according to SAM, are available from Micro Models, P.O. Box 1273-A, Covina, Ca. 91722, for a stamped, addressed envelope.

Sam further states that these sketches will accompany all future kits for those that want to fly competitively in the O/T F/F radio assist events. The columnist can't praise Sam Blumberg too highly for his conscientious efforts to make sure the buyer of the kit is made fully aware of SAM regulations and that he will have no problems in qualifying.

EAST COAST TEXACO EVENT?

According to Carmen Boltecello, Editor of SAM 7 Chapter newsletter, "Yankee Flyer." President Al Vollmer has proposed a fuel-allotment event be held very similar to the Dawn Patrol as originated by Sal Taibe of the SCAMPS. According to Carmen, the event (differing from Texaco) would allow any old timer design to fly on 1/8 ounce per pound of weight up to a maximum of 7/8 of an ounce. The intriguing title of "Yankee Yawn Patrol" would be the caption of this eastern contest.

Before all eastern flyers say the heck with getting that early, remember, at the Canadian Nationals, the Unlimited Rubber Event was flown by automobile headlights at 6:00 a.m., with dawn at 6:15. The turnout was surprisingly good. The best part about retrieving was that the timers went with the contestant, hence, preventing loss when one lost sight of the model. We'll keep you informed on developments, if and when it comes off.

MISS TINY COWLS

While we are handing all the hints on how-to-do-it items, S.H. Law, a doctor of the U.S. Hospital Service on Staten Island, New York, offers a real great idea for those hard-to-find aluminum cowls for models like the Miss Tiny, Pacific Ace, Ohloson Pacemaker, et al.

The hosing manufacturer that markets its hose under the name of LEGGS provides an excellent ready-made shape that can be easily modified to the required size. These egg-shaped forms are within an 1/8 inch or closer in diameter to the desired nose size. By cutting out

for the engine at the top, these finished cowls can be easily sprung in place. Best part of all, they come with a ready-made indent on the inside!

Might also mention that putting a small 1/4 inch diameter hole in the bottom will help drain the surplus oil and fuel, hence keeping the inside neat and dirt-free.

CONTESTS (IN JANUARY?)

About this time of the year, this column starts getting a provincial look as the only meets being held are out west. With the AMPS, SCIFS, and SCAMPS (not to mention SAM 21) in California, along with the VAMPS in Nevada, and the Southwest F/F Annual in January, most of the action is here. (What else, with temperatures ranging from 55 to 75!)

The AMPS have released their schedule along with the SCIFS and SCAMPS. What a beautiful arrangment of contests! With each club putting on eight to ten competitions a year, there aren't many free weekends! This doesn't take into account the annuals staged by the San Valeers, San Diego Orbiteers, etc., that feature old time events on a big scale.

AMPS O/T RUBBER

Probably the biggest thing to come out of the AMPS Annual Meeting was the adoption of the 36 inch Cabin Commerical Event as so successfully initiated by the SCAMPS. Of course, the AMPS had to have a contest immediately, on February 8, featuring this "new" rubber event. Well, it rained, believe it or not, so the contest had to be resecheduled for the 15th. For the benefit of the easterners, California has been suffering a drought with accompanying beautiful weather for modelers. The last time it rained was 44 days ago!

SCIF FUN FLY

As quoted from the "Flight Plug", a large group of can't-wait-for-the-next-contest types turned up at the SCIF Jan. 25 meet at Taft. Weather was gorgeous, with clear skies, 70 degree temperatures, and a very mild wind (After that, if an easterner shot me, no judge in his right mind would convict him!).

Between the free flighters, R/Cers, and rubber band boys, a thoroughly enjoyable time was had by all . . with the exception of President Al Hellman, who proceeded to reduce Flying Quakers to kit form quicker than "Fast Richard" can produce 'em!

SAM 21 FUN

Not to be outdone by the free flighters, the SAM 21 Boys staged a formal meet at the Santa Teresa Hills, featuring a Fuel Allotment Event (1/8 ounce fuel per pound of model). With all models conforming to O/T SAM rules being allowed to enter, fifteen official entrants were noted.

Temperature got up to 60 degrees, and it was then the old man (Pond) spotted a thermal good for eleven minutes, to beat the lead man at that time, Ed Wood. About one o'clock in the afternoon, a breeze came up, and with the hill directly in back of the launch site, the meet degenerated into a slope soaring event, with every flight getting progressively longer.

Finally, at 2:50, the boys hollared quits and Vern Schultz brought his Miss Philly VI down after 29 minutes. It would probably have been going yet! Had to smile at Loren Schmidt, as he let his model get on the downwind side of the hill after 13 minutes. It was a long hike over that hill, but fortunately, the model free flighted quite well in the downdraft, getting only the usual holes from weeds and rocks. With no crashes to speak of (except for Don Bekins' tearing the wing off his .020 R/C Replica Stratostreak), the contestants had a great day, thanks to the efforts of Tom Bristol, SAM 21 Prexy.

WRAPUP

With all this talk about the generation gap and how the young ones are supposed to take over, the columnist spotted the best sign he has seen yet.

"OLD AGE AND TREACHERY WILL TRIUMPH OVER YOUTH AND SKILL."

Couldn't have said it better myself! •

Birds . . . . . *Continued from page 10*

feather bends and twists automatically and simultaneously.

Going back to the inverted U-shape of the gull wing for a moment, it occurs to me that shear stresses play a part in nature's design. If you can imagine holding an extremely long stack of paper cards parallel to the floor merely by pressing them together between your two hands, it is quite obvious that a simple push from the side or the top (shear stress) would send them scattering. If you could take that stack and bend it into a U-shape or inverted U-shape, and still

manage to hold it in the manner as before, the shear stresses would be met everywhere and the cards could not be easily pushed apart from any direction. The gull wing may utilize its shape to help with shear forces too.

AERODYNAMICS

The farther I go with this, the shakier becomes the ground I walk on! Let's see where it leads us, and if I'm wrong, someone out there will let me know. This is a kinder fate than having nature itself prove me wrong in the most direct manner possible . . a crash! In the late 1800's, Otto Lilienthal in Germany, Octave Chanute in the United States, Percy Pilcher in England, and many others, were trying to fly. They built hang gliders, and because they lacked man-made aircraft data, they turned to the birds for ideas. Their "contraptions" seem primitive by our present knowledge, but were they on the wrong track after all? For example, they all used thin, curved airfoils which turn out to have very low drag and which are greatly superior to present thick airfoils at low Reynolds Numbers.

Experiments in Germany in the early 1940's (F.W. Schmitz, et al) showed that for R.N. below about 100,000, the cambered plate 417A airfoil was superior to any other tested. Recently, Eric Lister has proposed very thin airfoils based on the meanline curves of more familiar thicker airfoils. Structurally, it is not easy to build a thin wing adequately strong to support large spans, because there is not enough thickness for the spar depth required. But . . it just may be possible to use an external spar system. In the world of hawks for example, there appears to be a workable compromise between structural and aerodynamic requirements. For the greater portion of its chord length, the hawk's wing is quite thin. On the lower surface, behind a thin, steeply curved "nose" portion, there is a "step" which is also found on the stork, crane and flamingo; all of which are excellent soarers. Behind this step lies the upper arm humerus (forearm bone) and a thick extensor (muscle). The step is recessed furthest at the elbow. The flexors at the airfoil nose are thinnest for land soaring birds, but are more strongly developed and thickly feathered for the ornithopters (flapping wing birds). The upper arm, forearm and flexor form a triangle covered by the leading edge skin. By way of contrast, the eagle has an airfoil shape which is very similar to a Jedelsky wing structure, and somewhat thicker in section than the wing of a hawk.

Birds with an eagle-type profile are best in stroking flight, while those with the hawk profile are superior soarers, being faster, climbing better and soaring more efficiently in thermals. It is interesting to note that the "step" is most pronounced on birds which have the highest aspect ratio and wing loading . . sea soarers such as the kite. Kites are gulls which always attack eagles at play, and, in spite of its higher wing loading, climbs faster and turns tighter. The kite has a measured sinking velocity of 1.7 feet per second at a forward velocity of 28 feet per second, yielding an L/D of nearly 17 to 1! This is remarkable, even for an R/C sailplane.

In spite of all of its advantages, the hawk airfoil is said to be gust sensitive, noisy in flight and tends to "buck", a term which means that it appears to abruptly lose its efficienty at times. Either this is a momentary stall, or it may be an instance of the wing making an abrupt transition from laminar to turbulent flow. I would like to see an R/C sailplane modeler try the hawk profile sometime, step and all. You might even attack an eagle at play . . and get away with it! I'd try something else, however, first before taking on an eagle . . because you can't flap!

The pattern of feathers on the wing is interesting, being somewhat overlapped and running at an angle to the chord line. This may be a measure to increase torsional stiffness. Each feather also has a series of tiny ridges or roughness on its surface. These are at an even greater inclination to the direction of airflow, and are believed to turbulate the flow to improve airfoil efficiency at low R.N. At high angles of attack in the soaring mode, a row of feathers along the leading edge pops up, acting as anti-stall slats or flow straighteners. When hawks are observed "bucking" inflight, it may be these feathers rising and falling automatically as required to keep him at maximum lift coefficient without stalling.

Owls have the most silent flight of any bird of prey, and their wings are covered with tiny, soft "downy" feathers which ruffle in the slightest breath of air. If it is true that noisy flight is "draggy" and that silent flight is low drag, then the owls much have the lowest drag of any species. As far as I know, drag and glide measurements have not been made (or at least reported) on any of the owl species.

Inasmuch as owls fly and hunt after dark, that may explain why aerodynamicists have not studied them. I've heard, however, that some engineers and aerophysicists are night owls, so perhaps that isn't the reason, after all. In any case, supporting data would be very worthwhile, I should think.

Sea birds have been seen to "swim" underwater by using their wings. The gannet is an example of this peculiar behavior, and swims after diving into the water from altitude in pursuit of a fish . . should he miss the fish in the first instance.

The bodies of sea soarers are somewhat slimmer (fineness ratio) than are the bodies of land soarers. This may be because of the lower drag of a slim body which improves the L/D and penetration for slope soaring at relatively high speeds, but would have little effect at lower, thermal soaring speeds. Perhaps gull bodies are slimmer also because they swim in the water, both in and on the surface. It is always a pleasure to watch the body of a gull in flight, because it seems to undulate and streamline itself into the airflow, scarcely ever being motionless. These movements are even greater in flapping flight and great amounts of "body english" can be observed under these conditions. Strangely, I've not noticed the body movements in hawks to the same degree as in gulls. If anyone can explain this, I'll be interested to hear from them. Maybe I just haven't observed carefully enough; but that's my impression, anyway. It is no doubt true, that sailplane modelers may never be able to duplicate this body movement on their sailplanes in any case, so investigation of it may not be productive of any useful information. The bodies of soaring birds are long enough so that at any soaring speed they are likely to use, the Reynolds Number of the flow over and around their bodies is likely to be supercritical, and the flow laminar . . at least during soaring.

To be continued. •

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

first place in the Golden Gate Trophy event, and second in the Thompson. By 1939, it flew its final race in the Thompson, placing third. The craft has been stored for some 36 years, and is still 95% complete, with only about 40 running hours on its engine. Suitable for restoration to flight status or as a truly rare museum specimen, the Marcoux-Bromberg deserves attention. Serious inquiries may be directed to Mr. Profant at the above address.

PONDER THIS . . .

Fed up with the high cost of model engine glo fuel? Perhaps this will ease your pain, by comparison: According to a recent issue of *AIR INTERNATIONAL*, the fuel cost for operating a single USAF F-111 fighter is $2,321 per hour!!!

HANDY HINT PLUS A FEW NEW PRODUCTS

Quite a high percentage of small models call for bond paper covering on such parts as cowlings. In some cases, a section cut from the plan itself, serves the purpose, or as an alternative, ordinary white typing paper has been employed. The objective of using paper, of course, is to more nearly simulate metal or plywood covering of the real machine, as contrasted with the sag-between-stringers effect of fabric.

Phil Koopman, of Vintage Aero, puts forth this suggestion for a lighter substitute. Instead of using paper, tape a piece of lightweight silkspan to plastic-wrap covered cardboard. Give it a coat of thinned-out SIG Litecoat clear dope, then rub on a piece of colored tissue to match the rest of your model. When dry, the material may be applied in the same manner as bond paper. Result: No need to shrink or dope with color, as well as a savings in weight.

And speaking of Vintage Aero, Phil reports release of a new autogyro kit of his own design. Rather like an R.O.G., the kit model features a two-bladed rotor, tractor propeller, and small fixed wings with turned-up tips. The sheet-wood parts are printed in color, and should be a cinch to assemble. Phil reports altitude flights equivalent in height to a two-story building, followed by vertical autorotation.

Also new from Vintage, is Japanese tissue AND rubber with very good characteristics. The new rubber product is claimed to have much of the "punch" found in a much-lamented old Italian product (Or was it the product of old Italians?). The Japanese tissue should be a welcome commodity that many had feared was gone from the scene forever.

Send $1.00 to Vintage Aero, 1 The Glen, Tenafly, N.J., 07670, for complete details and prices on these and other offerings. Tell 'em MODEL BUILDER sent you!

ITALIAN PEANUTS

MODELLISTICA magazine has recently published full-size fold-out plans for two Peanut Scale Models, the Ord-Hume O-H 7 (smacking strongly of Walt Mooney influence), and a Cessna Airmaster. This is the first evidence of Italian recognition of Peanuts brought to our attention, and we welcome this latest addition to the ever-growing ranks of devotees. Perhaps Peanut Scale shall one day become an Olympic event! Already we have greater international participation than the Luge, and no aerodynamic helmets are required!

SIMPLE SCALE MODELS

One of the most popular forms of "gamesmanship" among scale model fliers, is searching for simple-design real aircraft to duplicate in miniature. While the purists recoil in horror, such "boxes" as Volksplanes and Cougars continue to multiply. Latest entry in the "how simple can you get" derby is a German rig, designed by one Helmut Wilden, that makes a BD-4 look complex! According to a small photograph, sent to the Hangar by Dave Stott, the craft consists of a single tube fuselage joining the empennage with a pair of dihedraled wings. Picture a Sleek Streek with a V-tail, plus a seat beneath the wing, and you pretty well have the idea. Actually, the basic concept dates back to 1910, when another German, Hans Grade, flew a similar machine to win a $10,000 prize. But Grade did it the hard way: He designed and constructed his own V-4 air-cooled engine for power!

Yet another super-simple scale subject might be the modified Volmer Jensen hang-glider, shown in another of our photos. The short prop clearance might pose a problem, but probably a Cox .010 or Brown J. CO2 powered version would work out just fine.

VTO LIVES!

Just as we were preparing to wind up this column, we received a frantic note from Dave Linstrum, editor of the popular VTO column, in *Model Airplane News* magazine. Dave had announced a "name the column" contest, when it looked as though vertical take-offs had been drummed out of the AMA rules. But lo and behold, the VTO rule has been reinstated, so Dave has decided to stick with the present column title. Perhaps if any of you have "invented" good replacement headings, you could submit them to Bob Stalick instead?

PROXY PEANUT PHLASH

According to Milan Kacha, the Blackburn monoplane sent from England to MODEL BUILDER's Peanut Postal event last year, by Butch Hadland, is now being proxy-flown by Jiri Kalina in Czechoslovakia. The tiny machine was one of a trio of similar Blackburns entered in the MB contest, where it placed third in the Pioneer class.

FAREWELL TO ED FRANKLIN

The saddest task of any writer has to be presenting eulogies, especially when a close friend and fellow modeler is involved. Word has reached us that Ed Franklin, of Bergenfield, New Jersey, has passed away, as the result of an industrial accident. Although deeply interested in all phases of the hobby, Ed was perhaps best remembered for his participation in "Old Timer" activities, and sometimes flew early vintage designs in "modern" events, just for the fun of it! Furthermore, he could be competitive with such entries. His sense of model history was particularly strong, and he was a lifetime collector, even retaining the box lid from the first model kit he ever owned, an Ideal "Spirit of St. Louis". Ed's philosophy about the

hobby was one of the most cheerful we ever encountered. To him, the main objectives were to have fun and share it with fellow enthusiasts, and that's exactly the way he operated.

Perhaps we could all benefit by careful consideration of Ed's way of thinking, when we start taking things too seriously. Somehow, it seems altogether too easy to become so wrapped up in our own limited interests that we tend to overlook opportunities to ENJOY the hobby, JUST FOR ENJOYMENT'S SAKE. Our sympathy is extended to Ed Franklin's family, and speaking for all his many friends, we shall remember him fondly.

BILL DAHLGREN REPORTS:

"Entered the kids (and myself) in Delta Dart and noticed an interesting thing . . . the youngest turned in the best times, the oldest next, then me . . . I think that there might be a message here, but I'm not sure I intend to figure out what it is." ●

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

you guys who have been flying free flight for the past 15 years or more. As a Wakefield for its time, it had no peers, and I would venture to say that it could still hold its own in contemporary contesting. Guess its name and you'll receive a nice prize from Bill Northrop. Send him a card or letter as soon as possible.

APRIL MODEL OF THE MONTH. . . SLO-POKE FAI

Charlie Martin is one of the chief proponents of technical developments in FAI Power here in the N.W. His correspondence and visits to notable Power fliers throughout the world has allowed him to take advantage of the latest in design theory. These he has assembled into his latest ship, The Slo-Poke. As shown in the three-view, it is a high aspect ratio, very low pylon design. Climb is very fast with a half-turn power pattern to engine cut-off, and then a smooth transition to a flat and moderately slow glide. Launch angle is critical for best climb performance, as it is with most VIT designs. It is fitted with a slightly modified Kerr engine brake that stops prop rotation within four revolutions after actuation.

Construction features include a formed sheet balsa fuselage and plug-in wings. The fuselage has no bulkheads aft of the pylon. The wing tongue is a straight piece of stainless steel five inches long by 1/4 wide and 1/16 thick. Brass extrusions buried in the wing panels mate with the tongue and provide a smooth sliding fit. The fully cowled Rossi exhausts through a 5/8 diameter aluminum tube that exits at the bottom of the fuselage, at about the trailing edge station.

The ship is covered entirely with glass cloth and squeegeed epoxy resin (one coat). Wing and tail are covered with 5/8 oz. per sq. yard material, and the fuselage with 1.5 oz. per sq. yard. All up weight is 745 grams with a total projected surface area of 572 sq. inches. All in all, a fine looking and performing machine.

NEW PRODUCTS AND OTHER STUFF FOR FREE FLIGHTERS

A Tailboom for all seasons: Mattes Sales, 3042 Willow Wood Rd., St. Charles, Mo. 63301 presents its new custom fiberglass fuselages for practically any application. Half-A, A, B/FAI Gas models can now have their own fuselage booms, as well as Wakefield and Nordics. From 34.5 inches in length to 51.5 inches for the gas types, with diameters from 1-3/16 tapering to 7/16 or 1/2 inch, all the way up to 1-13/16 tapering to 11/16 on the big ones, those booms present a very compatible weight ratio. Wakefield booms are available in 22 inch lengths and in diameters from 1-1/8 to 1-1/4. A/2 booms are 49 inches long.

The above booms begin in price at $10.00. For the headaches a ready-made boom can solve, these are a good buy, indeed!

Keil Kraft Fuse: For those of you who have become used to using the small diameter Keil Kraft fuse, the bad news is the K.K. has stopped marketing this very desireable product. The good news is that it is still available in Jolly Old England, in your favorite gas lamp shop. It goes by the name of Lamp Wick and is actually less expensive and purchasable in much larger quantities than before. The only problem is finding someone in England who would like to serve as a broker for this item. In the meantime, drop a letter to one of your English pals and see if he might pick some of this stuff up for you.

CLUB SPOTLIGHT: M.A.C.H. . . .Model Airplane Club of Huntsville

A recent letter from George Batiuk, president of MACH, contained P.R. re-

leases as well as some well done pictures from the recent Heart of Dixie F.F. Championships. This mailout was sent to all contestants who participated, and gives them an indication as to where they placed in the overall contest results. The nice feature about this mailout is that all contestants are listed down to last place in each event, complete with scores. And with the large turnout, this hopefully will stir forth some souls who passed by this good event. Good luck for next year's meet, George. Thanks for the news and the pix.

HUMOR SECTION

Because of the rather lengthy and heavy introduction to this month's column, I felt that it would be pleasant to end on a lighter note. The following excerpts from the engineering magazine, Design News, was forwarded to me by A/2 flier, Kevin Collins:

"From: The National Board for Aircraft Improvement

To: All aircraft manufacturers, research facilities and military squadrons

Subject: More effective military and civilian aircraft construction and utilization. The following directives are to be implemented immediately to reduce cost, improve efficiency and improve front line readiness:

1. All funding and research will cease on the bullet-proof balloon project.

2. Designers shall no longer include the half-moon cutout on the doors of rest room facilities. Recent improvements in literacy have eliminated this historic requirement.

3. Concrete will not be used for any airframe despite its availability.

4. Wagers shall not be conducted between designers within the hearing of test pilots.

5. All pilots are encouraged to raise wheels only after the aircraft is airborne.

6. All personnel shall direct efforts towards developing a cockpit heating scheme that will eliminate the need for venting exhaust gases into the cockpit areas. The present system apparently causes the instrument faces to be covered with an oil film and renders them difficult to read.

7. Silkspan or model aircraft tissue will no longer be acceptable as covering for military aircraft.

8. The use of sandbags in engine test facilities is encouraged. Note that this means bags filled with sand, not straw. While straw does make the bags easier to handle, the Borsk Test Facility has found them less effective in stopping flying objects.

9. Parachutes should be packed before leaving the ground. Attempting to do it in the air and waiting until the last minute is asking for trouble!"

May your flights be long, your thermals strong, and your temperment cool, as we enter another season of designing, building and flying our favorite form of aeronautical devices. . .Free Flight. See you next month. ●

F/F Scale . . . . *Continued from page 43*

member is that the foam will want to stick permanently onto your covering unless you remove it as soon as you are finished painting. If you are unable to finish the job in one sitting, and you don't want to lose your center mark by removing the foam piece, you can leave it on and later use naptha to remove it safely.

I like to use enamels for painting lettering, markings, etc., even on many rubber models. My prime reason for doing so is that in the event that a goof occurs, you can remove the enamel with synthetic thinner without fear of damaging the nitrate finish underneath. I might add that the finish underneath has to be thoroughly dry, otherwise the synthetic thinner could ruin your overall painted surface. Another reason for using enamel is that it generally covers quite well, both by brushing and by spraying. Since I use diesels for F/F gas only. . .then fuel-proofing isn't a problem. You don't want to build up too much paint while using enamel, because it is more dense than the lacquer type paints. I prefer to use Humbrol paints due to the variety of colors that are availabile. I use lacquer thinner for the solvent when painting with enamel. This not only tends to make the paint dry a little faster, it also cuts down the unnatural shine which typifies enamel paints.

Floquil has several natural metallic colored paints that are suitable for use on engine cylinders, engine crankcases, radiators (where applicable), gas tanks, gas caps, tail-wheel springs, etc. The realism achieved using this paint for detail work will be quite satisfying. The use of either Grimmy Black or Engine Black is ideal for tires. In fact, the use of this product is quite endless.

* * *

Ron Limbrick of Ontario, Canada sent in a really super adjustable thrust bearing for use on Peanut models. The beauty of this little jewel is that it is hardly noticeable, and it can be easily adjusted when needed. The drawing has most of the detail, but here are a list of instructions that should make this an easy item to construct.

1: Drill the balsa nose block with a 1/4 inch drill, with 5° to 10° down thrust. (5° seems to work best).

2: Thread this hole with a 5/16 coarse thread bolt. Naturally, a coarse 5/16 tap could also be used.

3: Take a piece of 5/16 hardwood dowel and thread this with a coarse 5/16 nut. Aluminum or nylon could be used.

4: Drill this 5/16 dowel with a 3/16 drill and a 5° angle.

5: Thread the inner hole with a 1/8 bolt. Cut a slot for the X-Acto adjuster and cut a dowel to 5/16 long overall, or trim to suit.

6: Cut a slot with a hacksaw in the Peck Polymer nylon thrust bearing.

7: Thread the collar of the bearing by running it through a 1/8 nut.

8: Redrill the bearing with a 1/16 drill angled at 5°.

9: Cut a piece of 1/16 aluminum or brass tube and insert into the new hole.

10: Screw the 5/16 dowel into the balsa nose, then screw the thrust bearing into the dowel.

When you have finished, you will have an adjustable front end on a Peanut model that will give you plenty of adjustment without having to use obtrusive-looking shims. Any added weight will probably be needed anyway.

* * *

It has been only a month since I initially commented about starting some kind of National Scale Organization. Even though there is plenty of time for additional response and comments, I feel that the majority of F/F scale modelers around the country *DO* want to get this organization going full force. Therefore, it can be assumed at this time, that there will be such an organization. Details will be worked out and reported back as soon as they become available. This is going to take some time in order to get every item worked out to the satisfaction of everyone interested in joining. There would have to be some kind of assessment in order to defray the cost of printing and mailing some type of news bulletin, etc.

No question about it! There will be a U.S. National Scale F/F Fly-In to be held in the summer of '77, here on the West Coast! The dates will be set as soon as convenient. The month would probably be either July or August. June in Southern California is typically overcast for the entire month. Those who have families wanting to take advantage of the beach would be disappointed at the lack of rays, but again this will be decided at a later date. Please plan for this special event. We would like to see fellow modelers from all over the U.S. participating in this most unusual type of modeling Fly-In. If any of you are interested in helping to plan for this special event, please let me know. It will take a tremendous amount of work and energy to make this successful.

* * *

On Valentines Day, I had a crew of friends over to help me put the wings on my homebuilt biplane Marquard M-S Charger for the first time. The purpose of this exercise was primarily to determine the length of flying wires, and also to see whether the wing-attach fittings would match the ones on the fuselage . . .also whether or not the "N" struts would fit. You can't imagine the consternation while waiting to see if all of the sweat, toil, and expense add up to a usable part. With a model, you simply cut out another from a sheet of balsa. In essence, I suppose you can say the same with a homebuilt, but the effort to duplicate another part from chrome-moly steel isn't particularly easy or cheap!

It is curious to note that the entire assembly is so similar to building a

model biplane, with the size being the only difference. You have to concern yourself with dihedral, proper wing incidence in both upper and lower wings, and the wing tips must be in equal distance from the tail post. I was fortunate in having two designees from my EAA chapter who were willing to give so much of their time and knowledge. You may not have any idea how much fun it is to build a full-size airplane, or the amount of valuable information one gathers from its education aspect. The wealth of knowledge garnered should help in making better flying scale models. . .at least I certainly hope so!

Note: June 20th is the date for the Flightmasters R.O.W. Scale Contest at Lake Elsinore. •

Sailing . . . . . *Continued from page 57*

quired for scale appearance. Contrive to let the jibstay carry the whole job of supporting the mast in a forward direction. For in so doing, it will become taut and straight, allowing the jib to set with the shape the sailmaker intended.

Last in our presentation of scale efforts in Lon Hocker's magnificent Massasoit. At a scale of 1/3 inch equals 1 foot the hull is 74.5 inches LOA and carries 14 pounds of lead in the fiberglass shell. Only two channel radio is presently fitted, and winching is accomplished by a scaling up of the usual system we use in the sloop rigged boats. The myriad of headsails were made non-overlapping so that they are self-tacking. In order to generate enough force to take the long hull through the eye of the wind while tacking, Lon found it necessary to fit a rudder with 4 times the area of the scale one. But since it is underwater while sailing, he feels that it was worth the departure. A full-page article appeared in National Fisherman about Massasoit in the November 1975 issue. In it, the builder advised that one should measure the back of his stationwagon before laying the keel on a too ambitious project.

With the opening of the 1976 regatta season, we are faced with continued pressure for fair competition at crowded regattas. I'm coming to the belief that 30 boats marks the maximum limit for reasonable size. This might consist of 3 boats per frequency, with 10 possible frequencies. How to decide on which 30 boats to let compete will be the subject of a report by AMYA Director Cas Woodbridge sometime this spring, for he has collected and collated the experiments from last season. But now that you have thirty boats, how to treat them fairly? How to arrive at the end with the winner being truly the fellow who beat everybody?

So far, the best bet is a diabolical patchwork called the Mark 30. This was developed in the winter of 1975, and has yet to have been improved upon by 4 different computer types who tried. In Figure 1, is the Mark 30 Heat List. A square with a slash in it is a heat that is sailed by a competitor.

1. Split the skippers into groups of three according to frequency. Skippers on 53 mHz can be saved till last to fill up open holes. Try to fill each letter (a, b, c. . .) completely so that letter categories with only one or two people are minimized. The better you are able to do this, the more nearly equal the heat sizes will remain.
2. Make up a 3x5 Card, listing the heats that each skipper sails. For example,

A2:5-6-8-11 (Make up duplicates for as many times as you plan to cycle through the Mark 30.)

3. On regatta day, check in the skippers right on the sheet. If there are no-shows, fill up the holes with skippers from below as frequency will allow. I usually make a list of each entrant and the frequencies he could sail on.
4. At the skipper's meeting, the skipper's names can be put on the appropriate card and he is ready to sail.
5. The racing can be stopped after 6, 9, or 12 heats, with each skipper having sailed an equal number of races. These are good times to update a scoreboard that you have at lakeside.
6. For a one-day event, plan on running through the Mark 30 twice, a two-day event, either 3 or 4 times. Fill out the Mark 30 (Steps 1-4 above) differently for each round. That is, switch frequencies as possible, and never let a skipper be the same letter designation unless absolutely unavoidable. (This would be the case of three skippers, each with only one-and-the-same frequency in a 4-round event. But since everybody else would be getting mixed up well, it would not seriously bias the set up.)
7. On the score sheet, the upper left half of the hash marked square is where you put the score for that heat, the lower right half is where you add that heat score to the previous score to keep a running cumulative score.
8. We have found it handy to reproduce the left-hand column with the skipper names and boat numbers on a manila cardboard which can be slid along from heat to heat. It makes book-keeping much easier and helps to avoid errors.
9. We also have found that a clip board, with one 8 x 11 sheet of paper for each heat, is a useful way to keep the actual finishes and protests which may then be transcribed onto the master score sheet. Often the scoring tent is some way from the finish line, and yelling back and forth is not condusive to keeping the skippers calm. The Master Score Keeper should have nothing to do but enter the data from the heat finish sheets onto the master score sheet. And he or she should be declared off-limits to skipper inquires.

The Mark 30 can be improved upon, and there is a simple way to analyze a new heat list to see if it is better, ie, to see if it does a better job of having each skipper meet every other skipper an equal number of times. If you have a heat list, contact me and let's see if it is an improvement. The analysis system was published in the winter 1974 AMYA Quarterly Newsletter.

Next month we will present Forest Godby's 50/800 design, "Wind," and discuss 50/800 hull shapes in general

terms. Remember to send in your $5.00 dues to the AMYA Secretary, Bud Salika, 3917 Sunnyside Avenue, Brookfield, Ill. 60513. I'll field questions either directly at 7608 Gresham St., Springfield, Va. 22151 (Send a self-addressed, stamped envelope), or in care of MODEL BUILDER. •

Rocketry . . . . *Continued from page 32*

pod, the side opposite the boom attachment; this helps prevent the clips which connect to the engine ignitor from dropping off and catching on the stabilizer, an embarrassing occurrence. The pylon is balsa, the same thickness as the glider boom, and the alignment plates on either side of it are thin plywood. The thrust tongue is cut from the glider boom, in the shape shown, and glued to the pylon. The alignment plates are then carefully glued in place, and serve to keep the boom and pylon parallel during powered flight. Once the whole assembly is dry, test-fit it to the boom. It should slip out backwards with a very slight tap on the nose. If it's too tight, sand the sides of the boom a bit, or sand the back of the thrust tongue slot.

Assemble the glider as per the instructions, except for fitting the rudder to the underside of the fuselage to avoid getting it fried off! Trim for a slight stall, which will improve the boost characteristics; experience will soon give you other ideas to try. Oh, yea, build it extra strong; sooner or later everyone zorks one of them into the ground.

The pylon should support the pod at least a 1/2 inch above the wing surface, as shown. A little higher is allowable, but too much will cause the whole business to nose down under power. The length of the pod is rather uncritical, as long as it is at least 1 to 2 times the wing chord. Longer pods give improved boost stability. They also make it easier to eject a parachute properly.

Note the string, knotted and glued to the joint between the pod and the pylon. This string (heavy carpet thread is fine, or fishing leader) slips past the nose cone and is tied to a short piece of shock cord, which is attached to the nose cone. The reason for this outside attachment is simple; in case the shock of parachute ejection doesn't kick the pod clear, the parachute can open and drag the pod off the glider boom. The thrust ring is inserted by using an engine of the size you plan to use to push it up into the pod, after running a line of glue inside the back end of the tube. Leave about a 1/4 inch of engine projecting.

To fly prep the recovery system as shown in the instructions included with the engine. Friction-fit the engine in the pod by wrapping it with masking tape until it makes a fairly tight fit. Launchers are described in the Centuri and FSI catalogs (incidentally, you can get one from Centuri at Box 1988, Phoenix, Arizona 85001). You hook her up to a car battery or other power source, (NO fuses!) clear the area, hit the button, and you're underway. Setting up for the next flight is simple; collect the pieces, pull the old engine, and start over again.

So give it a try, if it interests you. It could turn out that, once you get a little exhaust smoke up your nose, you'll find that you have another exciting flying hobby on your hands! •

Choppers . . . . *Continued from page 25*

When it came time to design the main rotor head and associated components for control, Charlie had some unusual ideas. Rather than experiment with a variable speed motor unit which would absorb power without giving performance in return, he chose to run the main rotor at full speed and control the vertical movements with a collective pitch set-up. This was accomplished in the time-honored fashion of sliding the swash-plate up and down on the main rotor shaft and connecting it to blade pitch arms.

The rotor head itself was machined from Delrin, a space-age plastic, and holds a pair of built-up rotor blades with a diameter of 38 inches. The main rotor blades are constructed in the same manner as a sailplane wing,

that is, a spruce leading edge was used with a 3/16 x 1/2 spruce spar and balsa ribs placed on 1 inch centers for the length of the blade. A balsa trailing edge was fitted and the entire blade (wing?) covered with Monocote. Oh yes, the blades were built-up on a special workboard that has an 8° helical pitch change from tip to root . . . this is another of those "Gilbert" details!

The stabilizer paddles were carved from phenolic material and the swash-plate was machined from graphite impregnated nylon . . . no bearings in this assembly! The main rotor shaft was turned from a length of 1/4 inch titanium rod, which is almost as light as aluminum, and stronger than steel.

The all-up weight of the chopper is 4 lbs., 4 oz., which is about 3/4 of a pound heavier than programmed. Tail rotor diameter is 8 inches, overall length of fuselage is 33 inches, and it stands 17 inches high. Now, to the part you've all been waiting to hear . . .

Does it fly? Well, no . . . not yet. Sorry to disappoint you with such an abrupt statement, but don't despair, he has hopes that it will fly with a few modifications. This evening, I went over to Charlie's to take photos of the completed chopper, and turned it on to see what it would do.

Incidentally, when you get ready to fly this bird, you simply turn on the switches (nothing happens yet). Then, as you move the throttle stick out of "low", a micro-switch turns on the motor and away she goes. About all we could get out of it was "swimming" around on the garage floor . . . it did become light and definitely would have flown had it been just a few ounces lighter! It's almost impossible to shave off any more weight unless a better battery system can be devised.

Next steps are to experiment with different gear ratios (4:1 main) and loosen up the tail drive, which has considerable drag! If that doesn't do it, I suggested he remove the battery and run a pair of wires from his car battery to the model. We know it would fly with all that weight out, but its usefulness would be limited by the length of the wires! He hasn't given up and I'm sure we'll hear very shortly that Charlie has done it again! Keep tuned for the latest in "Electro-choppers".

HELICOPTERS ANONYMOUS

Got a call from John Gorham, who said that the club was doing great and the membership was up to 22 regular members, plus a few more who show up for the fly-ins. A couple of months ago, we ran pictures of the club activity and labeled one of the members as Stan Norwood . . . actually, his name is Stan Noar, and at the last meeting he was heard to say "The only chance in my life to get my name in a magazine, and they had to misspell it." Sorry about that Stan, you'll have to short-out Gorham's starting battery for that one, he sent me the names! Ha! John also reports that the aluminum tube installation on the Heli-baby, in place of the stabilizer paddles, really makes that chopper go! John uses 3/4 inch diameter thin-wall tubing about 1-1/2 inches long, attached to the stabilizer bar with two jam nuts. Performance is said to be as good as the Kavan Jet Ranger now, and that stability is not impaired. (See MB, Jan. '76).

FINAL APPROACH

It's been a very busy month with the following projects stretched out along my work-bench:

1. Rebuild the Helix Autogyro
2. Complete Kim's Kavan Jet Ranger
3. Complete John's scratch-built trainer
4. Build a fuselage for Heli-baby (Hughes 500)

A last minute project was started yesterday while waiting for the primer to dry on the Jet-Ranger . . . Some months ago, during my disenchantment with the inverted engine on the Graupner 212, I made a new engine plate and installed a German Veco 61 upright, with Schluter clutch and cooling shroud. By the time the new power-package was ready to go, I started something else and let the Graupner project slide. Now, it has been re-installed (not without considerable modifications) and hopefully will fly next week-end. I still say, that is one of the prettiest helicopter models on the market today.

No, fellow modelers, I haven't forgotten you . . . I've been too busy with the airline, and never seem to have enough space in the magazine to answer your questions and print your ideas. I cheated a bit this month though, so will list a few names of interested

modelers, in the remaining space:

Leonard Malone, 3737 Arbolada Road, Los Angeles, Calif. 90027, phone (213) 666-6291. Flies DuBro 500 and Kavan Jet Ranger.

Arthur Murray, R.D. 1, Box 593, Vandergrift, Pa. 15690, phone (412) 567-5000. DuBro 300. Wants data on electrical noise and blade balancing.

Robert Rachan, 136 South St., Sunbury, Pa. 17801, phone (717) 286-9568. DuBro shark.

Michael Hamm, 2789 Bardy Road, Santa Rosa, Calif. 95404, phone (707) 528-2658. (2) Dubro 300 and (1) Shark. Has modification data for above.

Richard Lohrmann, 909 College Hill, Cape Girardeau, Mo. 63701, phone 334-0904. Would like help on getting started. That's it for now. BCNU next month. •

Remotely . . . . *Continued from page 16*

By the way, controlling interest in Coast Catamaran and its Hobie Hawk Division has been sold to The Coleman Co., Inc., of Wichita, Kansas, a company well known for its camping equipment, especially gas lanterns. Production of Hobie Hawk gliders will not be affected by the change of ownership, now or in the future, contrary to conflicting rumors.

THEY REALLY NEVER LEFT

During the WRAMS trade show, we caught some good-natured ribbing from Jerry Bonzo, Pro-Line's marketing shark, for not reporting that the company was back in production. Playing it real cool, we just looked very surprized and commented that we didn't know it had ever gone out of business.

Actually we were quite aware of the momentary hitch, with its usual rumors of total collapse and the list of prospective buyers, etc., but, knowing the excellent reputation of the radio, we were confident that its popularity would carry it over the troubled times without too much hassle. Pace Industries, Inc., under the leadership of E.A. McDonald, President, has picked up the ball and ProLine Electronics will continue to produce the top-line radio that has guaranteed its success over the past seven years. Vice-President and General Manager of Pace, Alan Clouse, will head up the ProLine operation.

Now for Pete's sake, write to Jerry, at 10632 North 21st Ave., Suite 11, Phoenix, Arizona 85029, and tell him you read about it in MODEL BUILDER!

. . . AND NEITHER DID RS

Also announced during the WRAMS trade show, in fact they had a booth, was the purchase of RS Systems by Tech Serv, Inc., 5301 Holland Drive, Beltsville, Maryland 20705, (301)474-2900. The complete RS line, including all equipment inventory and documentation was purchased on Feb. 25, 1976, and will now be known as "RS Systems—a Tech Serv Company."

According to Frank Goodwin, President of Tech Serv, radios will be manufactured in Tech Serv's plants in Maryland and Pennsylvania under the direction of Manufacturing Manager Curt NeSmith. Ron Ray, Engineering Vice President, will supervise the FCC type acceptance transfer. Goodwin heads up marketing activities and will expand the dealer and distributor network, as well as selecting additional RS Systems Service Centers.

Tech Serv was founded in 1960 as a publicly-held electronics firm and has been a prime supplier of digital electronics and lab equipment to the field of experimental psychology. It also markets a digital electronic optical-scanning system for the plywood business, which has become a standard for that industry.

Contact Frank Goodwin for further information.

NOVICE VS MASTER

R/C clubs in the Clintonville, Wisconsin area are having a lot of success with an aerobatic competition known as the "Valley Pattern." Following a satisfactory 1975 season, Jim Vanderwalker, of the Clintonville R/C Club, sends us a run-down on the rules.

Primary purpose of the "Valley Pattern" is to provide a pattern competition for small clubs that can only put up enough prizes for 2 classes. Consequently, Novice and Master (as well as Advanced, Expert, and Bipers) can compete on the same level. The only division is novice and expert within each category. This division could get a little sticky because it's somewhat on the honor system, however, in small local contests, it's morally tough for a known expert flier to sandbag. Basically, it goes like this:

CLASSES: Novice and Expert (Not the AMA classifications). Self-appointed, but CD may have to rule in the case of an "unknown."

PATTERNS: Each flyer uses his AMA Classification pattern; Novice, Advanced, Expert, Master, Bipe.

SCORE: Chosen pattern must be

flown in its entirety. Maneuvers not flown get zero. Maneuvers that are attempted, but very poor, get an automatic one.

FLIGHT SCORE (This is the key to the "Valley Pattern"): Score is the total of seven maneuvers. The Takeoff and Landing scores are mandatory. The other five maneuvers are the ones for which the highest points were earned in the flight. The total number of Zeros in the flight are then subtracted. This is your flight score. Remember, you only get a Zero if you don't even *try* the maneuver, otherwise you at least get One, just for trying, even if you goof it up.

We think the "Valley Pattern" is a great idea, particularly in the fact that a flier is encouraged, and rewarded, for trying a maneuver that he may or may not be able to complete . . . he has nothing to lose and two points each to gain by tackling every maneuver. We'd like to hear comments, particularly from clubs that give it a try.

THE STRAIGHT POOP

Top pattern fliers will remember Red Scholefield as the Contest Director when the Rocket City Radio Control Club of Huntsville, Alabama, hosted the 1972 Masters Tournament. He is now located in Gainesville, Florida, and is Manager of Design Engineering for General Electric's Battery Business Department.

Red sent us a copy of the new 2nd edition of the Nickel-Cadmium Battery Application Engineering Handbook, published by G.E., and for which Red was a contributing editor. In an attached note, Red comments, "With all the material treating (or mistreating) nickel-cadmium batteries recently in the modeling press, you will find this a useful reference."

The G.E. book, which measures 5-1/2 by 8-1/2 inches, and is 5/8 inch thick, has, as the popular saying goes, "Everything you've always wanted to know about nickel-cadmiums but were afraid to ask." It is divided into eight sections as follows: Introduction; General Description of Nickel-Cadmium Cells and Batteries; Application Information; Charge Characteristics; Battery Life, Storage, and Maintenance; and a catalog of G.E. nickel-cadmium battery products.

In the index, each section is broken down into sub-sections, sub-sub sections, and even sub-sub-sub sections (haven't had a real good Sub since we left the Wilmington, Delaware area). For instance, under Section 3—Application Information, you find 3.4—Electrical Considerations, and under 3.4.7—Discharge Characteristics, you'll find; 3.4.7.1—Discharge Capacity Rating, 3.4.7.2—Discharge Voltage, and 3.4.7.3 Effective Internal Resistance . . . the page number is given for each of the above.

Copies of this excellent reference material may be purchased directly from General Electric Company, Battery Business Department, P.O. Box 992, Gainseville, Florida 32602. Single copies are $5.00 each, however, quantity discounts are available (5 to 10 copies at $4.00 each, 10-15 copies at $3.00 each, etc.) No CODS or stamps accepted.

When ordering, tell Joseph C. Grant, Advertising and Sales Promotion, that MODEL BUILDER sent ya. •

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

Need a prop for your Peanut . . . for your Walnut . . . for your sport rubber F/F? Peck-Polymers probably has what you need. It is offering a complete line of plastic propellers in five sizes. The props are molded of a tough plastic compound, with a molded-in free-wheeling cam. The sizes and prices are: 4-3/4 inch, $ .15; 6 inch, .25; 7 inch, .30; 8 inch, .40; and 9-1/2 inch, .50. The props are available from dealers or direct from Peck-Polymers, P.O. Box 2498, La Mesa, California, 92041. Also new from Peck-Polymers is a stock of light-weight Japanese tissue. The 24 x 18 inch sheets are available in red, yellow, orange, blue, green, and white for $ .30 per sheet.

* * *

The Modelcraft Soaring Glider of the 1930's is being reproduced in a replica kit by CPM Products. The 29 inch span stick 'n tissue free flight glider is a replica of the Los Angeles company's inexpensive model aircraft. The CPM kit features selected strip wood, and cleanly printed sheet wood. Two large sheets of quality Japanese tissue are provided for covering. The kit sells for $3.98 from dealers, or can be ordered direct from CPM Products for an additional $1.00 to cover postage and handling. CPM Products, 722 Lennox, Yreka, California 96097.

* * *

Prather Products is turning a skunk loose on the modeling world! Fortu-

nately though, the Pole Cat has been thoroughly descented. The 56 inch wingspan trainer is intended for .10 to .19 power. The Pole Cat features a strong plywood fuselage with plywood bulkheads and hardwood motor mounts. A plywood reinforced tailboom attaches the solid balsa tail feathers to the fuselage. The flat bottomed, high lift airfoil should make the Pole Cat easy to fly, and the pre-formed landing gear can be removed to allow landings on the built-in skid. The Pole Cat promises to be an ideal trainer . . . strong, lightweight (2-1/2 to 3 lbs.), and easy to fly with two or three channel radio gear. The plane will be available from hobby dealers for $29.95.

Also from Prather Products are two accessory items. One is a very heavy-duty formed dural landing gear. The thick aluminum gear is predrilled with two mounting holes, as well as axle holes. The large gear (which is the replacement for the Prather Panther sport plane) retails for $5.95.

Another clever item from Prather is nylon coated steel cable. This lightweight cable is intended primarily for use as wheel brake activator line, although modelers could probably find many uses for it. All that is necessary to attach the cable is to thread it through a hole on the part to be moved, twist the cable together, and heat it with a match. The nylon will melt, fusing the cable together. A five foot length sells for 98 cents. ●

Electric car . . . *Continued from page 17*

chassis-mounted charging jack on the other. When the batteries are completely discharged, you charge for 30 minutes. Then, you charge for twice the length of time that the car is run, after each race.

The Leisure Electronics "Auto Charger" unit eliminates guesswork and tabulating. It precisely meters the correct charge in 15 minutes and contains a built-in load to discharge the batteries without running the car, so that you can be certain of a perfect charge for important races. The unit sells for $29.95. It is most important to remember to *return the throttle to the fully retarded position when charging.* Otherwise, you can burn out the motor, or the rheostat . . . or both.

No doubt, there is a lot of the realistic sound and smell of racing that is lost when using electric power, but at least you're not apt to be stopped entirely by the environmentalists. Of course, if you win too often, the gas powered boys will probably make you run alone anyway! ●

Peanut . . . . . . *Continued from page 47*

Before you start the wings, decide how much dihedral and washout you want. I think you could get by with scale dihedral, as discussed in recent articles which assert models fly well with none, but I didn't have the nerve to try it. Whatever you pick, the root rib must be carefully aligned with this design since the wing-to-fuselage joint must be perfect, not just for looks, but to take the flight (and the usual impact with immovable objects) loads. I debated running a spar or two through the fuselage but decided against it, and the model has proven to be very sturdy.

For the 1/16 washout recommended,

block-up the trailing edge during construction so that it is built-in and you don't have to fuss about warping. You can cover the wings either before assembly to the fuselage or after. I did it before, since that way I could pin them down during water shrinking and doping. This preserves the washout, and again no warps.

The tail is strictly routine except for the stab-to-fin mount. Use hard balsa for the fin-rudder and soft/light balsa on the stab-elevators. If you're confident of getting the stab incidence right the first time, just build it into the fin. I almost never can . . . in fact, I had to take my Andreasson biplane apart after initial assembly because it flew in a weird skid/side slip and needed ballast. With adjusted incidence it did quite well without any ballast. So, I left a generous 1/32 clearance in the fin slot to permit changes to stab incidence during flight tests.

Now there's the canopy. It really should be a one-piece tailor fit. If you have vacuum forming equipment, that's the way to go. *(Little did the author know what was in this issue! wcn)* I chose the lazy way out. A slow oven . . . as they say in cookbooks. After about five tries with different thicknesses of heat-formable plastic, I got a fairly good one with 0.010 material over a male mold carved from balsa. Had one bubble on the aft edge but not too bad, and by then I was anxious to get in the air. Oven temperature was 275° or so. Hot Stuff is great for gluing the canopy.

The real airplane was olive drab with black trim and just letter markings on the fuselage. I didn't have a picture of the real plane at the time I covered the model, and during a hurried phone call, Monty Groves told me they were black. The picture he sent shows white. Use lightweight tissue applied with dope, water shrink, and finish with one coat of 50/50 dope. Add black details with tissue, tape, or dope as you prefer.

I started with a typical plastic propeller. The model was slightly tail heavy, so weight was added to the nose. That, plus fairly high prop speed, resulted in underwhelming performance.

Then I tried the 1/32 ply paddle prop. Blades were formed by soaking in water, wrapping with cloth strips on an 8-ounce size frozen juice can (25° to 30° off axis) and again your slow oven. Assemble with hub, and sand blades for balance of prop and model. What you really want is a good glide and good-powered flight, and by making several tries at propeller weight, you should be able to avoid any clay additions to get the CG right. Hard balsa blades would probably be just as good, but they're not as durable for the inevitable head-on collision with the basketball hoop.

You should get a good motor run with two loops of 1/32 or one loop of 1/8 rubber and fly in the 45 to 60 second range. As always, total weight is important, and you must keep it light. Actuals were: aircraft 8.0 grams, prop 2.5 grams, rubber 1.5 grams. The first two could obviously be reduced. For example, remove every other stringer on the fuselage aft section, single cover the stabilizer, and use bond paper for the fin fairing. Then lighten the prop. You should be able to remove 1.5 to 2.5 grams worth without going the "ghost ship" route. Hope you enjoy the model.

Diamond . . . . *Continued from page 55*

Sand smooth, paint to your taste, mount the .010, and you're ready to fly the Flying Diamond.

Test glide in tall grass (wonder how many times I've said that!) to keep from breaking the prop on landing. The plane should glide straight ahead. When you've adjusted the rudder so it does, fire up the engine and fly. But I suggest you keep the engine run down to about thirty seconds . . . unless there's no wind and you have a big open area. Otherwise you'll have a long chase.

If you're like me, you'll enjoy your Flying Diamond. •

Soaring . . . . . *Continued from page 27*

Monokote, or painted. It is not nearly so prone to warp as plywood, and enough for fifty airplanes can be scrounged from a cabinet shop. Bob epoxies a 1/16 inch brass tube along one edge of the blade and uses two short sections of tube at each end in the wing to make a mechanical hinge, with a piece of music wire through all three for a hinge pin. Neat, clean, and reliable.

The other gimmick I swiped from him is his canopy attachment method. A keyhole slot in the canopy floor, along with a woodscrew, or machine

screw and blindnut, makes a simple, positive canopy attachment that won't come off. You can tape it for security if you wish, but I don't believe that it needs it. Legion-Air owners. . .take note of the drawing. This is just what you need!

* * *

Dave Phillips, of Chapel Hill, N.C., tells us that the Cyalume Light Sticks which we used for our night-time soaring contest are now available from Sears Roebuck. The 1976 Spring-Summer catalog lists them on page 621. The stock number is 9K 57033. A package of three lights is $2.95 plus shipping. This is the first source that we have heard of that makes the lights locally available in all areas of the country. Thanks for the tip, Dave.

* * *

Interest in the FAI R/C Soaring program is growing in the U.S. With the team selection program finalized, interest and activity is starting to become more specific. Several clubs are planning 'warm-up' contests in preparation for the team selection quarter-finals. Many fliers are considering changing to sailplane designs that are better suited to the rules.

The FAI rules are clearly slanted toward a fast, high L/D type plane. The very short speed course, and the long distance course, with emphasis on covering maximum ground in the least time, all works toward the exclusion of a slow, floater type plane. Since the amount of experience with the FAI tasks is very limited in this country, I have been doing some research on the planes and fliers that are competitive overseas.

Radio Control Models and Electronics, a British magazine, recently published the results of a survey compiled by Willy Schoorel. The survey was done on a random sampling of the 65 entries in a large FAI contest held in Dortmund. I picked out the ten planes that finished highest in the contest, and translated the metric specifications into units that are more easily compared to the planes we are now flying. I'll let the results speak for themselves.

* * *

If you are looking for a big sailplane . . .really big, Ernst Tscheulin is manufacturing a 183 inch span scale model kit of the Glasflugel 604. This giant has an epoxy resin fiberglass fuselage, fully sheeted foam wings, and comes with the ailerons and spoilers cut out. Obviously, this bird is intended for full-house soaring. Price for everything needed to complete the bird is over two hundred dollars, but considering the amount of prefabrication and the inclusion of tender, loving German craftsmanship, it is probably worth the investment. You can be the first kid on your block to have one by writing to Ernst Tscheulin, 7311 Owen-Teck, Bohlstrasse 18, West Germany. He has complete catalog sheets with excellent black and white photos of the 604, as well as several other kits for smaller scale sailplanes, including the Cirrus, LS-2, and Kestrel. Prices on all are quoted in German Marks, and as near as my translator can tell, there is no price given for a complete kit, only the different components. You would be well advised to find someone who reads German proficiently, before ordering. ●

Workbench . . . *Continued from page 6*

tell us what would be of particular interest. Please send us your comments, and we'll do our best to satisfy you.

* * *

Also new to MODEL BUILDER, beginning March 8, though certainly not new to the hobby, and especially in radio control, is Eloy Marez. Anyone who has owned an Orbit radio in the past 5 or 6 years will probably know about whom we are writing, as Eloy has been one of the top technicians with Orbit during that period.

Eloy, whose articulate voice is completely devoid of any accent relating to his Mexican ancestry (unless he wants it not to be) will be assisting MB's editor, especially relating to advertising accounts and correspondence, of which both, we are glad to say, are too much of a load for one person to handle.

Orbit Electronics, by the way, is in the throes of change of ownership, with one buyer taking the name and associated papers, while another has purchased the test equipment. We will pass on more information as soon as it's out of the rumor stage.

GOODBYE . . . JOE DODSON

We only met Joe Dodson for the first time at the 1974 Nationals . . . and met him again, only briefly, at the 1975 Nats. Yet, in those two short encounters, we recall an enthusiastic and extremely energetic modeler. Word comes from John Kiker, a fellow NASA member, of Joe's death, from cancer, on De-

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.

SCALE "CURTISS HAWK" PLANS: 2" R/C P6E, 2" R/C P1A, 2" R/C F/C-3 (Red Rippers) all 3 sheets, 30 by 72, blackline, $13.50 per set. Coming soon 2" R/C YP23. Smith Plans, Box 8, Snowmass, Colo. 81654.

BOAT RADIO & WINCH: Heathkit 4-channel, ni-cads, 2 servos, $150; Harris winch, servo & speed control, $50. John Decker, Annursnac Hill Rd., Concord, Ma 01742 (617) 369-6047.

TRUE! Earlier magazine called "Model Airplane News." Several copies January 1929, Feb./Mar. 1929 issues @ $3.00 each or $5.50 both. Mark Levinson, 95 Bowman St., Hamilton, Ontario, Canada L8S 2T5.

BOATS . . R/C ELECTRIC . . Solid state electronic, full variable speed controls, motors, special machined shafts, props, drive systems, multiplex control panels, fire hose nozzles, sirens, whoopers, boat whistles, fiberglass hulls, etc. Free literature. Write to: INTERNATIONAL MARINE EXCHANGE 17, Al Gray, 24501, Los Serranos Dr., Laguna Niguel, Ca. 92677. New ideas and products welcomed.

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.

50th NATIONALS SOUVENIER BOOK Includes reprint of rare aeromodeling course, plans 10 best models from First Nationals period, capable of maxes today. Plus 5 lost Nationals, and much more. COLLECTORS Limited Edition. Send SASE now for advising your special low discount price (under $4.25) dependent upon total reservations at press time. Bert Pond, 128 Warren Terrace, Longmeadow, Mass. 01106.

"PERRY DIRECTIONAL PORTING" A patented modification for baffle-type engines. See Feb '76 RCM. Supertigre engines, $20.00 plus postage. Nightingale Mfg., 218 Via El Centro, Oceanside, Ca. 92054, phone (714) 433-2281.

COBBIE'S features: $2.00 engraved name-number identification plaques for field boxes, transmitters, trophies. Adhesive backed, 3-5/8" x 1-1/8", line limit 26 letters and spaces, maximum 3 lines. Cobbie's Gifts, Box 2, Dept MB, Deal, New Jersey 07723.

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.

FOR SALE: Hundreds of old model magazines, 1930 to present. Send SASE for free list. Arthur Suhr, W218, N5866 Maclynn Ct., Menomonee Falls, Wisc. 53051.

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.

EXTENSIVE COLLECTION, magazines and vintage plans. Lists $1.00. Guerrieri, 107 Alameda, Redwood City, Calif. 94062.

TISSUE PAPER, 10 cents per sheet, 19 colors, send SASE for sample. Bill Wilson. P.O. Drawer U, Kountze, Texas 77625.

INDEX TO ADVERTISERS

Ace R/C Inc. 95
Astro Flight Inc. . . . . 2nd Cover
Applied Design Corp. 92
Cannon Electronics 64
Carr Sails 84
Century 21 64
Cloudbuster Venture 66
Coverite 70
Jim Crocket Replicas 82
Custom Craft Products 89
Du-Bro Products Inc. 69
E.K. Products 91
FAI Model Supply 87
Flyline Models 66
Flying Scale Models 78
Fox Manufacturing 68, 76
Fusite Corp. 75
Glider Guiders 64
Gas Model Products 68
Carl Goldberg Models 63
Golden Age Reproductions 62
Gulf-South Aeromodels 78
Herb's Model Motors 61
Hobbypoxy Products 65
HRE Inc. 90
International Marine Exchange 86
K & B Mfg. 60
Kraft Systems 3, 71, 72, 73
Kustom Kraftsmanship 62
Leisure Electronics 90
Leisure Products 85
Micro Models 62
Midwest Model Supply Co. 79
Model and Craft Show 2
Model Builder Binders 66
Model Builder/Pana-Vise Contest 4
Model Builder Products . . . . . 3rd Cover
Model Racing Products 83
Model Rectifier Corp. (MRC) . . . 4th Cover
Sid Morgan (Vintage Plans) 92
M & S Ltd. 85
Octura Models 83
Pana-Vise 88
Peck-Polymers 82
John Pond O.T. Plan Service 92
Probar Design 84
Proctor Enterprises 91
R/N Models 87
Rocket City Specialties 77
Satellite City 77
S.C. Modeler 81
Sig Mfg. Co. 96
Special Edition Plans 74
Jack Stafford Models 86
Sterling Models 67
Sullivan Products 87
Su-Pr-Line Products 76
Tern Aero 81
Top Flite Models 1
Gene Thomas 89
Tyro Model & Supply 64
VL Products 82
Victor Model Products 84
VMW 91
Vortex Model Engineering 85
Peter Westburg 81
Wilhold Glues Inc. 88
Williams Bros. 61, 91
J.L. Wittman Co. 74
World War II Scramble 80

cember 4, 1975. Another close associate, Paul Marchal, gave us the following information.

Joe Dodson began his modeling career under the guidance of the late Carl Hopkins, Clarksburg, West Virginia. Joe began work at Langley Field, Virginia, for NACA in 1940. Later this became an NASA installation. His early work included precision model building, design of dynamic test models, and rocket test models, and later, work on all NASA Manned Space Programs. He was awarded the NASA Exceptional Service Medal in a ceremony in Washington, D.C.

Joe held various National records, and set the Cat. II Half A Open R.O.W. record at the 1974 Nats, and repeated his win at the 1975 Nats. As a SAM member, he placed second in .020 Replica at the '74 Nats. Also an avid hunter, gunsmith, and a member of NRA, his many friends will remember Joe's warmth, friendliness, and zest for active participation.

THINGS TO DO

On April 25, 1976, the Jefferson County Fairgrounds, in Denver, Colorado, will play host to the biggest model show in Rocky Mountain West, the Annual Model Builder's Exposition, put on by the Model Museum Flying Club. The show will include manufacturer's exhibits, club displays, and swap-and-sell. Contact John Allen, 463 Kline, Lakewood, Colorado 80226, or phone 303-985-3268.

CORRECTIONS

In our February, 1976 "Over the Counter," we mentioned the R/C Soaring San Diego Area Handbook wich is available from the Torrey Pines Gulls, Box 1564, La Jolla, California 92034. What was not mentioned was the fact that an additional 30 cents is required for postage and handling, plus an additional 9 cents from California residents for Governor Jerry Brown's dietetic lunches.

* * *

In the January "Remotely Speaking," we commented that unofficial events, such as Half-A R/C Pylon are

not covered by AMA insurance. This is incorrect. Actually, AMA insurance has nothing to do with the rule book. This use to be true, but is no longer. Now it is not what you fly, but how you go about doing it. As long as you fly in accordance with the Safety Code, insurance coverage is provided.

CLARIFICATION

Recent controversy over the passing of certain AMA rules has exposed a mathematical fudge factor. At some point in time, it was established that two-thirds is passing when it comes to contest board voting. Problem is, the 11-member board can't be divided by 2/3 . . . not without chopping one member into two voting parts. Consequently, contest board procedures state that 7 is two-thirds of 11. Actually, it's .636363 etc., but it was considered that this is close to enough to .66666 etc. In other words, the nearest whole numbers are to be used, ie, 7 of 11, 7 of 10, 6 of 9, 5 of 8, 5 of 7, etc. Gotta do the best with whatcha got, right?

TECHNICAL DISSERTATION

It isn't often that the "oracle from Ave. O," otherwise known as "The Grayte Goldy," takes the time to write down a solid tid-bit of aeronautica for us mere mortals. When it happens, we must copy it down immediately, as the Great One only writes on thin, highly perishable layers of bagel dough.

"The time has arrived for the Grayte Goldy to once again chronicle a major event in model airplane's-ville.

"I present . . . 'The Grayte Goldy's 1/3 Back Theory.' In leafing thru Charly Grants' *Model Airplane Design* I noticed the following para-graph, 'on any given wing shape, the center of lift takes place 1/3 back from the leading edge.'

"Acquiring a set of Bolonium Curves, I proceeded to draw up a new airfoil. I carefully located 1/3 back from the leading edge, the *Center* of *Lift*.

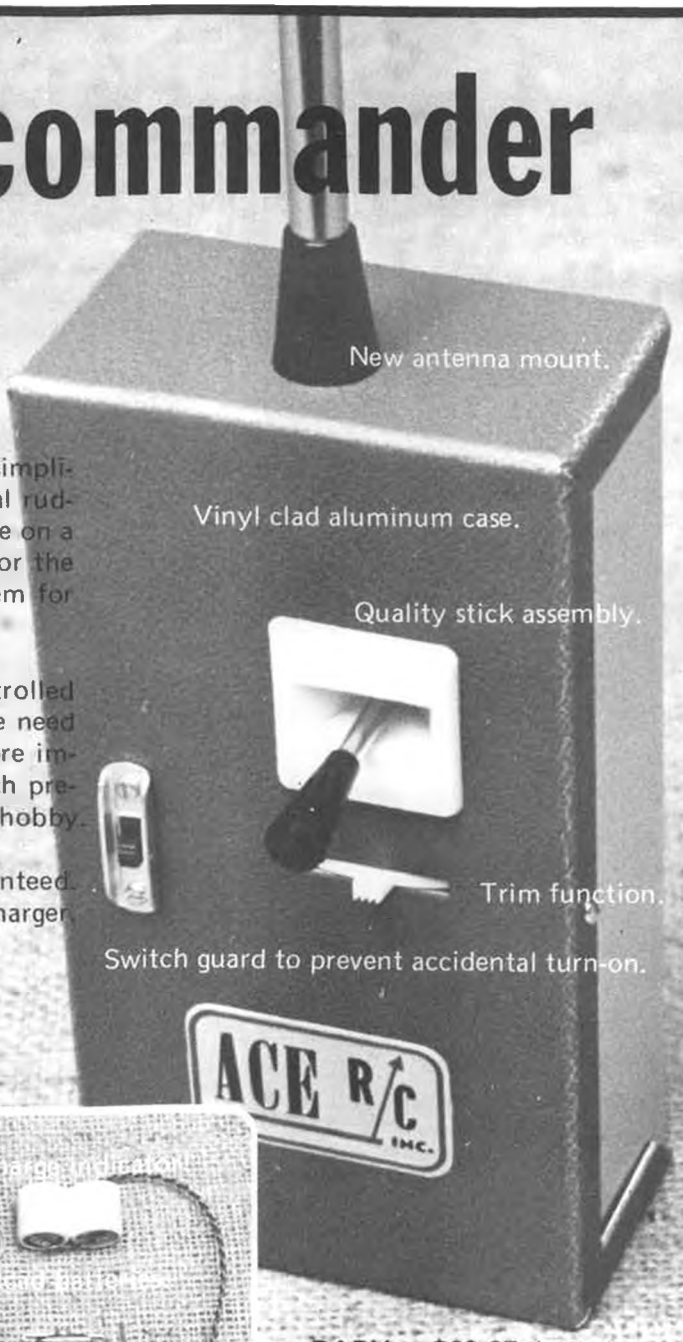
"Locating the *Center* of *Lift* directly over the *Center* of *Gravity* . . . and adjacent to . . . the *Center* of *Lateral Area*, I now had a POINT. I took this POINT, and got into my car, and drove out to the flying field. Facing into the wind, I hand launched my POINT, which flew directly over the horizon and disappeared.

"This proves that you *do not* need a wing in total, just the point which is the center of lift.

"Now all I need is a radio the size of a point.

The Grayte Goldy" •

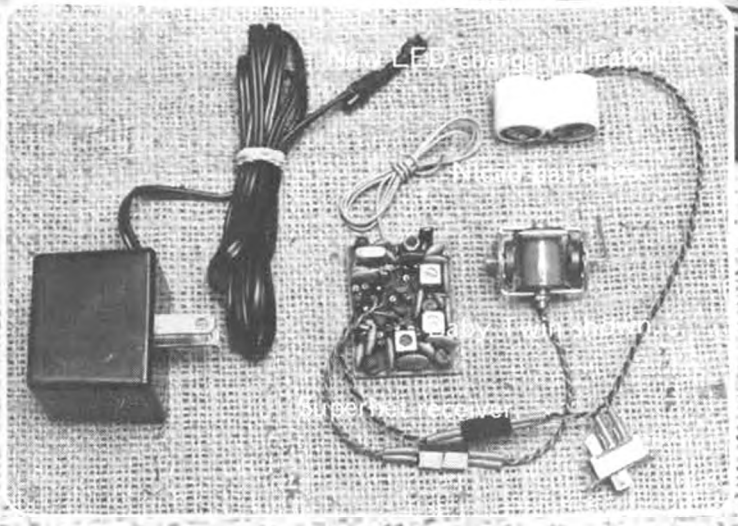
pulse commander



Due to its small size, light weight, simplicity, and low cost, pulse proportional rudder-only flying is an ideal way for one on a budget who wants to get into R/C or the sport flyer who needs a second system for fun flying.

The sensibility of small, rudder controlled airplanes continues to increase as the need to economize becomes more and more important. Don't let an economic pinch prevent you from enjoying your favorite hobby.

Units are wired, tested, and guaranteed. Complete with airborne nicads and charger.



AVAILABLE ON: 26.995, 27.045, 27.095, 27.145, 27.195 mHz

BABY $69.95 (10G15)
- Airborne weight = 2.35 oz.
- Recommended for .010 and Pee Wee .020 planes not greater than 36" span.

BABY TWIN $72.95 (10G15T)
- Airborne weight = 2.55 oz.
- For Pee Wee .020, Tee Dee .020, and slow flying Babe Bee .049 planes up to 40" span.

STANDARD $71.95 (10G16)
- Airborne weight = 3.7 oz.
- For Babe Bee and slow flying Tee Dee .049 ships up to 42" span.

STOMPER $74.95 (10G17)
- Airborne weight = 4.1 oz.
- Recommended for hot .049 to slow flying .15 powered ships.

ACE R/C, Inc.

BOX 511 D HIGGINSVILLE, MO. 64037

Please send me your complete catalog. Enclosed is $1.00 which is refunded on my first order. (Add $.50 for 1st class mail return)

Name _____

Address _____

City _____ State _____ Zip _____

Introducing: TWO OF A KIND

IDEAL FOR FLYING FROM CONFINED AREAS

STABLE!

SIG
KIT RC-36
$18.95

KLIPPER

Designed by CLAUDE McCULLOUGH

BUILDS FAST!

Flat-Bottomed Ready-To-Use Foam Wing
Built-Up Balsa Fuselage
Sheet Balsa Tail Surfaces
For .09 to .15 Engines
Room Enough For Standard Size Radios
For 2 or 3 Channels
45" Wing Span

NEW!

SIG
KIT RC-37
$17.95

STRONG!

SUPER SPORT

Designed by MIKE GRETZ

COMBINING THE CONVENIENCE OF A READY-TO-USE MOLDED FOAM WING WITH THE STRENGTH AND RESILIENCE OF A BALSA FUSELAGE AND TAIL.

KLIPPER & SUPER SPORT KIT FEATURES

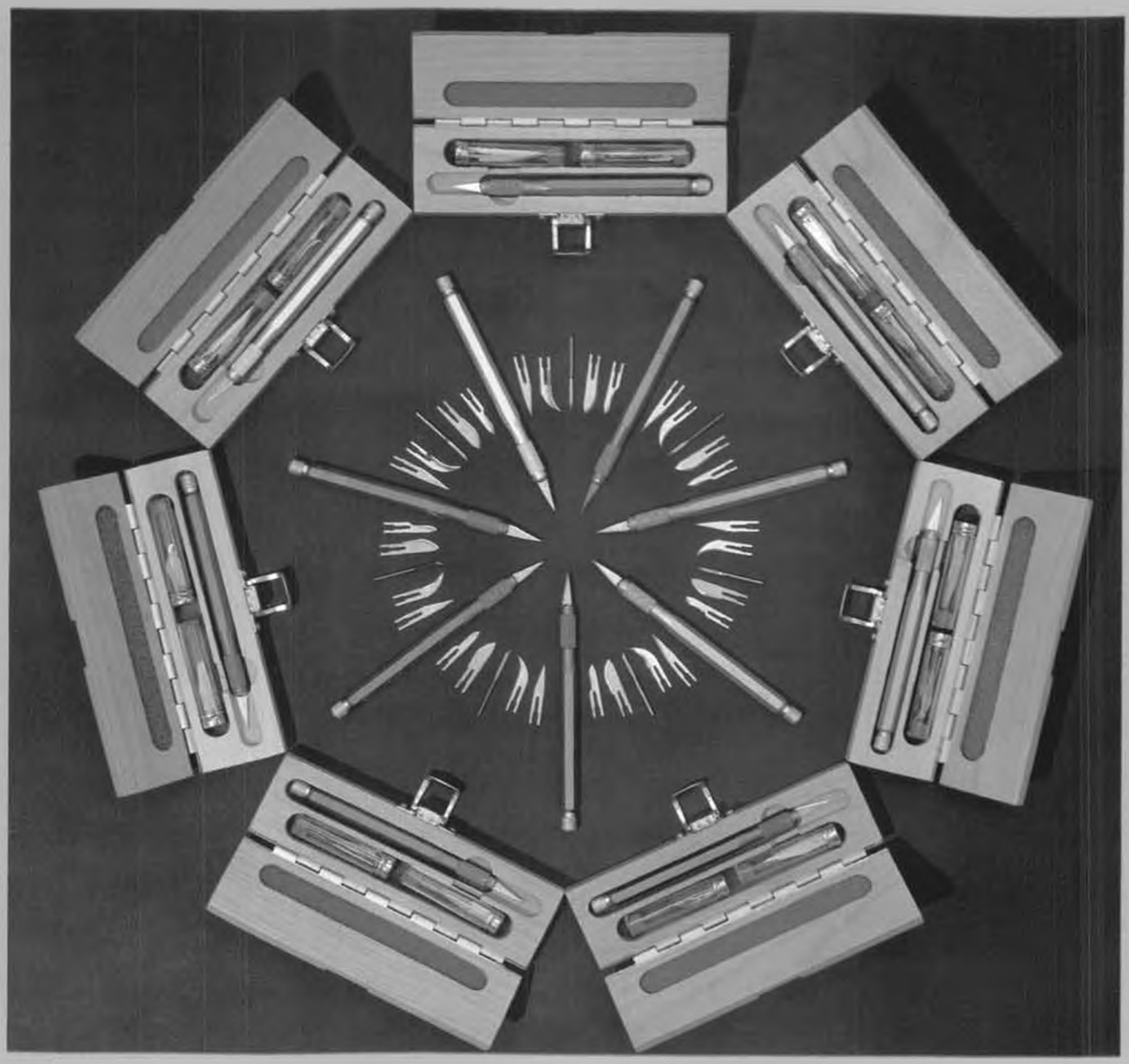
Handy Printed Fuselage Sides -
Build Internal Structure Directly On The Wood
Aluminum Landing Gear
Plus: Coil Spring Nose Gear, Nylon Bearing
And Steering Arm On Klipper,
Tail Wheel Included On Super Sport
One Piece ABS Molded Cowling
Molded Foam Wing
Die-Cut Plywood
Aluminum Motor Mounts
Tuf-Steel RC Links
Nylon Control Horns
Molded Plastic Control Hinges
Illustrated Instruction Book

See your dealer first. To order direct add $1.00 postage in the U.S., $1.50 in Canada. No C.O.D.

PLACE YOUR ORDER NOW FOR SIG'S LATEST COMPLETE CATALOG - $1.50 POSTPAID

SIG MANUFACTURING CO. . . Montezuma, Iowa 50171

IN THE BEST CIRCLES, IT'S **über skiver**



A PRECISION INSTRUMENT FOR THE DISCRIMINATING MODELER

- *Safe, Rear Draw-Bar Clutch*
- *Precision, Instrument-Quality Materials*
- *Strong-Holding Advanced Collet Design*
- *Non-Rolling Hex Cross-Section*
- *Deeply Knurled, Non-Slip Grip*
- *Long-Life, Stainless, Surgical Steel Blades*

Available in seven anodized handle colors: silver, blue, red, green, gold, copper, violet.

Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing six No. 11, six No. 15, one No. 12, and one No. 20 . . . A total of 14 blades $12.95
Individual handles (specify color) $5.10
Vial of 6 blades (No. 10, 11, 12, 15, or 20) $2.10

See your dealer, or order direct.
Dealer inquiries are invited.
All direct orders sent postpaid in U.S.
California residents add 6% sales tax.

MODEL BUILDER PRODUCTS
1105 Spurgeon, Box 4336, Santa Ana, California 92702

Up till now, the Mark V was the best 5 channel we ever made!

Introducing MRC's New "765"

You might say we've taken the best of our Mark V and built an even better system around it. Remember, Mark V made its reputation proving its consistent reliability and superior range. The Mark V had quality in the box and sensible pricing on it. We haven't compromised any of this. What we did do, was add some step-up, customized, professional-type features.

There are new, adjustable length, ball bearing, pivoted sticks for smooth, responsive, custom control; longer-life potentiometers; a high impact, molded, shock absorbent carrying case, and 7 servo designs to choose from.

We've kept the mil spec, gold plated connectors; double tuned front end receiver; transformer isolated charging system and nickel cadmium batteries throughout. And of course, the entire system is supported by MRC's uncompromising standards of quality and service.

We can't really describe the great feel of the sticks, or prove to you the system's superior range until you get on the field. But keep in mind, we told you the Mark V was a winner. And you proved us right in Sunday flights and competition flying. Now we're telling you the "765" is even better. It has the range, reliability and a professional feel about it that makes it the best 5 channel system we ever made. . .at the best feature-for-dollar price you've ever seen. At your hobby dealer, now.

"765" features 5 channels, 4 servos, nickel cadmium batteries in receiver and transmitter, charger, field carrying case.

MODEL RECTIFIER CORPORATION • 2500 WOODBRIDGE AVENUE • EDISON, NEW JERSEY 08817