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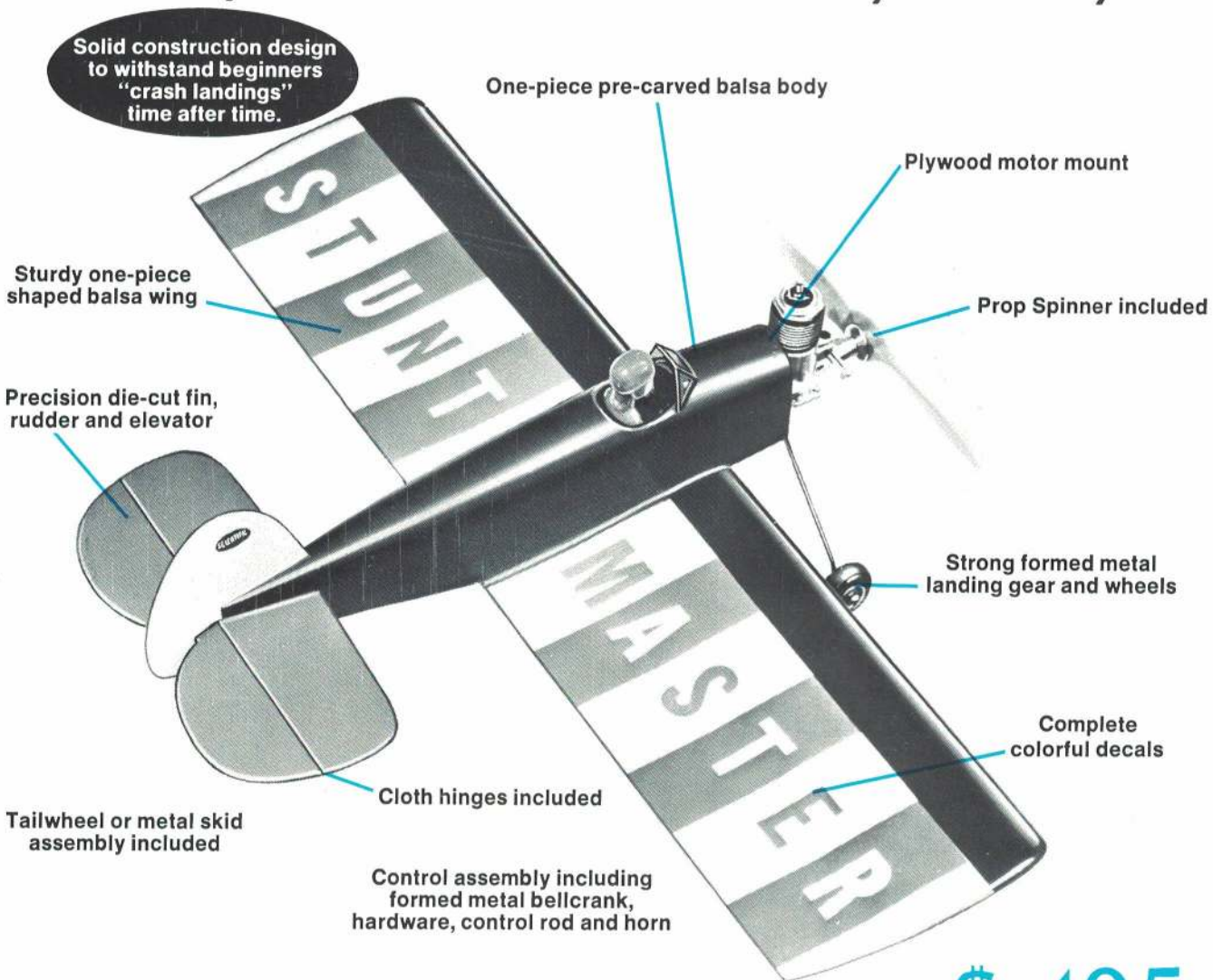

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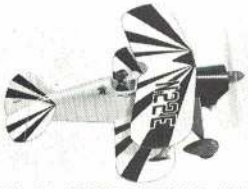

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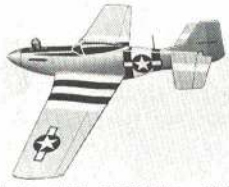

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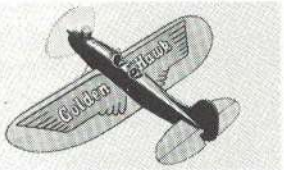

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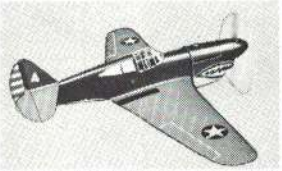

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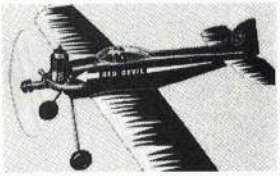

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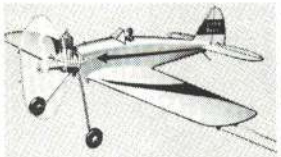
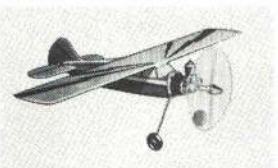
Kit 54 **CESSNA "182" TRI-CYCLE** High performance private plane

Kit 14 **PIPER TRI-PACER** 18" with popular tri-cycle landing gear



Kit 28 **LITTLE DEVIL** 18" Fast, easy to fly, great performer

Kit 7 **CESSNA "180" 18"** Model has good looks, great speed



Kit 53 **RED FLASH** 18" Model has sleek looks, good control

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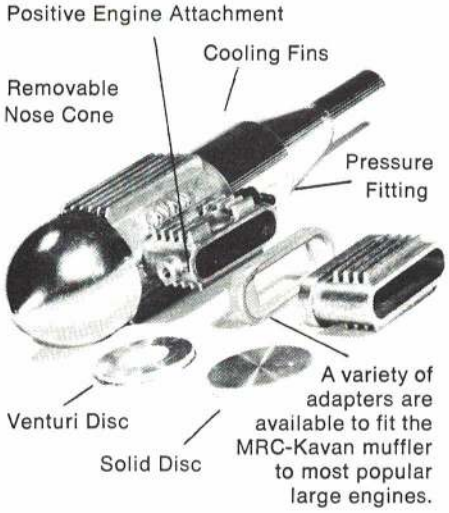
THE TREND TOWARD MUFFLERS

Mufflers are most certainly *here* and in. In fact, 1972 is the first year that the AMA rules call for mufflers in competition (unless adequate prior notice is given). The vast majority of clubs in the Northeast and West now require mufflers on all of their members' planes out of necessity . . . fields are getting harder and harder to find all the time.

The secret to using mufflers is finding a good one that will provide adequate quieting without creating a substantial power loss or engine overheating.



The MRC-Kavan muffler fills the bill. It is supplied with a removable nose cone that allows the installation of two separate, interchangeable "front-ends" — a venturi front end for an absolute minimum power loss and lots of quieting and a solid "expansion chamber" front end for the very maximum in quieting. What's more, the MRC-Kavan muffler is cast with lots of cooling fins to dissipate muffler heat that would be otherwise transmitted back to the engine causing loss of power. There are a number of other unique design features built into the MRC-Kavan muffler that go a long way towards making it the ideal type to use. This new MRC-Kavan muffler is available with a large selection of inexpensive standard adapters that allow you to switch the muffler from engine to engine, plane to plane, in seconds. One muffler and a few adapters are all you'll ever need for efficient engine quieting.

There's no doubt you'll be using a muffler on that screaming .60 or other large engine soon. Make sure that the muffler you use is the best. A quote from Clarence Lee in RCM finishes our story. "To sum up our findings of the Kavan muffler, with the venturi disc insert installed, we would have to rate this as one of the top mufflers we have tested . . . with the solid disc insert installed the Kavan muffler would be about equal with the best expansion chamber mufflers we have tested in the past."

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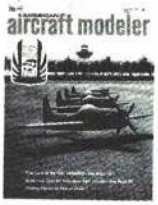

Cover Photo: These four Blue Angels F8F Bearcats were flown at TRANSPO as part of AMA's effort to show modeling to the public. A project created by AAM and supported by the model industry. You'll see them at our Nats and other airshows this summer.

Correction: Credit for the July issue's cover photo of the U-2 should have been given to Whitey Pritchard.

WILLIAM J. WINTER — PUBLISHER **EDWARD C. SWEENEY, JR.—EDITOR**
Thomas L. Murphy, Art Director **Joseph R. Wright, Circulation**
Anna Maria Nunez, Editorial Assistant **Anne Fuhrken, Advertising Assistant**

VOLUME 75, NUMBER 2 **AUGUST 1972**

Articles:

Features:

Academy of Model Aeronautics:

Departments:

Published monthly by Potomac Aviation Publications, Inc., 733 Fifteenth Street, N. W., Washington, D. C. 20005. William J. Winter, Publisher; Edward C. Sweeney, Jr., President; American Aircraft Modeler Business Manager & Secretary, Harvey E. Cantrell.

ADVERTISING DEPARTMENT
733 15th St., N. W., Washington, D.C. 20005 (202) 737-4288

Western Advertising Representative: Aaron D. Viller & Associates, 5311 Venice Blvd., Los Angeles, California 90019. Tel: (213) 939-1161.

Eastern & Midwestern Advertising Representative: Boynton and Associates, P.O. Box 551, Barrington, Ill. 60010. Tel: (312) 381-7726; offices also at 438 E. Washington St., Chagrin Falls, Ohio. Tel: (216) 247-7094.

Subscription Rates: In U. S., Possessions and Canada, 1 Year, $7.50; 2 Years, $14.00; 3 Years, $20.00. Elsewhere, $9.50 for one year. Payable in advance. Single copies, 75 cents. Six weeks are required for change of address. In ordering a change, write to American Aircraft Modeler, 733 Fifteenth Street, N. W., Washington, D.C. 20005. Give both new and old address as printed on last label.

We cannot accept responsibility for unsolicited manuscripts or artwork. Any material submitted must include return postage. When writing the editors address letters: Editorial Office, American Aircraft Modeler, 733 Fifteenth Street, N.W., Washington, D.C. 20005.

Second class postage paid at Washington, D.C. and at additional mailing offices.
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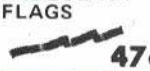

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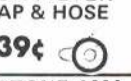

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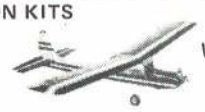

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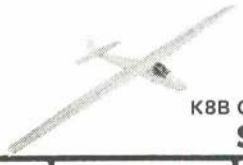

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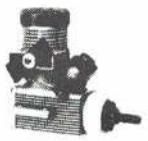

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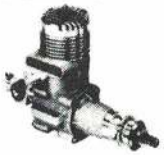

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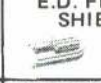

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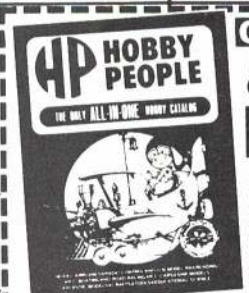

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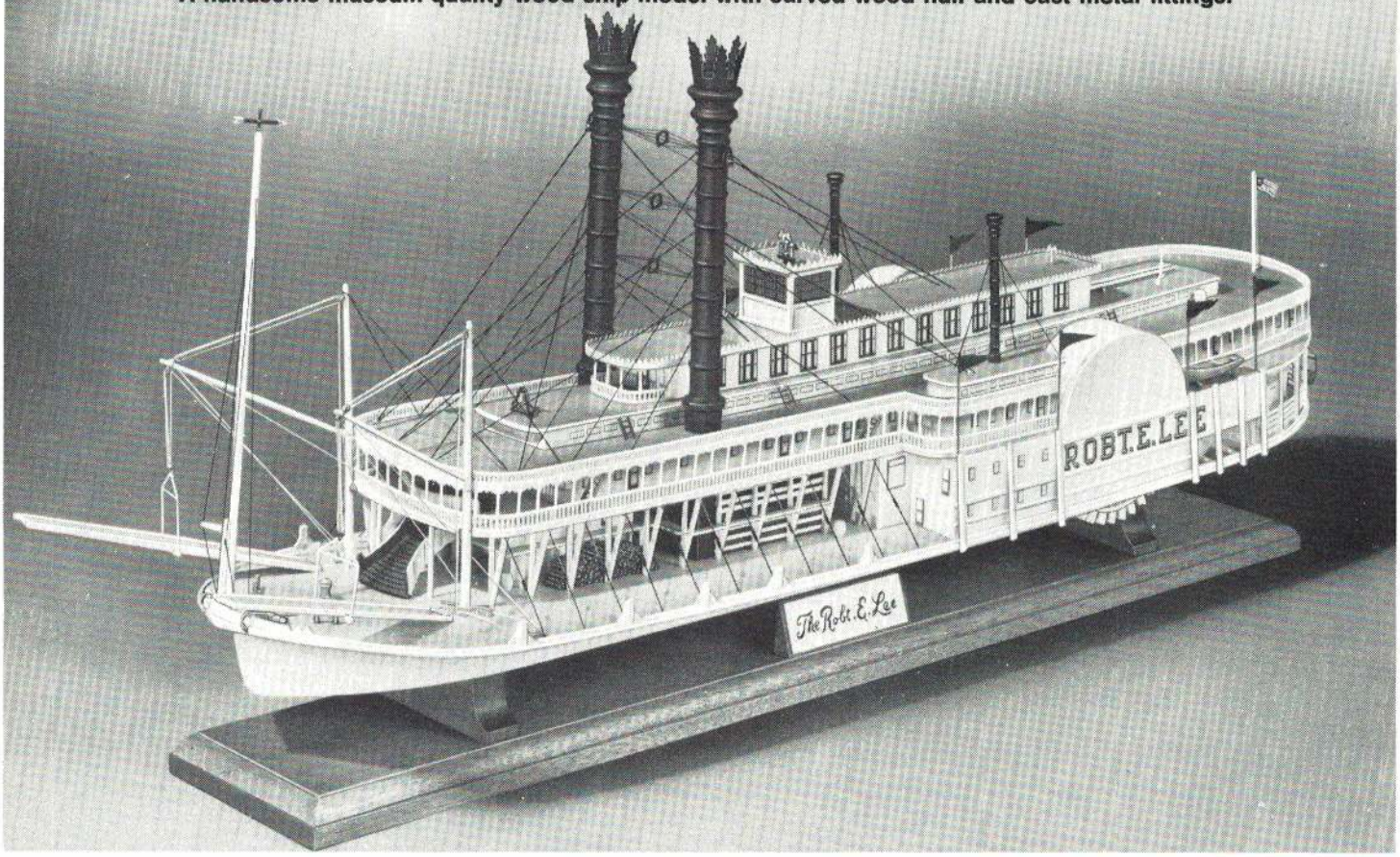

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24½" Long, 6" Wide, 9" High

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ANNOUNCING THE MODELERS ARE CREATIVE PEOPLE CONTEST

Ever since we introduced Super Monokote a few years ago, we've found that modelers use Super Monokote for a lot of things other than covering their models.

And, some of them have taken the time to write and tell us about their creative efforts with Super Monokote.

FOR INSTANCE

One modeler wrote that he improved the looks of his kitchen 100% by covering the front of his dishwasher and refrigerator with Piper Yellow Super Monokote.

A modeler's wife said her cats always left footprints on the windowsills and all the washing was gradually wearing the paint away... So, she borrowed some of her husband's clear Super Monokote and now just wipes the footprints away with a damp sponge.

Another clever fan said that after he covered his model with Super Monokote, he actually made a bikini for his wife.

Several modelers have created wall designs, paintings and "stained" glass with Super Monokote. One particular artist-modeler did a painting of his TOP FLITE Contender and "Monokoted" the finish on the canvas just as he had done on his model.

Now, we'd like to find out what others are doing with Super Monokote. So, if you've ever used Super Monokote for anything other than putting a beautiful glasslike finish on your model... OR if you have a great idea for something you're *going* to do, tell us about it.

50 PRIZES

1st PRIZE—12" SONY Portable Color TV
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modeler mail

"RCDLER"?

I would like to comment on Dick Mathis' article on radio-controlled free flight in the July 1972 issue which was certainly interesting reading. However, there is one flaw in it, a basic one, namely that this is *not* FF. By Mathis' own words the entire flight is controlled, and moreover, the model's design is changed so that control is optimized and the model *could not* (probably) compete as a FF model. What is proposed is an RC model, not an RCFF model. So, let's not be deceptive about it and call it what it really is—an RC duration model with limited engine run, or "RCDLER" and leave the FF out of it.

To be "RCFF" the model must be capable of competing on its own, without the RC part, but RC may be used after the model is in its glide path (after the transition), and only then, even if this means even shorter engine runs for small flying sites. Then it is a radio "assisted" FF, or "RAFF," but still a FF model.

Mathis' proposal is excellent, but only as *another* RC event, not as a replacement for FF. That is, there must still remain a real FF event available in which the modeler flies a real FF model, or competitive FF will surely be extinguished for all practical purposes.

From the trend of the times, both social and technical, it appears highly probable that the true FF powered model has a future in only two areas: Indoor duration and indoor flying scale (all rubber-powered); outdoor flying scale (gas- and rubber-powered with duration only in the rubber-powered event). Even here FF scale will not flourish until realistic and equitable rules for contest flying and judging are established, as was discussed in the 1971 NFFS Symposium article about flying scale. Of course, the hand-launched glider will be with us to the end—both indoor and out.

William F. McCombs, Dallas, Texas

Swedish modeler seeks pen pal

I would like to correspond with a pen pal in the U.S. There must be a lot to learn from an experienced modeler in America. I have been modeling for the last 25 to 26 years, but recently went back to a two-channel radio transmitter and even to flying sailplanes and small old-timers. I am 42 years old and living in the western part of Sweden with my family of three boys (one is a modeler) and I work in a development laboratory at a large paper mill.

Lars Bagge, Stromgatan 25, 66600 Bengtsfors, Sweden

Credit where credit is due

After reading Howard Rush's "Where the Action Is" column in the May issue of AAM, I felt deeply hurt that credit for high aspect ratio Combat jobs was given to Bill Carpenter's Super Too in 1964. In 1955 and 1957, I placed third in Junior Combat and fifth in Senior Combat, flying my stunt job with a 54" span and 9½" chord. My ships did 93 mph in level flight with a pressurized torp .35; in manuevers they did over 100 mph.

My true love was Stunt. However, my visions were blurred by old man judges. At almost every contest the judges would say that my stunt job was too fast and that they couldn't see it. So I put a stock piston and cylinder on my pressurized K & B .35, disconnected the pressure line, ran Supersonic 100 instead of 50% nitro and put a piece of wood in the Venturi. My ship slowed from 92 mph to 77 mph. On my next official flight I received perfect flight points on every maneuver except overhead eights. I did a four leaf clover, a vertical eight, and a vertical hourglass as extra maneuvers. I brought her down, did two level laps, and then raised my hand for landing. I clipped the plastic prop to prevent an engine overrun, glided for three laps and made a perfect landing. On the scoreboard I was first in Senior Stunt. Then came the decision—the officials took away all my flight points and landing points, moving me from first to sixth. I didn't put in my third official flight and have never entered a contest since.

In my opinion, Stunt is still in the same rut. And Combat just "ain't" my thing. Many would be surprised to see that my planes resemble the RC jobs of today—long tail moment, short nose moment, and high aspect ratio wings.

I am now a surfboard designer. My boards have won three Makaha Championships, two Duke Meets, and have placed in every World Surfing Contest. I am now Hawaii State Senior Men's Surfing Champion. I would have liked to stay in Stunt, but nobody understood what I was trying to do.

Dick Brewer, Sunset Beach, Hawaii

The 'bug' hits the Far East

I am currently assigned to Okinawa and have noticed that there is a small but active interest in flying models. I was very surprised that the "bug" even reaches into the small Far Eastern islands. The only difficulty here appears to be very frequent winds which consequently require heavier and larger models to compensate.

Cpt. William A. Gibson, Okinawa Detachment, APO San Francisco, Calif. 96331

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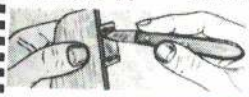
NEW! Tatone "HINGE-IT" $2.95



Cuts slots (rather than slits) and removes wood for hinges. Includes adjustable guide. Knife blade follows the guide, not the grain in the wood.

NEW! Robart Hinge Point DRILL JIG $2.98

Heavily made drill guide for drilling holes for Hinge Points exactly in the center of a trailing edge or control surface.

NEW! Port City DROPPING RESISTOR $1.00

Enables use of your 12 volt electric starter battery as a glow plug battery.

NEW! Port City PROP BALANCER $2.75

NEW! World Engines HAWK 460 A-R-F

List price $24.95
SPECIAL $17.97

52" span, 460 sq. inch wing for .19 to .40 engine. This excellent flying multi differs from the conventional "ARF" in that the foam portions are used as "jigs" for wood sheeting. The end result is an easy-to-assemble plane that is the creation of the modeler rather than the manufacturer. It is more repairable than a standard ARF.

NEW! J & J BANSHEE

List price $54.95
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This radical design contest plane has chalked up an impressive list of first place contest finishes. 62" span, 630 sq. inch wing, for hot .60 engines. The original plane used ROM-AIR retracts.

NEW! Su-Pr-Line PRO-ROD RIGID PUSHROD Pair $1.98

A lot of us have never been too carried away by the flexible pushrods when used for elevator and rudder control. This Pro-Rod Pushrod is the first complete rigid pushrod I,ve seen. It uses drilled hardwood rods into which threaded rods are screwed. Complete with end clevises, couplers.

SPECIAL! ROM-AIR Pressure Operated RETRACT LANDING GEAR

3 Gear System — List price $100.00 SPECIAL $ 79.00

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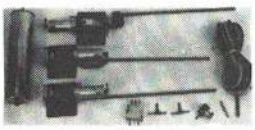

Here's a chance to save money on these fantastic ROM-AIR retracts. Systems are complete with freon airborne tank, charge valve, tubing, slide valve, steering line.

IS OUR $209 RADIO THE BEST RADIO MADE?

WHATEVER radio you buy, if it flies your plane reliably and precisely you got your money's worth.

But, consider these points:

1. We sell most brands of digital proportionals. Our customers usually let us know if their radio failed. But, we have fewer complaints about the H/L 5 than we do about some other radios that sell for twice as much money as ours.
2. Hobby Lobby 5 generally flies 2½ hours on a battery charge, some radios don't.
3. We know of no other radio which has more precise control-stick-to-servo resolution. We know of a couple that are EQUAL to ours, but not better.
4. We don't know of any radio that has a longer warranty than ours, nor a radio that is measurably more desirable in terms of servo size, airborne weight or range.
5. Our conclusion is that you can pay a LOT more than the $209 we charge for our radio, and you MAY get a radio that works as well as ours but, you also may not get as good a radio.

HOBBY LOBBY 5
Digital Proportional **$209.00**

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Our 80 page catalog is an education in R/C. If, after you look through it, you haven't discovered dozens of new products and haven't seen better pictures and descriptions of items you've wondered about, we'll give you your two bucks back.

We've even described and pictured the "little" items; the nuts & bolts, hinges, and gadgets in such a way that you can figure out exactly what they're used for. Where else can you find the exact dimensions of a Sullivan fuel tank, a closeup picture of an unusual Rand hinge, instructions on how to use 3m77, a diagram of a glider Hi-start, how to solder to a ni-cad, or an unusual use for silicone rubber?

And if that isn't enough, you'll be delighted with the new prices you'll find only in our catalog.

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37" span, Meets 1/4 Midget Specs. Also makes a nice sport flyer with .09
Jetline Products P-51 MUSTANG RACER

List price $29.95

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26" wide, 6 feet long

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SAVE $$ ON THESE MATCHED COMBINATIONS!

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and
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Midwest "SNORKY"
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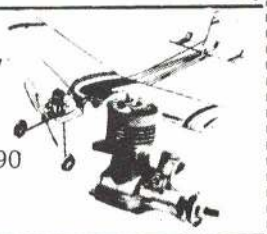

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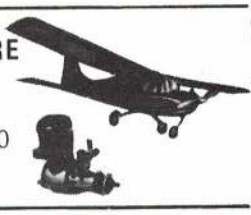

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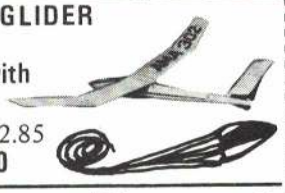

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SPECIAL!
Graupner CIRRUS Glider
List price $54.95
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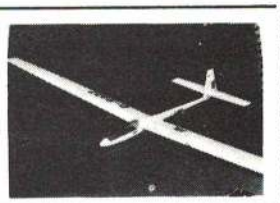

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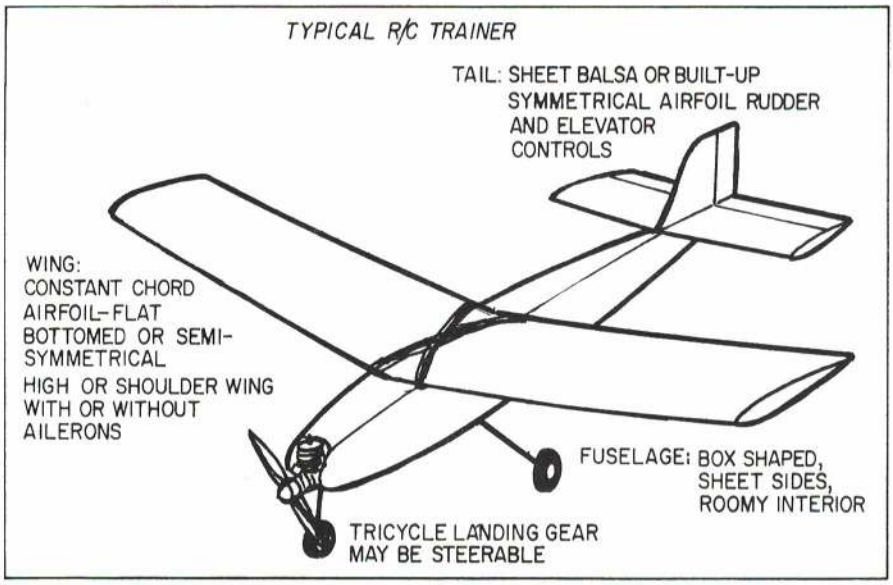
FORTY-NINTH IN A SERIES

getting started in RC

SELECTING YOUR FIRST RC MODEL

by JIM McNERNEY



Now that you have decided to join the RC fraternity you're over the first hurdle. There are many avenues open to you. In our first article we stressed the importance of success in your early ventures. Let's explore some of the aspects of selecting your first RC model which will help insure success.

Performance: Some will argue that you don't learn to fly until you learn to handle a full house, high performance bird. They will even argue that one must start with such a vehicle. It is true that flying a modern pattern or pylon plane is entirely different from the sedate maneuvers of a trainer or the control of a sailplane. However, it is cheaper, easier and much gentler on the ulcers to build up gradually from trainer to bomb, than to try for instant expert.

The types of airplanes recommended here are in the mild-to-moderate performance class. They are designed to perform satisfactorily with a minimum amount of required skill and a maximum amount of forgiveness. They have shoulder, or high wings, to enhance stability. Most have high lift or semi-symmetrical airfoils, also for improved stability. Increasing stability decreases controlability. Most trainers fly somewhat clumsily, whereas the better pattern aircraft approach neutral stability. Thus, you must concentrate on flying a pattern aircraft every second, but a trainer tends to fly itself and you can guide it around the sky rather than constantly controlling it. A tricycle gear is best for a trainer because it makes taxiing, takeoffs and landings less hazardous. Power should be in the mid-to-high range of the recommended displacement. You can always throttle back if you have too much power, but you can't add the horses to get out of trouble if they're not there in the first place. As you become more accustomed to flying, you can gradually increase the "cruise" power setting and improve your reactions. You want good dead stick flying qualities, particularly if you don't have much experience in adjusting model engine carburetors.

Construction: Before you pick out your first model, some questions must be answered: Are you an experienced model builder? Do you like to build models? Do you have time to build models? Are you more interested in flying than building?

If you are an experienced builder (free flight or control line), you can handle more intricate construction kits, or scratch-build from available plans. If you have the time and desire but limited experience in building, you would be better off with a well-designed, simply-constructed kit. If you have neither the time nor the desire to build, but want to fly, you can still get into RC by obtaining a ready-to-fly airplane.

Be careful to examine the kit you plan to build thoroughly. Note the amount of prefabrication, the completeness and accuracy of plans and instructions, and requirements for special tools and materials. Make sure die cutting is clean (i.e., balsa is cut, not mashed) and that dies are accurate (the parts fit the plan). Check the quality of the wood: balsa should be clear, straight-grained and smooth; plywood should be free of warps, voids and delamination; hardwood strips should be clear, straight-grained and warp-free. Some Almost-Ready-to-Fly (ARF) kits require nearly as much work as a balsa kit. In many cases the kit manufacturer assumes that the model will be constructed by an experienced builder and the instructions provided may be sketchy or unclear.

Try to locate a modeler who has built the particular kit, or one similar to it. He may save you some grief. Other sources of information are the construction articles in the model magazines and the comments on kit construction in club newsletters. Many hobby shops employ experienced modelers who can assist you, or know of patrons who might be able to help. There are many discussions available on the requisite tools for building models. We won't go into all that now. What is needed are good, well-maintained tools for measuring, cutting, smoothing, clamping, fastening, covering and painting. Two things are essential—plenty of light in your work area and a *flat* building board. You can make do without many things, but don't skimp on these two items. You must be able to see what you're doing and your flying surfaces must be warp free. While on the subject of construction, here are a few more tips. Don't skimp on the glue; resins, such as Tite-Bond, soak into the wood. After the initial gluing has set up, go back over all the glue joints with another coat. It won't add much more to the weight, but it sure makes your model strong. Many epoxies, although they set up rather quickly, can take up to 24 hours to cure thoroughly; some resins don't cure completely for days. Read and follow the manufacturer's recommendations. Use the right adhesive for the job. Contact cements are great for attaching skins and doublers where contact is made over a large area, but they're no good at butt joints and splices. Epoxies form an excellent bond and are fuelproof, but are very difficult to sand. They must also be mixed for each use. Ambroid, Testors and other

(Continued on page 74)

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NEW! CG RETRACT GEAR

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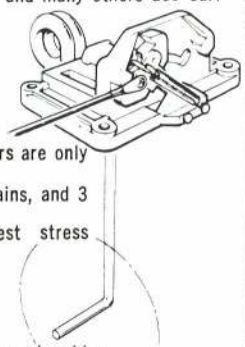

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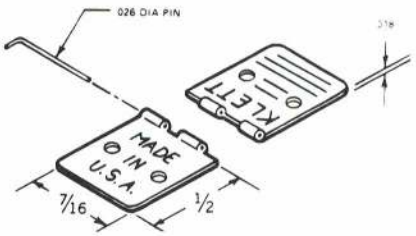
Pair of Main Gear Retracts—**$ 9.95**
Set of Nose Gear & 2 Mains—**$19.95**



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Designed and Manufactured by Roy Klett, Originator of the World-Famous RK Hinges!

An exclusive with Carl Goldberg, here is an extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is a knife slit. Top quality, yet only cost **$1.95** for 15 and **$1.10** for 7.

UNIQUE SNAP-LINK! Patent Pending. Now for the first time—you can buy a truly safe link—the SNAP-Link! Note these features:

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Snap-Link, Regular, with rod } **29¢** each
Mini-Snap-Link, with rod
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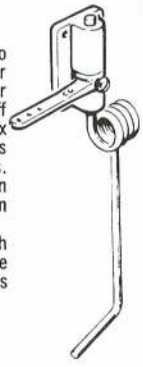
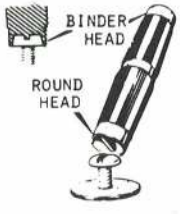
Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers—**$2.50**.





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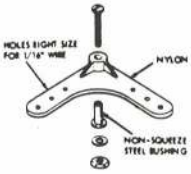

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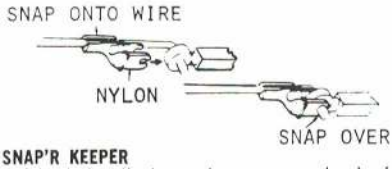

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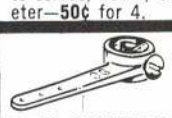

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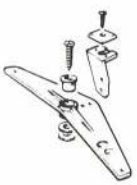

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NEMESIS II

by HOWARD RUSH

The Nemesis II is the result of an extensive research and flight test program followed by nine years of refinement in competition Combat flying. The design objective of the Nemesis was an aircraft that would be a shade faster than the competition in level flight, turn much faster and tighter than any opponent, be able to survive most crashes, and be stable and easy to fly. This objective was realized by finding an extraordinary airfoil and carefully working out a structure and controls to complement it.

The airfoil is a modified NACA four-digit section which is capable of an unusually high maximum lift coefficient with a high lift/drag ratio at high lift, as in tight maneuvers. Because a small deviation from the correct airfoil can cause a plane to lose these desirable characteristics, it was necessary to use a sheeted leading edge on the Nemesis to avoid airfoil anomalies caused by covering material dipping between ribs near the LE.

The control system of a Combat plane is simple, but details of stabilator configuration, stabilator and leadout positions, and control linkage can make a big difference in how a plane flies. The Nemesis II uses an airfoiled stabilator which operates pretty far behind the wing. A decent airfoil is needed on a stab for good control response and low drag, but it is not necessary to be as particular about airfoil shape here as on the wing because less maximum lift is required of the stab. I have been using long tails on Combat planes since 1961. Somebody maintained that short planes turn quicker than long planes and Combat fliers believed it for years. Actually, a stab which is next to the wing TE can cause flow over the wing to separate, causing a stall at low lift which badly inhibits a plane's performance. A stab placed farther aft will cause much less interference with the wing. The longer tail also increases stability for a given CG location. The greater leverage and farther aft allowable CG reduce induced stabilator drag. A nontechnical explanation of why planes with shorter tails do not necessarily have faster control re-

THESE VERY DIFFERENT SHIPS ACHIEVE THE SAME OBJECTIVE. THE DESIGNERS ASK THAT YOU NOT BUILD THEM BECAUSE THEY DON'T WANT TO FLY AGAINST YOU IF YOU'VE GOT ONE. IN COMBAT, THEY PLAN TO WIN EVERY MATCH.

APTERYX

by ROBERT MELLEN

Speed, maneuverability and strength are the qualities that have long been sought after in Combat since the guys gave up their Ringmasters for T-squares. Today's ships are a considerable improvement over the T-square, but since a Combat ship will always be a compromise between speed and maneuverability, you can only go so far before you start sacrificing one thing for another.

During the last four years of flying foam Combat craft, Dan Bregar and I have found that the foam wing has several advantages over a built-up wing which uses a covering of one type or another. The first advantage is that there is no loss of airfoil shape in the wing, normally caused by the covering material sagging or dipping between the ribs. The second advantage is that in a high "G" maneuver, there are no changes in the airfoil shape which are usually caused by the distortion of the unsupported covering material. This distortion will cause a model to lose speed in consecutive maneuvers while a foam wing will maintain its speed and not stall.

There are other advantages in the foam wing, such as a knife-edge thin trailing edge and a superior finish—but with a little extra work, they can be had in a conventional or built-up wing. These advantages seem to greatly aid our foam Combat ships not only in maneuverability, but speed as well.

The Apteryx design is less than a year old, but some four years of development have gone into it. Dan got the ball rolling in 1967 when he designed and built the first Rattler. Two years later I got in on the project, but less than a year after that Dan was "selected" by the Selective Service and I was left with the Rattler and some ideas.

One of them was a tapered wing. Tapered wings are difficult to build out of balsa because each rib requires a different pattern, but with foam it is just as easy to cut tapered wings as straight ones. Using the tapered wings and the idea of the engine being recessed back into the wing, I built the first Apteryx:

sponse is given by F.A. Cleveland in "Size Effects in Conventional Aircraft Design," *AIAA Journal of Aircraft* (Nov.-Dec. 1970, pp 483-512).

Of course, a long tail requires a heavier structure and increases moment of inertia, so there is an optimum stab position. Position is not too critical, but that shown on the plans has worked best—credit for finding this distance goes to Brooks Herndon of Kansas City. Incidentally, the Nemesis tail assembly works very well on a Voodoo.

Structure for the Nemesis II has grown heavier as engines have become more powerful during the last nine years and weak spots have been corrected. Fliers who hit the ground a lot or who fly in windy places should lean toward heavier wood and should include the horizontal spar. This spar adds effort and weight, but can save the plane in crashes. Weight of the plane without fuel is 16½ to 20 oz. Mine usually weigh 18 oz. with an 8½ oz. engine, using the horizontal spar.

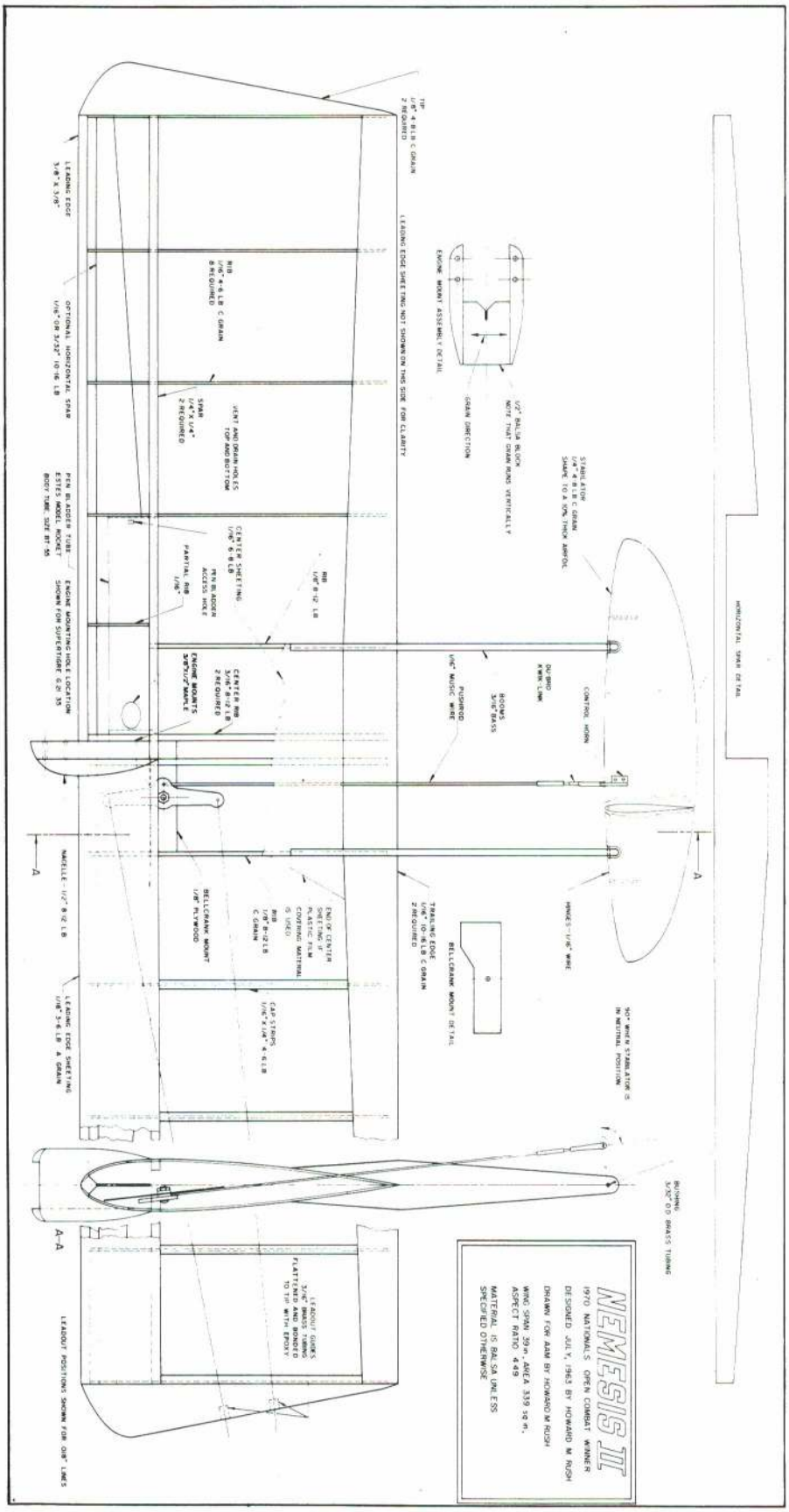
Construction

Throughout the construction of the Nemesis II the builder should keep in mind that the airfoil is very important and care must be taken to avoid an anomaly in the shape of the wing. Density and grain are specified on the plans for many balsa parts. If you are not familiar with balsa selection, see the first pages of the Sig catalog or ask someone who flies FF.

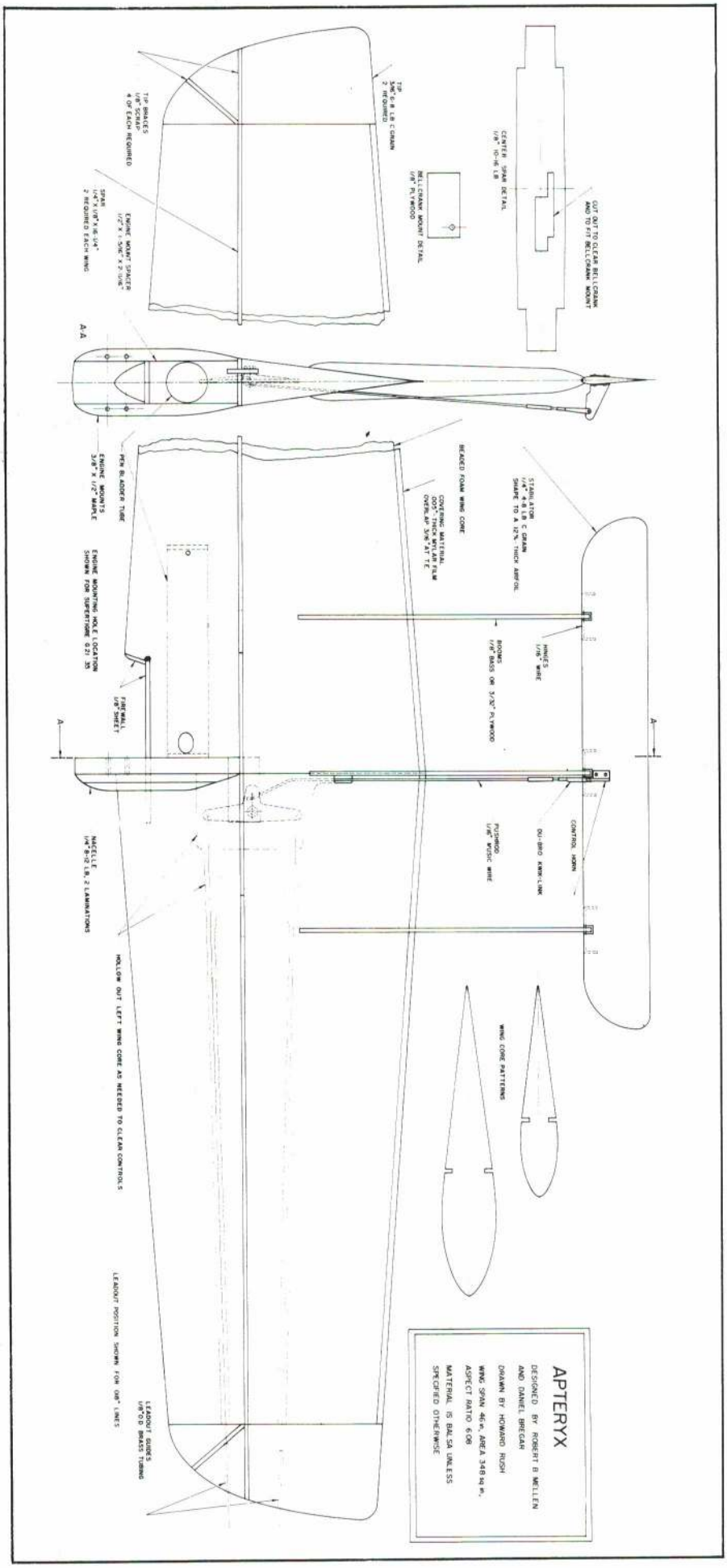
Begin by gluing the maple engine mounts to the ½" balsa block with Titebond or epoxy. Several coats of glue are necessary on the block because a lot soaks into the end grain of the wood. When this is dry, grab one mount in each hand and pull on them like a wishbone. If the assembly doesn't break with a good tug it can be used with confidence on a plane. If it does break, reglue and try again. Now sand the mount assembly on a flat surface so that both faces are flat. This prevents damage to the engine from mounting on an uneven surface. Drill engine mounting holes and install blind nuts. Glue the left-hand 3/16" center rib to the engine mount assembly, making sure that it is aligned so the thrust line is straight ahead. When this dries, cut a slot in these parts for the bellcrank mount with a jigsaw, then glue on the right-hand center rib.

Sand the rear corner of the 3/8 sq. in. LE so there is a 1/16" wide edge to glue to the horizontal spar. Without gluing, hold the LE to the horizontal spar with small rubber bands and slide the ribs and center assembly on the spar. These will hold the LE in position. Remove the ribs one at a time from the horizontal spar, add a dab of glue, and slide them back on. Glue the LE to the ribs and spar. Don't attach the center assembly yet. Make sure everything is square, allow to dry. Now add the center assembly, bellcrank mount, lower spar, and outboard 1/8" rib.

The pen bladder tube is Estes model rocket tubing, size BT-55. If this is not available, the paper tube from a roll of Baggies will work. Fuel-proof the inside of the tube with epoxy, FasCal, or polyurethane varnish. Coat the 1/8" balsa



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84



the nose and tail moments were way off. A second Apteryx was built with different tail moments and showed a lot of promise. It wasn't until the third and final version was built that I came up with an airplane that would outfly the Rattler.

Now it wouldn't be fair to push all of the good points about foam at you without telling you about the only bad one—weight. The foam wing cores themselves weigh about an ounce each, which is insignificant, so all of the weight and strength is in the covering material and the adhesive that is used with it.

Strength is the main reason that a change was made from a paper covering material to Mylar. Most of the Rattlers were paper-covered. Even though the Mylar used is thinner than paper, it weighs the same so no weight was lost there. However, the contact cement is another story altogether.

In the search for an adhesive that was strong, light in weight and easy to work with, over a dozen different brands were tried but Super Weldwood Contact Cement works the best. If none of your local hardware stores carry it, it is available from Kirtland Hardware and Hobby Shop, 9183 Route 306, Kirtland, Ohio 44094.

To compensate for the extra weight of the foam construction, a larger than normal airplane must be used. The current Apteryx has 348 sq. in.

The first Rattler that Dan built had a 42" span and weighed a startling 28 oz.—a tanker by anyone's standards. Since then the Rattler was reduced to 22 oz. and stretched out to a 46" span. The Apteryx is also a 46" span, but due to the lighter spar arrangement, weighs about 21 oz. All of these weights include a ball bearing Tigre and a nylon prop, totaling 10 oz.

Construction

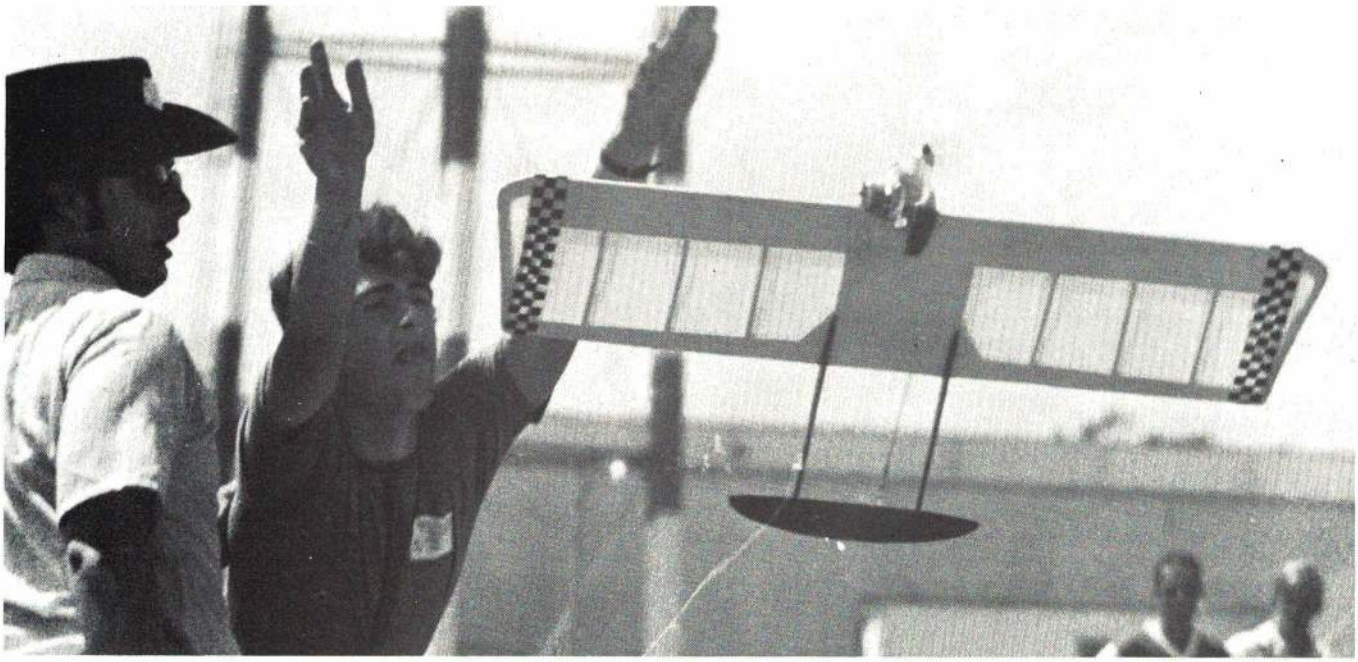
Since the construction of the Apteryx is decidedly different from any other Combat ship, the instructions given here must be followed very closely. Caution must be taken when working with foam, as many of the dopes and glues used with balsa wood airplanes will destroy foam. Epoxy glue is recommended for all of the construction of the Apteryx because of its superior strength and rapid drying time. White glue could be used but it is greatly absorbed into the foam, which leads to a very heavy airplane. Also, since white glue dries by evaporation, it may take weeks to dry in places such as wing spars.

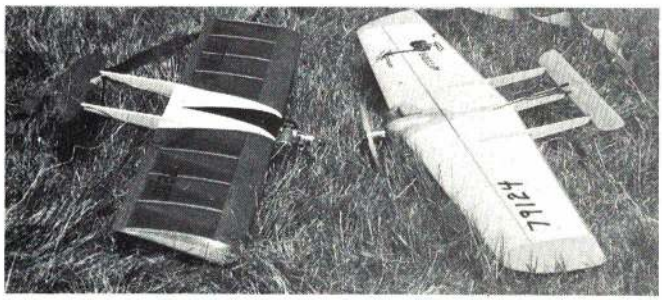
As mentioned before, Super Weldwood Contact Cement is recommended. It is a water base contact cement which requires two coats on foam but is by far the easiest to cover with and will not attack foam.

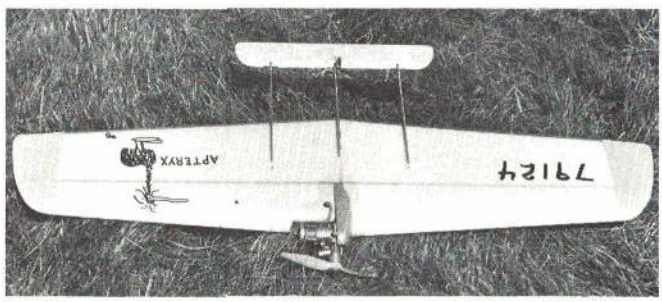
Contact cement will adhere well to the Mylar plastic covering used on the Apteryx but epoxy will not, unless the covering is sanded first to remove the glaze. Do not sand too hard—the covering could be weakened.

Make the two wing templates from 3/32 or 1/8 plywood and cut out the wing cores. We have had great success

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84







end plugs with epoxy and insert them in the ends of the tube. Now add the bladder tube assembly and top spar to the structure. Glue the partial rib in place between the bladder tube and LE.

Chamfer the 1/16" TE pieces as shown in the side view. Place the lower half on a flat surface and position the ribs on it by propping up the front of the wing. Glue ribs to the TE and pin them to it to dry. When dry, add the top half of the TE, glue, and clamp together with a lot of pins and weights. Install the 3" Veco bellcrank and pushrod. No Z-bend or retainer is necessary because the bellcrank mount keeps the pushrod in place. Note that the pushrod goes in the hole closest to the pivot of the Veco bellcrank. Poke the leadout wires through the holes which you were so clever to drill in the ribs before starting construction.

Leading edge sheeting is best done with epoxy because it stays wet for awhile after it is put on a surface. Take a tiny brush and paint epoxy on the top of the spar, ribs and LE on the top side of one wing; then hustle the rest of the mixed epoxy to the freezer where it will stay unhardened until you are ready for the next piece of sheeting. Pin the super light 1/16" sheet to the ¼ sq. in. spar, then bend it over the ribs and pin it to the LE, pulling forward a bit as you bend. Make sure the sheet is down against the spar, LE and all the ribs. If it sticks up anywhere, the resulting bump will hurt performance. Repeat this pro-

(Continued on page 88)

Howard watches as his design leaps into the air out of the hands of Gary James. Scene at the 1971 Nats.

The Editor would like to catch these birds together in Combat, but the authors know better.

This is a big, solid, stable plane. Great for windy weather. Mylar makes it tough.

using a model train transformer and nicrome wire. If you have never cut any foam cores, you may want to dig into some old model magazines as several articles have been written on this subject.

Cut the wing and center spars out of hard balsa as shown on the plans. Assemble these spars with the foam wing cores (do not glue yet) on a flat surface and lightly block sand with 220 grit paper to remove the fuzz from the cores and any high spots from the spars.

Remove spars and apply one coat of the Super Weldwood Contact Cement to the foam cores, using a 1½ or 2 in. wide paint brush. Let dry at least 45 minutes. Apply another coat of cement to the cores and one coat to the covering material. While the cement is drying, epoxy the hard balsa wing spars in the cores.

Tape one edge of the covering material to a flat surface and following the photo sequence, cover the cores. Be sure to get a good tight fit around the LE; seal the TE as shown. Use a 12" aircraft drill (available at most hardware stores) to drill the leadout holes in the inboard panel. Drill halfway from each end.

Cut out the bellcrank floor, drill and epoxy it in the proper place to the center spar.

Assemble and glue the motor mount. When dry, cut a notch for the bellcrank floor. Also, drill the holes for mounting your engine and install blind nuts.

(Continued on page 72)

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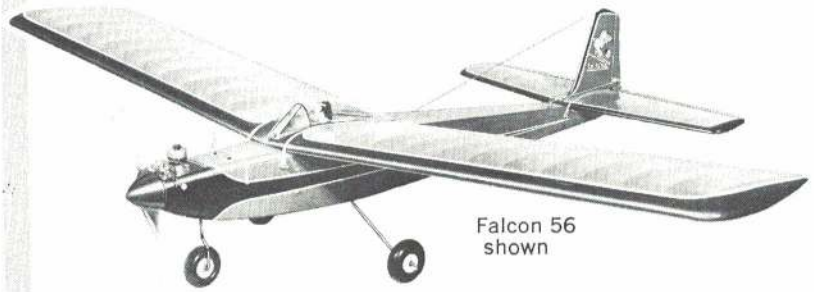

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transpo 72

It was a 1916 Boeing biplane with floats. . .and the quiet Lockheed Tristar.

It was Gustav Benz' world-first car of 1889. . .and Mark Donohue's two-days-before Indy 500 winner.

It was almost-too-small electric two-passenger cars. . .and 150 mph trains of the future powered by linear induction electric motors.

It was scale models and mock-ups and dreams of the future.

And it was the real thing from every possible branch of transportation.

And it was called TRANSPO-72, a combination air show/industrial exposition/state fair and family picnic, attended by 1½ million people.

For nine straight days, the normally too-quiet Dulles International Airport, 25 miles west of the nation's capital, seemed like the center of the world. Everyone and everything connected with getting from here to there. . .was there. For once, a government-backed operation was a whopping success on its first try. A superb last-minute effort by many hundreds of people turned a mud-hole into a brightly colored, lively event which will almost certainly be repeated every two years.

And about time, too! For decades, American aviation people have been wondering why the birthplace of aviation has let the French, the British, the Germans and others put on the super air shows, while we did nothing but talk, plan and cancel. After a trial run at Dulles Airport in 1969 which drew almost a half million spectators in two days (and probably set a world record for traffic jams), the Department of Transportation decided to go whole hog.

Somewhere along the line, some bright chap turned the airshow into a transportation show, and carved for himself a place in the history books. For, while the legendary Paris Air Show has always limited itself to aerospace action, TRANSPO was opened to all sorts of surface transportation as well. Not only did this make it possible to claim the title for the "world's largest show of its kind" (there having been no others!), but it brought together all sorts of increasingly related forms of travel.

Trains aren't airplanes, you say? Just try building a 200 mph train without the help of some pretty sharp aerodynamicists! And try qualifying a car at Indianapolis without airfoils on the front and rear to keep it solid to the track. And if you want comfort and efficiency in your intercity commuter vehicle, support it with ground-effect devices, and power it with turbojet engines, and control it with sophisticated electronics like the black boxes used in expensive airplanes.

All of a sudden, trains and cars and airplanes and all sorts of hybrids are one big family of transportation devices. And if the stories put out by some of the manufacturers are even 50% accurate, in another 10 years you won't be able to tell which is which. But you will be able to get from where you are to where you'd rather be, with a lot less strain than you can today.

The real purpose of TRANSPO-72 was to show how things can be done better in the near future and the far future. To that extent, it was educational, and four huge 400 x 200' pavillions were jammed with commercial displays from more than 300 firms in the U.S., Europe and the Far East. They were there with millions of dollars worth of hardware and hopes—to sell, or at least to sway. This part of the massive event was very serious, for success could be measured only in terms of orders signed and promises made. Most of the business was conducted in a half-mile long row of chalets, each operated by a major firm, where potential customers were wined and dined in luxury, while the sales pitch was made with all possible subtlety, and the spectators were kept at a respectful distance.

But that was only part of the story. Packed into several hundred thousand square feet of outdoor display space were almost 100 airplanes and helicopters and gliders. There were the complete '72 lines from Cessna and Fairchild, lesser-known models from Britain-Norman (Islander and Trislander), LTV's Corsair IIs, lots of Bell and Sikorsky helicopters, the imposing F-111F, and F-14 Tomcat, giants like the C-5A and L-1011. Along with them, for the public to see at close range, were many of the flying display aircraft: The Ghost Squadron's World War II air force of B-17, B-24, B-25, P-38, P-47, P-51, P-63, Corsair, Helldiver, Dauntless, Hudson. And many, many more.

Trains and cars and other kinds of ground contraptions were supposed to be as big a part of TRANSPO-72 as the flying machines, but they simply don't lend themselves to anything like an air show. And so for the general public—all hundreds of thousands of them—it was an air show first, and other things second. From nine in the morning until seven in the evening, the sky was full. First there were the product demonstrations, in which company pilots all tried to prove that theirs was the best airplane in the world for its particular job. This ranged all the way from the shortest possible takeoffs and landings, to the ultra-professional aerobatics of Bob Hoover, in the P-51, Shrike Commander and OV-10 Bronco.

After an hour or two of that, the morning air show began! Two hours of concentrated flying by all sorts of things from Red Arrows to Red Devils, with very little time in between. The break for lunch was hardly a break in the show, for the manufacturers returned with their demonstrations. After that, there was a two-hour afternoon air show, then more showing of flying products. You had to eat on the run, because the dinner hour was also the time for the evening Sport Aviation Spectacular: the NAA-sponsored revue of all its sporting divisions—Academy of Model Aeronautics, Aerobatic Club of America, National Association of Rocketry, U.S. Parachute Association, Soaring Society of America, the Balloon Federation, Experimental Aircraft Association and Antique Airplane Association. Each did its best in a few minutes of coordinated noise and motion.

The Theme Area—just inside the main entrance to the 300-acre show grounds—set the stage for the entire production: "Man In Motion." Whether it was the antique trains or the Ford Tri-motor or the realistic mock-ups of tomorrow's VTOL airliners, it was all concerned with getting people moved about. And not only was the technology interrelated, so was the use. The smoothly working model of a magnetically suspended, linear induction motor powered 200 mph train in the West German exhibit could by just the thing needed to get crowds of people to and from the airport of the future, which may be even farther from town than today's air terminals.

Once a person is in town, after flying a Mach 2 for 4000 miles and whizzing at 200 mph for 50 more, he still has to get around, preferably with a minimum of discomfort and delay. Aimed at this great problem were, among other things, four full-scale, people-carrying "personal rapid transit" systems. One was a suspended monorail, the others were on the surface, but all featured highly automated little cars which their developers said would eventually be the absolute limit. Just get on board, push a button for your destination, and sit back for a few minutes of effortless commuting on a "horizontal elevator." Thousands of average people, and hundreds of city officials from all over the world, rode the ultra-modern cars, compared them with each other and with how they have been getting around. From this could come rapid progress, now that ideas and brochures are being translated into hardware.

For the millions who prefer to do their own driving, scores of ideas were offered to make it easier, safer, less polluting and sometimes even more economical. All the major auto manufacturers in the world had their formal displays, equipped with the latest in cars, future ideas, knowledgeable engineers and pretty girls (some of whom showed surprising awareness of the technical part of the show). Safety, in particular, was in the spotlight, and many of the firms had either specially-built cars of the future, or modified current models. The Volkswagen exhibit featured several different arrangements of seat belts and shoulder harnesses, any one of which would be more comfortable and more effective than those in use today. And one Japanese firm even had a unit which used retractable arms to put the harness around the driver as soon as he sat down—a little like their science fiction movies.

While actual, working hardware got the lion's share of attention, many of the really advanced concepts were too far in the future for that. Enter models. Almost every one of the hundreds of indoor displays included artistically built models of what may come in time for TRANSPO-74 or even much later. These ranged from projected lightweight fighterplanes and turbo-powered cars to the 20 ft. 5 in.-long model of the British/French Concorde which stood in

for the real thing because of the latter's embarrassingly smokey engines.

Some models simply sat there and looked futuristic, while others worked almost around the clock. One snazzy looking train-of-tomorrow demonstrated, via one model, its ability to hover magnetically a fraction of an inch above the track to beat that old devil friction. Near by, engineers hovered to explain how a 10-ton test vehicle is running along a half-mile track at almost 100 mph and another is being built to do 200 mph on a two-mile track. But without the priceless working model, it would be just another vague idea.

For the first time anywhere (which is a phrase heard often and accurately at TRANSPO-72) all branches of sporting aviation pooled their resources into a combined effort to educate and influence hundreds of thousands of people who had never seen things that fly for fun. In a 60 x 20' booth in one of the big pavillions, NAA's Sport Aviation Council set up its displays: pictures, samples, literature and men and women with enthusiasm to answer uncounted thousands of questions. AMA was there with models not only over its 10 ft. booth but appropriate models over several of the neighboring displays.

During some of the daily programs and during each evening's Sport Aviation Spectacular, the most broadly appealing models were in action: Snoopy's Dog House, a "flying saucer," and four RC Grumman Bearcats in Blue Angels colors. All of this action was on the taxiway in front of the extensive grandstands.

Alongside the AMA booth was that of the Experimental Aircraft Association, which flew a variety of homebuilts during each day's activities, and next to that was the National Association of Rocketry, which launched all sorts of miniature space vehicles into the once-calm Virginia skies. Next in line was the Professional Race Pilots Association, handing out literature in its booth and showing its stuff in the Formula One races sponsored by Race Air Corp. Others in the Sport Aviation Center included the Antique Airplane Association, Soaring Society of America, U.S. Parachute Association, and National Pilots Association. All were in close proximity to each other and worked with a high degree of cooperation.

Perhaps a model, and perhaps not: one of the truly unusual displays of the entire event was the "Liverpuffin"—a 64 ft., 140-lb. man-powered airplane from England. Driven via bicycle pedals, the styrofoam-and-mylar near-free flight had only made one short flight, but attracted the attention of hundreds who could see its inventor's love of the novel medium. Interest was so great, in fact, that it may be left in the U.S. to act as a stimulant to American man-powered flight progress.

So there was a lot to see and a lot to think about. But it would all be for naught if hardly anyone looked or thought. But that was far from the case, as more than a million people from all over the world tramped the 1½-mile long, ½-mile wide exposition grounds. On several days, well over 200,000 were there, but the place was so big that crowding was at a minimum. People wandered and gawked and snapped pictures and talked to salesmen and to each other. They walked some more and they ate at a variety of refreshment stands that sold the usual hot dogs and soft drinks, and others that sold Chinese food and pizza and Italian ice cream.

In fact, so much was done to make the average guy feel at home that it looked as much like a state fair as anything else. In place of the businesslike atmosphere of a Paris or Hanover Air Show was the feeling of a family outing. Mom and Pop and the kids were there and they were taking it all in. And it didn't seem to detract from the more serious part of the show at all. The businessmen were busy talking to potential customers, giving them rides on their new airliners or natural gas-powered automobiles, and coming out of it with a sense of accomplishment.

And what it all means is that there will more than likely be a TRANSPO-74, same time, same place, but heaven-knows-how-much bigger. More airplanes and more models and more people and more new ideas and more slightly older ideas that have been turned into reality. For that is really the point of the United States International Transportation Exposition: to improve ways of getting you from where you are to where you'd rather be.

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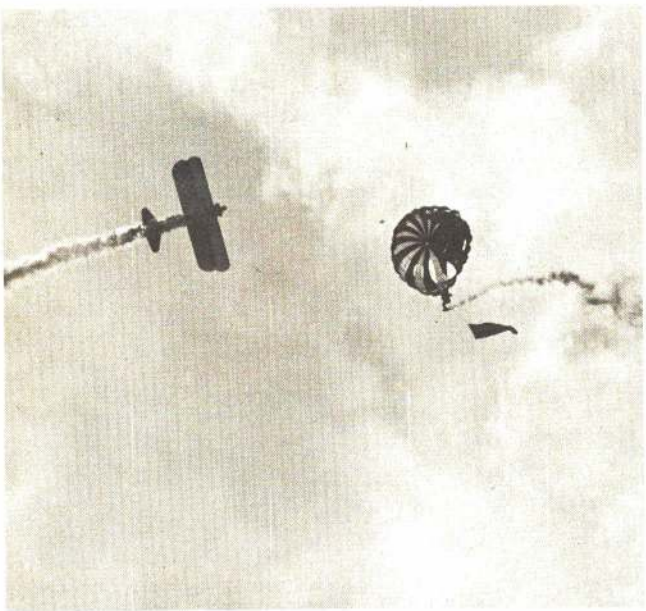

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(1) It wasn't all serious. Here a cooperative youngster pets the invisible dog being walked by Baron Von Nasty of the Flying Circus Aerodrome at Bealeton, Va. Nasty and his friends cavort each Sunday in Fokkers, a Nieuport and other types in an authentic World War I setting. (2) Streaking vertically while streaming multi-colored smoke and changing formation, the Red Arrows enter a loop and the hearts of a million Yanks who had never before seen them. (3) TRANSPO-72 may have been the biggest air show in

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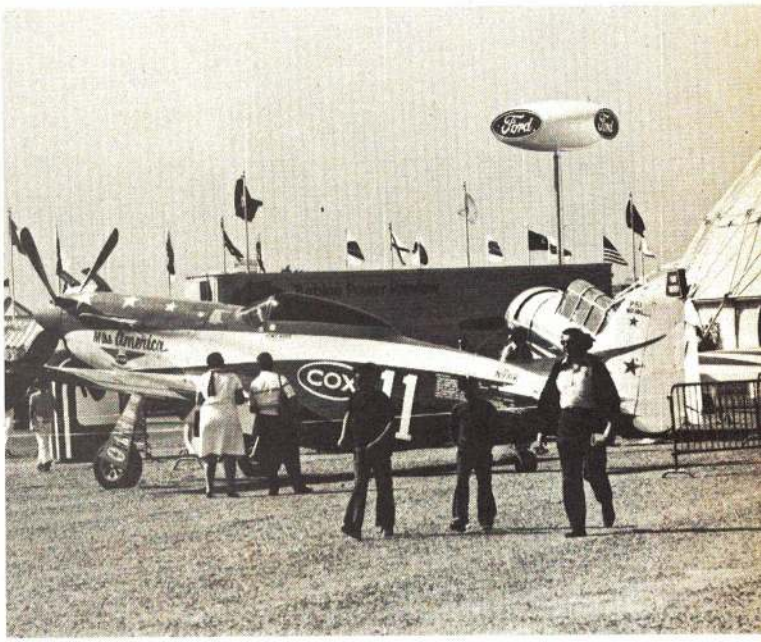
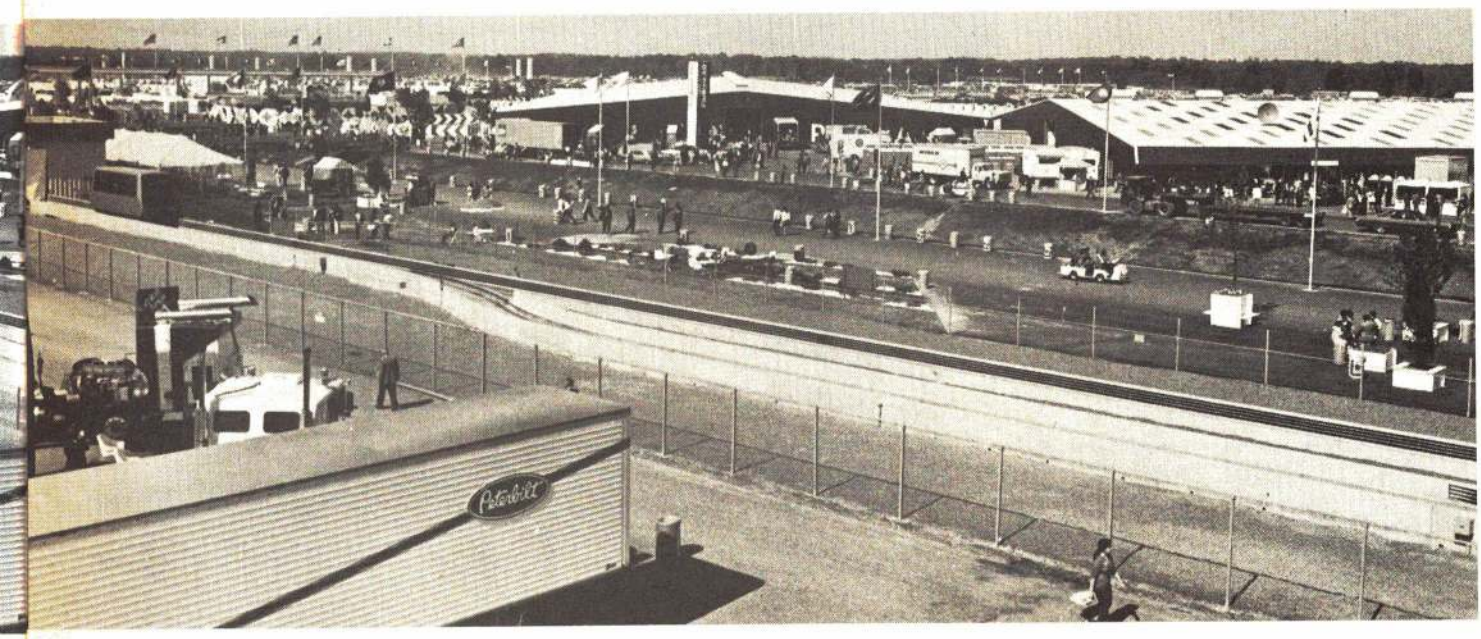


American history, but it wasn't too big to be opened with that long-time air show tradition, the flag parachute jump. A parachutist floated down with a large flag suspended beneath, while smoke-trailing aerobatic planes circled him, and the national anthem blared forth from the public address system. And the show was on! (4) Howie Keefe's Merlin-powered and Cox-sponsored modified P-51D Mustang was one of the big attractions in the display of the Professional Race Pilots Association.



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(5) Thumbs Up! from the Red Rippers. A lot of old Navy fighter pilots, and everyone else who remembered, got a special thrill out of the flight of a Grumman F6F Hellcat, courtesy of Chicago industrialist Bill Ross. (6) The scourge of the Pacific—the Grumman Hellcat—taxies down the long strip of concrete to await clearance for takeoff. (7) In the air it had all the meanness of a true Messerschmitt 109, even though it was built in Spain with a British engine. The sight of it being chased around the northern Virginia skies by American Mustangs and Thunderbolts will be long remembered by all those who missed the big show, and more so by those who were part of it. (8) Bill Ross's P-38 Lightning was a fantastic WW II fighter find. Recently acquired aircraft has less than 90 actual flight hours! (9) Welcome back to World War II! One of the true hits of the great TRANSPO-72 air show: the Confederate Air Force "Ghost Squadron," looking for all the world like they were returning from a mission. Seen were: B-25 Mitchell, F4F Wildcat, F4U Corsair, P-38 Lightning, SB2C Helldiver, SBD Dauntless, TBM Avenger, B-24 Liberator, Lockheed Hudson, B-17 Flying Fortress, with a Douglas A-26 Invader behind it. (10) This authentically painted Curtiss P-40 flew with the Ghost Squadron in Chinese markings of the fabled American Volunteer Group's "Flying Tigers." (11) The massive Republic P-47 Thunderbolt rekindled memories and the age-old argument between its supporters and those who know only the Mustang. Complete with invasion stripes, it flashed across the sky with grace unexpected of something so bulky. (12) A lovely old lady. . .the Ghost Squadron's B-24 Liberator. Though it was built in greater numbers than any other American airplane of World War II, only this one remains on flying status. Its frequent fly-bys, accompanied by a dozen or more of its colleagues, brought a lot of lumps to many throats. (13) Two of the greats: the Spitfire XVI and Lockheed P-38L Lightning of Warbird Bill Ross sun themselves in the early morning, before going off to do battle with history. In the background sit the large and small Lockheed jets: Galaxy and Jetstar.

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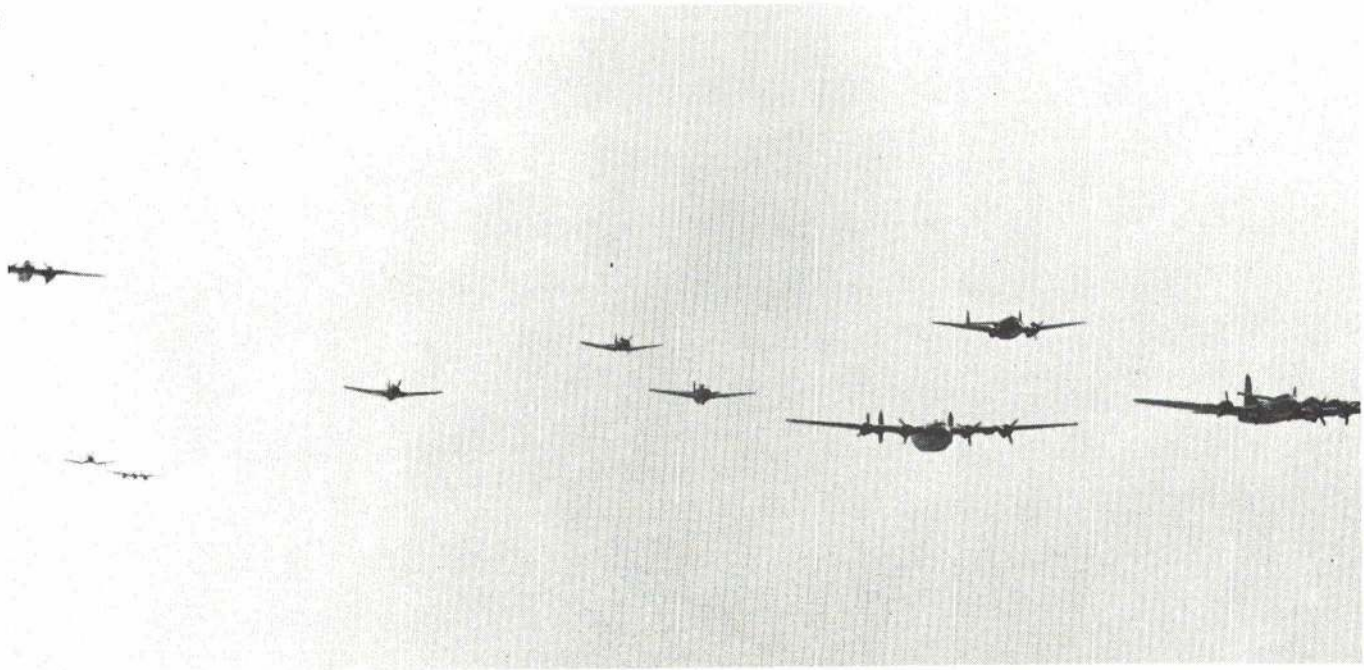

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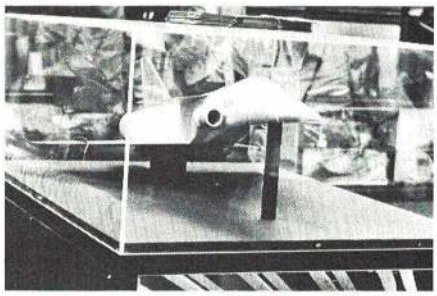

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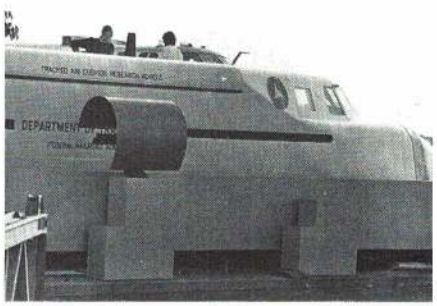

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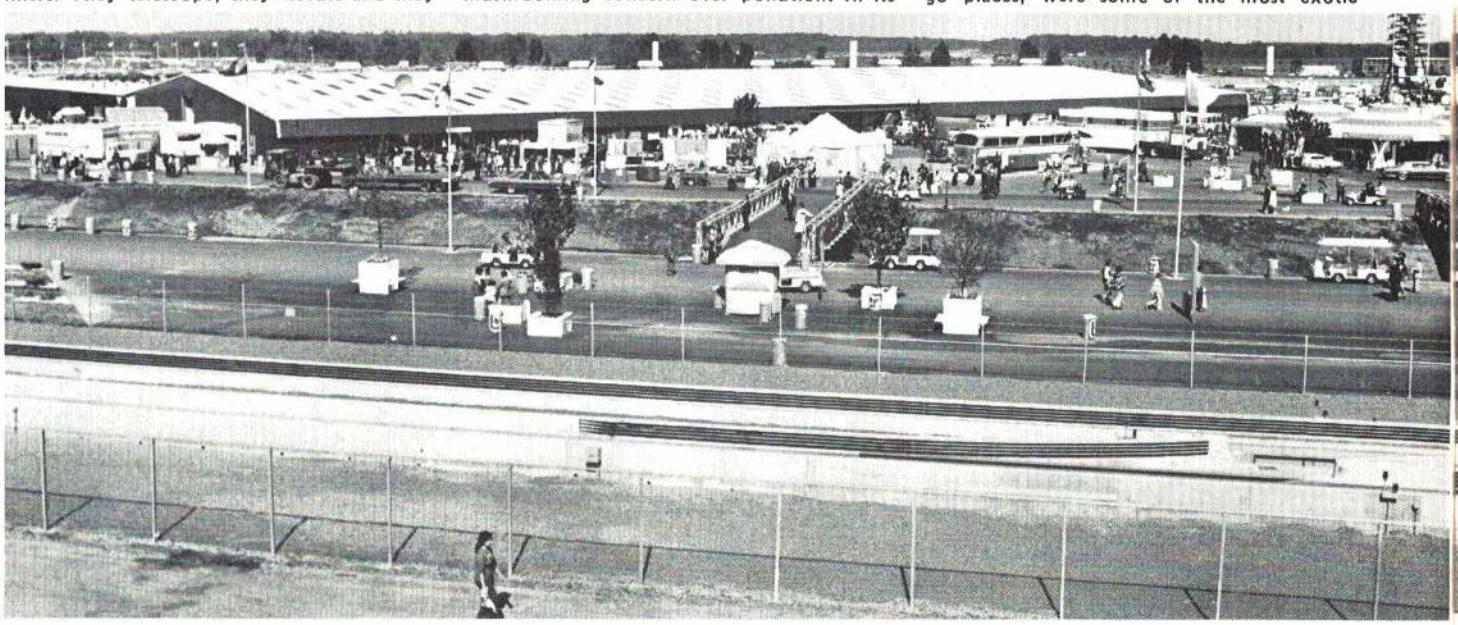
Above: (14) Models all: the family of wide-body jetliners ranges from the fully-established Boeing 747 Jumbo through the more recent McDonnell-Douglas DC-10 and Lockheed TriStar air buses which have been in service just a few months. This scaled-down bit of reality was aimed at showing how older airports could be modified with ease to accept such oversize craft with versatile enclosed walkways. (15) Just flip a couple of switches and become an airport czar. The miniature terminal is equipped with moving walkways which can conform to a wide variety of airliners. They telescope, they elevate and they bend in the middle. (16) Wind tunnel models are hardly new, but the use of precision miniatures continues to aid the engineer in testing out his new ideas at a small fraction of the cost of building an airplane each time he has a brainstorm. In the U.S. Navy display, a test model of what may become a lightweight fighter was displayed with its forward delta control surface so far back it looks like a delta biplane. (17) The magnificent Anglo-French Concorde was at home during TRANSPO-72, for its owners were sensitive about the noise and smoke from its test engines in this day of mushrooming concern over pollution. In its place was a 1/10 scale model with upholstered seats and a complete cockpit packed into its 20' 5" of supersonic grace. (18) Still a few months from flying is this Airbus Industrie A-300B, a wide-bodied air bus being built in Europe by a combination of British, German, Dutch, French, Italian, American and Spanish companies, for no single country or manufacturer can afford such a project in the face of established U.S. airliners. The model gave potential customers a vivid picture of the completed craft. (19) In the Theme Area, alongside some of man's earliest attempts to go places, were some of the most exotic



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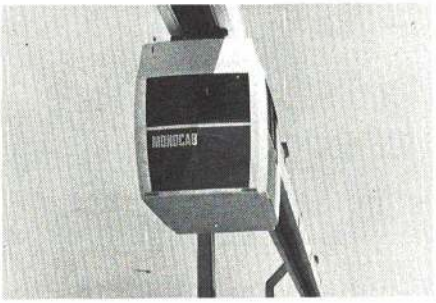

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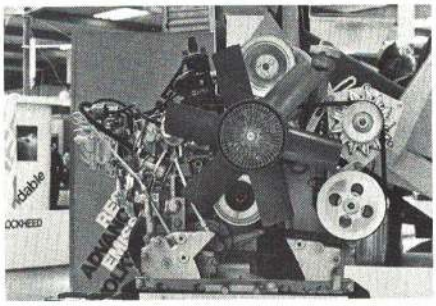

shapes, including the Martin X-24A lifting body research vehicle which is aimed at fully-controlled re-entry from space, and a mock-up of the Lunar Module, courtesy of NASA. (20) Amtrak's Turbotrain, built by the Sikorsky Aircraft division of United Aircraft, is a living example of the growing together of air and ground transportation technology. It and a twin are in operation in the Northeast, providing the fastest train service yet seen in the U.S. (21) Not all the new ideas were far in the future. This government-sponsored train-of-tomorrow is once again running, now that TRANSPO-72 has ended. It is supported by an air cushion, and kept clear of the walls of its channel track the same way, while being propelled by a linear induction motor built into the train and the roadbed. (22) Smoothly and quietly overhead, the Rohr monorail gave thousands a taste of the near future. Not even waiting lines as long as two hours discouraged the throngs which made this the most popular ride of the four "people movers." All will remain at Dulles International Airport for 18 months of continued testing. (23) Car engine of tomorrow, or perhaps the day after tomorrow, a Wankel rotary combustion chamber engine.

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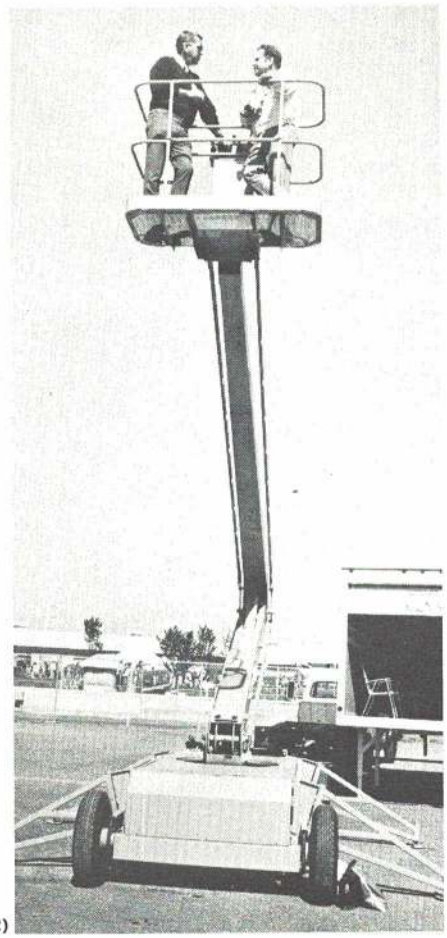
(24) Model aviation was an aerial highlight of TRANSPO's air shows twice each day. AMA's Bob Lopshire organized ten flight acts including Snoopy's Doghouse, a flying saucer, banner-towing biplanes, pattern aerobatics by Jim Martin and Joe Solko, glider flights and formation flight team of miniature Blue Angels. Model airplanes were a greater thrill for the public than some of the full-scale flying. (25) Unloading Bearcats from the NAA van. Most of the model flying projects were prepared just for TRANSPO-72. Bearcats were an industry supported effort created by American Aircraft Modeler magazine for the AMA to have at air shows. (26) A Bearcat in flight, gear down, before lettering and decals were added for TRANSPO. There were many other model demonstrations including big RC bipes and Snoopy's Doghouse. (27) There were big helicopters and little helicopters. Solo acts and the Army's Silver Eagles formation routine. Here, a Bell Hueycobra makes a fast pass by the spectators. (28) The Coast Guard's Lockheed C-130 Hercules. (29) USAF Sgt. Ford fires up his Douglas C-133 in preparation for one of many flights of the huge control-line model. (30) AMA President John Clemens studies perhaps the largest aeromodel he has ever seen. The "Liverpuffin" is a 140-lb. man-powered aircraft designed by Dr. Keith Sherwin and built by his engineering students at Liverpool University in England. Made of styrofoam, balsa, spruce, aluminum and mylar, it has made one flight of 20 yards. The ultra-light craft will spend its next few months in the U.S. to encourage similar projects here. (31) With the help of friends, USAF Sgt. Ford hoists his huge B-52 control-line model above the NAA Sport Aviation Council display. Here, thousands of people got their first taste of almost a dozen ways of flying for fun. (32) Panoramic view of the vast TRANSPO-72 grounds, courtesy of the friendly guy who flies a "cherry picker." (33) While a lot of the aerial things at TRANSPO-72 made noise—sometimes entirely too much—this propane-powered hot air balloon was one of the truly quiet, graceful ones.



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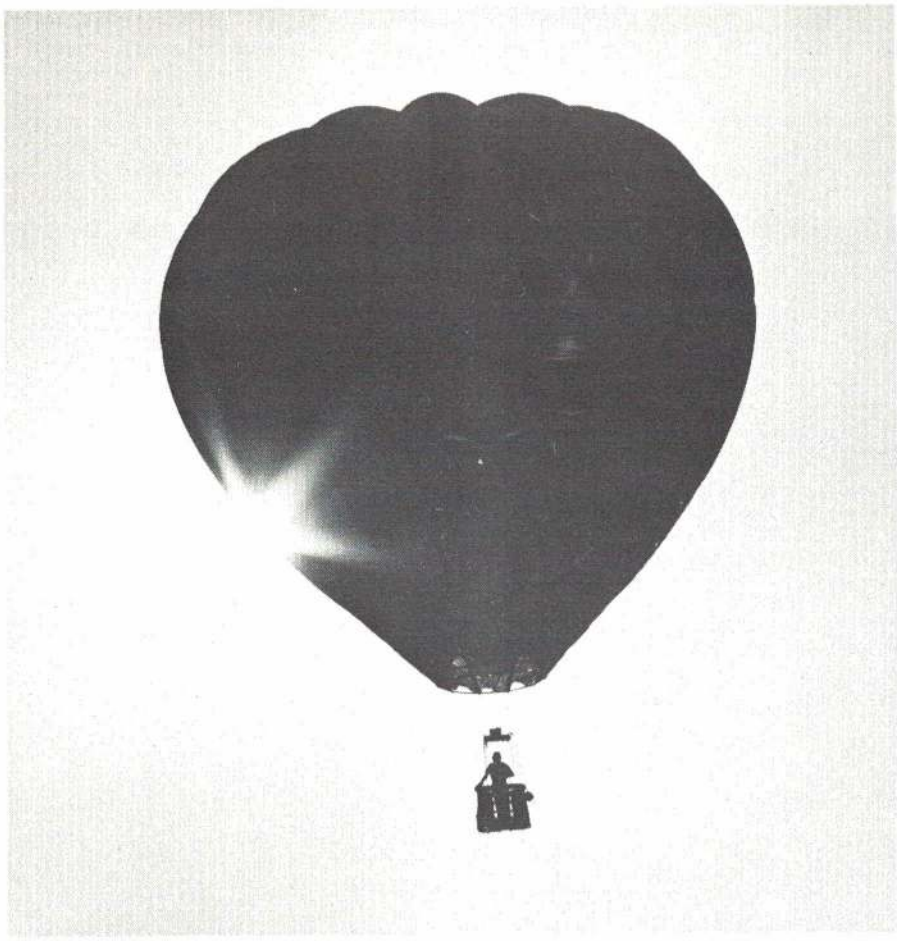

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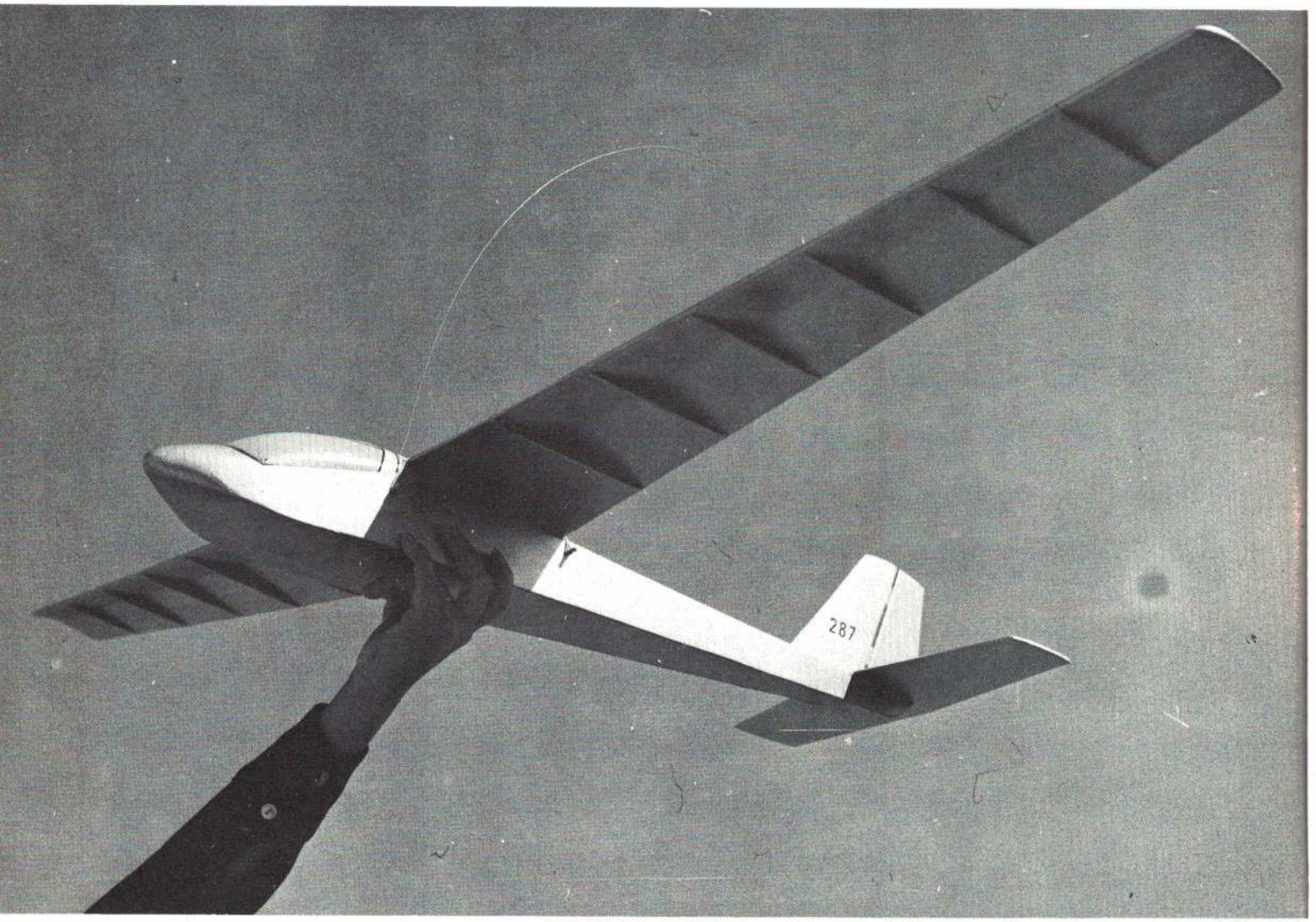
LIGHT RUDDER-ONLY GLIDER BASED ON THE SLINGSBY TWO-SEAT TRAINER.



by JACK HEADLEY

CAPSTAN

30 August 1972

The Slingsby Type 49B Capstan is a simple wood and fabric training glider, with side-by-side seating, intended for all stages of training and glider club flying. The simplicity of line was one of the things that attracted us to this model, together with the wide cockpit area which provides ample space for all the radio gear. Our model is a simplified version of this design, for single-channel radios, including galloping ghost types.

Also included on the plan is another version of the design, the Type 49C "Powered Capstan"—a standard Capstan with a 45 hp Nelson engine mounted on a pylon above the wings. This type first flew in 1968. We used an 020 engine for our model version, and this unit provides almost scale type performance. If you make the powered version, don't forget to use fuelproof dope when finishing the model. (The following construction notes apply to either version.)

Construction

All construction articles seem to assume that the builder will begin building very logically with one piece, the body or the wings for example, and then work steadily to finish this piece before beginning the next. This may be their way of doing it, but my system is to go into a building "frenzy," which the dictionary defines first as "a temporary madness" (could be!), but later as "compulsive or agitated activity" which is more my description, and make everything at the same time—doing a bit at the wings while the body is drying, then making the tail while both are drying, etc. No piece ever gets finished before another until suddenly it's all done. But everyone has their own techniques, and so the following notes are written assuming each piece is built separately. It's recommended, however, that you read through to the end before beginning balsa cutting, or you might find that you've omitted the "flangle-sprocket," which is very, very important, and can't be put in afterwards.

Construction of the fuselage begins by cutting out two fuselage sides from 1/16" sheet. Be sure to choose the correct grade of wood for these pieces—medium hard is the most suitable. It's also important to make the two sides from the same or similar sheets of wood. Cement onto these sides the 1/8" square framework and the 1/8" sheet doublers at the nose and wing locations.

While all this is drying, the various frames can be made. Frames 1,2,3 and 4 are all made from 3/16" sheet, and 5,6,7 and 8 from 1/8" sheet. The fuselage sides are initially joined by gluing frames F2, F3, and F4 into place, and then gluing the sides together at the back, followed by the 1/8" square crosspieces between F4 and the back end. Next cement into place F1 and the cockpit floor, the latter resting on the 1/8" sheet doublers in the nose section. This floor provides a flat area for the radio equipment to rest on, and also gives the nose section the correct curvature. The various gussets for the wing dowels are cemented in next, as is the 1/8" sheet fin locator.

The bottom surface is next. Note that the forward portion of this is 1/16" ply, and the aft portion is 1/16" sheet balsa which is cemented into place with the grain crosswise. The tailplane, fin and rudder are now installed and the radio can be put in temporarily to check out the pushrod clearances before the turtle deck sheeting is completed. After this checkout, cement into place frames 5 to 8, and then add the 1/16" sheeting, not forgetting to close off the front end of this with a triangular scrap of 1/16" sheet. Add the noseblock as well as the canopy block, which should be hollowed out as indicated on the plans.

There are no great feats of construction for the tail assembly. Just select some straight-grained, *flat*, not too heavy sheet, cut out the required out-

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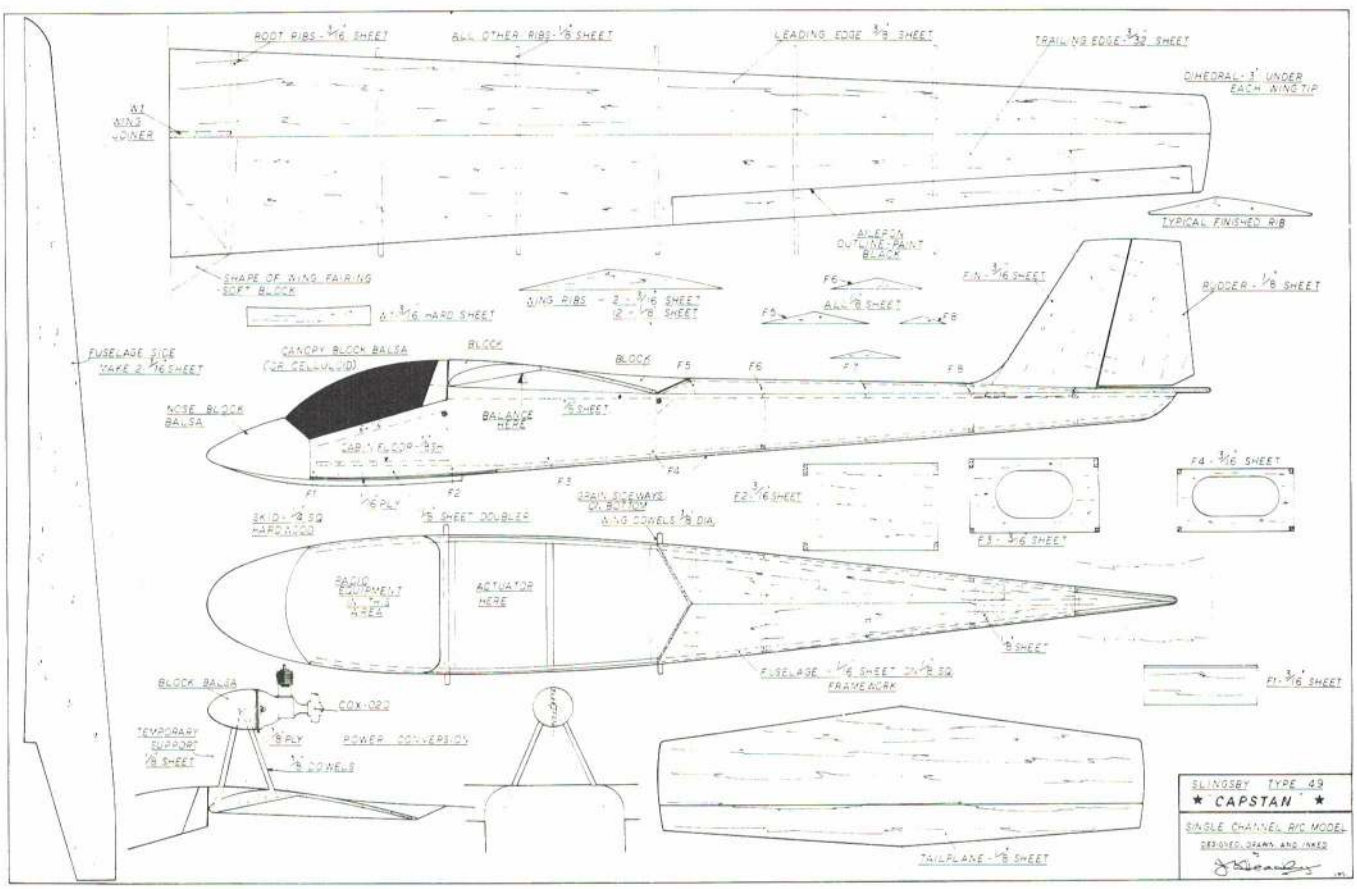

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

ON THE SCENE

Canadian RC Championships

by FRANK H. ANDERSON

HOSTED BY THE FOREST CITY FLYERS OF LONDON, ONTARIO, THE MEET HAD SHARP COMPETITION IN ALL EVENTS. MANY AMERICANS ATTEND, TOO.

A quick trip to London, Ontario, Canada after watching a whole week of assorted events at the U.S. National Championships enabled us to view the final round of C Pattern on Sunday, August 1 last year.

The Model Aeronautics Association of Canada (AMA's counterpart north of the border) has broken FAI Pattern into A, B and C sections, with A and B being your choice of FAI maneuvers to a total point score, and C becoming the total FAI scoring.

In addition to Pattern, only Scale was added this year, with Pylon interest rapidly gaining ground in pockets across the country.

Many Americans who were unable to attend the Nats—even a few who had been in competition the previous week—were in evidence here for the two-day Championship. Competitors from Ontario and Quebec, Canada, as well as Michigan and New York enjoyed two excellent days of weather and flying hosted by the Forest City Flyers of London.

Vern Scanland and Clarence Keaton from Pontiac, Michigan almost tied for first and second places in A Pattern with Howard Mottin of Warren, Michigan—well-known in UC circles—taking first place in B Pattern.

Sportsman Ed Izzo of Skaneateles, New York truly made the presentation hour by his generous offer (which was graciously refused) to stand down from his well-deserved second place in C Pattern: "I feel this is a Canadian Championship which should be won by Canadians. We enjoy coming here just to fly with our friends."

Our own '70 Canadian Champion and first-place RC Team member, Warren Hitchcox (Oakland, Ontario), reconfirmed his stature by becoming the new 1971 Canadian Champion. Watching Warren practice with his hard-working wife/mechanic Shirley, and seeing his final official flight, one begins to understand how much really goes into making his efforts successful.

Slightly more than 100 points out of a total of 3000 plus separated first and second places in Scale—Frank Knowles from Guelph, Ontario with his fine performing Nieuport 17 and Jean-Guy Gregoire from Montreal, Quebec and his nerve-shattering P-38. Both made demonstration flights during the late afternoon while scores were being tallied; although Frank took home the first-place trophy, Jean stood the crowd on their ear with loops, rolls, eights and the beautiful sound of two well-synchronized 60s.

Both Americans and Canadians expressed their thanks to the CD George Rogers and the many co-workers in the Forest City Flyers for the enjoyment of two days at a Canadian Championships not soon to be forgotten.

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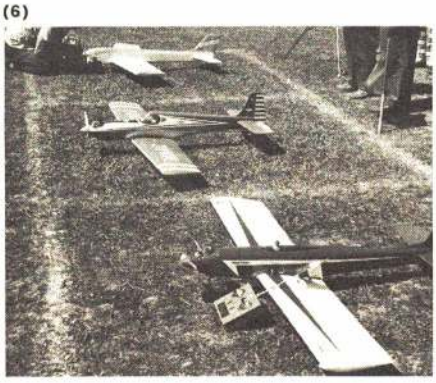

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(1) Only a few of the host club's members. A very active club all year round. (2) Winner in FAI Pattern and thus continuing as Canadian RC Champ, Warren Hitchcox and his helper/wife Shirley. (3) Howard Mottin and wife of U Control fame in the U.S. now flies RC with the Detroit RC Club—placed 1st in B Pattern. (4) Montreal RC Club is a young and active group. Canadians make well-finished and colorful models. (5) Jean-Guy Gregoire about to fly his spectacular Royal kit P-38. Two synchronized 60's motivate it. (6) The ready box at one flight line with Ron Chapman preparing his model for flight. (7) The Pontiac Michigan RC Club group. These fliers are regulars at Forest City Flyers meets. (8) Smiling Cliff Moll, MAAC RC Chairman with his Firebird. (9) Kitchener-Waterloo Flying Dutchmen came in force. Their members won 1st and 3rd in Scale and 3rd in B Pattern events. Nice variety of models.

getting into peanut scale

GREAT FUN WITH TINY, LOW-COST SCALE MODELS
HAS BECOME A NATIONAL CRAZE AMONG MODELERS.
TRY IT, YOU'LL LIKE IT.

by HAROLD WARNER

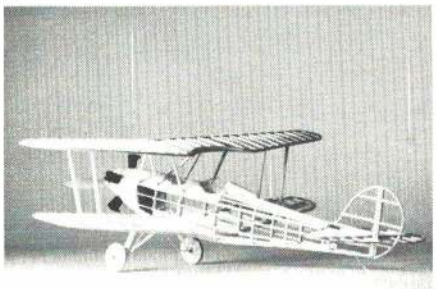
At one time people made model airplanes that looked like real airplanes. They did not have radios in them, nor even fancy gasoline engines, nor did they cost sixty dollars to build. These dandy little models weren't very big, but then they only cost a nickel or a dime per kit. A battery wasn't needed to get one started. You even got the fun of cutting out the parts from a printed balsa sheet, which was great for those of us who felt creative enough. In those days few people had need of insurance against model injuries as very few people could not survive a bonk on the bonce from a one-half ounce ship. Huge flying fields were not needed, either.

Kids used to run to their local toy or hobby store each Saturday, nickel or dime in hand, and come home with a different model of a really live plane and maybe even a few extra sticks or some tissue thrown in by a kind hobby dealer. A week later they would be back for another. . .and another. Just like peanuts, it's hard to eat just one. Their size, too, was in the lower ranges, like peanuts. Certainly the price by today's standards was less than peanuts.

Many old-timers, feeling too grown up to continue building these wee craft in later years, went to the more prestigious models of more elephantine size. These more sophisticated ships, unfortunately, had certain drawbacks which tended to be directly proportional (no pun intended) to their size and cost. Some, however, stashed their treasured lilliputian kits and plans away in musty attics preparing secretly to sneak up and work on them in odd moments when their fellow modelers were not looking.

A few hardy souls like Ralph Keunz in Detroit, John Pond in San Francisco, Bob Thompson and Dave Stott in Connecticut, and Bill Hannan in California launched a campaign in 1967 nostalgically designed to start a new craze among the jaded youth of the jet age as well as the older flat-wallet crowd. Peanut Scale, for this was indeed the name chosen for this "new" class of model, became the rage in modeling circles from coast-to-coast. Peanut

(1)



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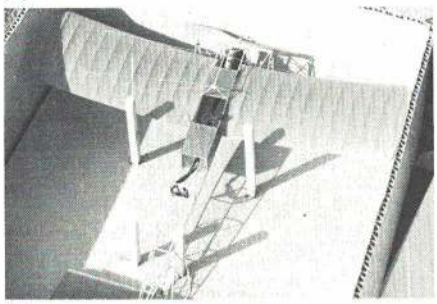

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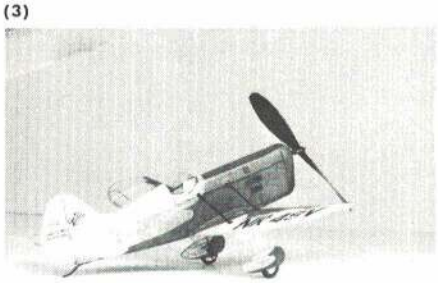

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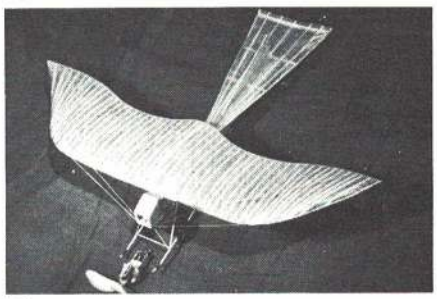

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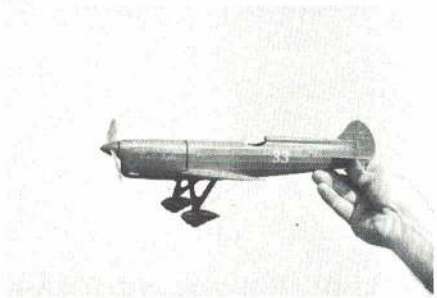

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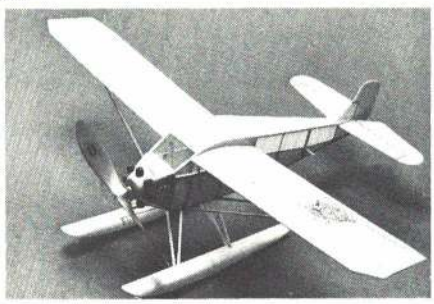

(1) Here's the same Fairchild sans covering. (2) 1911 Cessna ultra-light peanut by Fernando Ramos. (3) Nickel kit of Gee Bee Sportster dates back to 1935. Kit contained shaped bamboo wing and tail tips and all-balsa landing gear. (4) Waterman Gosling by Dave Stott is smooth flyer. Simple lines make it good for beginners, too. (5) Air Force jet pilot Capt. Bob Mickleson built this fabulous 1911 Albatros with geared rubber motor. (6) Miss Los Angeles racer by Jack McCracken is bear to trim but does fly well. It has no dihedral and, while light, it is fast. (7) A General Aristocrat by Hannan flies great even with the floats. Note peanut decals. (8) Array of Peanuts at Las Vegas Vultures New Years Annual recently. Event has been held regularly since 1969 and draws entries from everywhere. No two are alike. (9) Jim Warner demonstrates stretch-winding technique with his Farman Moustique. Stretching permits packing in many more turns. (10) Ultra-simple approach to the event is this Goppingen GO 9 by the author. Profiles are OK but not worth many scale points. (11) Tom Atkinson built this Mooney-designed Tailwind. An avid EAA member, Tom likes homebuilts. (12) Jim Warner launches his Dad's Poullin JP 30 which came from AAM's plans in the June '71 issue. (13) Dave Saks with an all-sheet balsa Driggs Dart. (14) Fudo Takagi with his one-minute-plus Evans Volksplane. Note ample dihedral necessary for low-wingers.

On facing page: Author's Fairchild KR21 from Modernistic Models plan just fits the rules with 13-in. span—weighs only 1/2 oz.

modelers have now pulled those old plans out of retirement, and proudly trace reduced-size RC model plans from magazines and convert them into rubber-powered *Peanuts*! Peanut plans are now appearing in all of the major magazines, and are readily available from many sources. Kits are a little hard to come by, as nothing sells for a nickel these days, but peanut kits of high quality will be marketed soon. The event is even being flown at the NATS, though it is to be hoped that this will not damage its popularity among those who build and fly for fun.

Choosing a Plane to Build

Build anything you want! The advantage to building a simple, small model is that if it doesn't fly when you finish, you're not out a bundle and can quickly build another that probably will. If you don't go for the super-simple formula, you can make a peanut just as complicated as your abilities will let you. Remember, though, that the spirit of Peanut is to keep it simple if you want real flyability, reliability and repairability. Some modelers like to build fancy to the point of being afraid to fly unless a trophy is at stake. Flying for real fun involves having a model you are not going to cry over if it gets wiped out while you're demonstrating it to some kids in a park or parking lot.

If you are new to the scale game, Peanut variety, you should try to find a plane with a square or box-like fuselage, a rather large wing (can be up to 13" span and still be classed as Peanut for contests), a horizontal stab (tail) which is around 1/3 of the wing area, a high wing (a la Piper Cub) or biplane, and a landing gear which is long enough to clear about a four-in. prop in case you want to ROG. The fewer things dragging in the breeze such as engine cylinders, struts, rigging, machine guns, bombs, etc., the better. You can add it all, but expect performance to drop sharply. Don't try and make it *too* scale if it means that by doing so it will be miserable to keep in repair. Ask yourself, how stark can I make it without making it unrecognizable?

Some scale subjects which have done very well and could be classed as one-minute-plus models when built well are the Poullin JP 30 (June 1971 AAM), ALCO monoplane, Laird Speedwing, Sperry Messenger, Waterman Gosling, Evans Volksplane, Miles M-16, Ryan M-1, Jodel Mascaret and the Pietenpol Air Camper. Kept down under 1/4 oz.,

almost any of these or similar models will fly amazingly well.

Weight is Important

If 1/4 oz. seems like an impossible weight to shoot for, just remember that tiny wings aren't going to carry heavy loads unless, of course, you want to fly faster. Flying faster means tiny warps or maladjustments will become magnified greatly. A fast flying, heavy model tends to return itself to kit form. Go thinner and lighter wherever you can. 1/64" is thick enough for wing ribs. Use lighter balsa or else sand it down.

Keep the strength of your model in four areas: Main fuselage longerons (usually four) between the nose and the rear motor peg; the nose which takes bashes but also has to be heavier than the tail for balance purposes; the wing leading edge as it often carries the load in no-spar wings, and in any case gets hit often; the landing gear, which should be made of wire and firmly attached. Other than that, *go lighter*. If it breaks, strengthen it a bit in that area. Repairs are easy on simple planes!

Other tips for light models include making your own balsa wheels, building planes with long noses which will not need added clay for that oh-so-necessary balance point 1/3 of the way back on the wing from the leading (front) edge, using jap tissue or condenser tissue for covering and decorating with colored tissue, not colored, heavy dope. When covering lightly-built frames such as tail surfaces *do not shrink the tissue with water*. Fuselages and strong wing coverings can be neatly shrunk before doping by wiping with a bit of cotton soaked in rubbing alcohol. Dope (nitrate type clear) can be thinned 50-50 with dope thinner for best results. Always use warp resistor or plasticiser in your dope for light planes, as it keeps the dope from pulling too tightly and warping wings. TCP, castor oil, or warp resistor sold in hobby shops will do. Experiment for the right amount. I use about 20 drops per ounce of raw dope when using Mel Farrel's stuff. Some modelers have been thinning "Floquil" model railroad enamel or mixing it with clear dope. It looks great, but adds weight. Detailing such as aileron separations, letters and numbers, etc. can be done with black jap tissue or a "permanent" fine-tip felt marking pen.

Building for Flying

More models have fallen victim to unwanted wing warps than to any other villain from the cursed Black Peanut's

(Continued on page 93)

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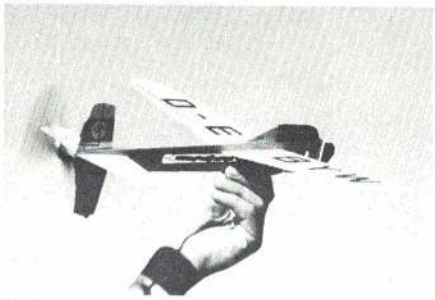

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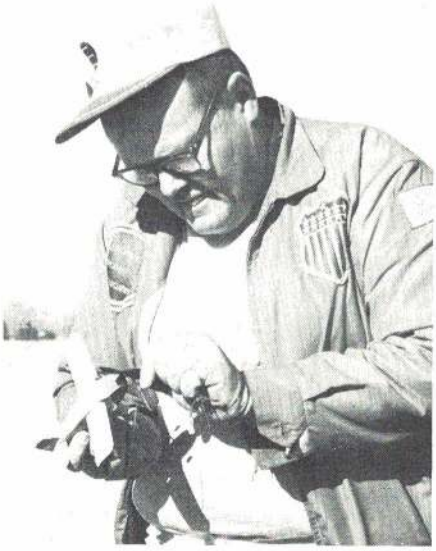

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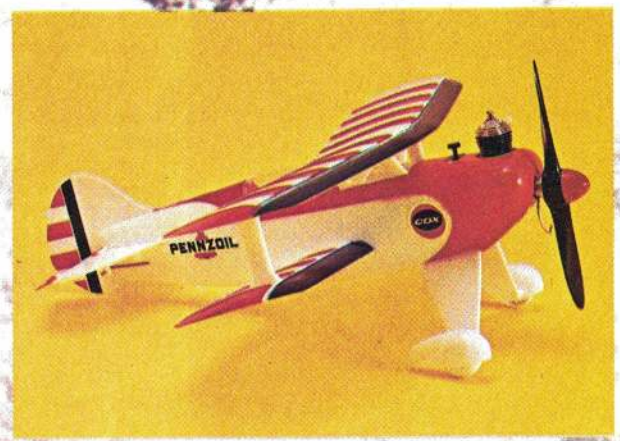
It's an Art.

Flying upside down or inside out, Art Scholl in his Pitts Special is one of the most skilled aerobatic champions of all time. He's been a member of the U.S. Aerobatic Team for the past three years.

Now you can fly a handsome replica of Art Scholl's famous Pitts Special. Endorsed by Art, the new Cox model measures up in every way to the Cox tradition of fine quality and superb fly-ability. It loops, dives, climbs and does wingovers, all within a tight 30 ft. circle. It's beautifully responsive and maneuverable, yet is built to take the hard knocks. Powered by a sure-starting Cox .020 gas engine, it's made of high impact plastic with authentic red, white and blue competition markings just like Art's plane. Comes complete and ready to fly.



Aerobatic flying is an art. But you can get your beginning training with a Pitts Special by Cox. Less than $13 at your hobby, toy or department store.

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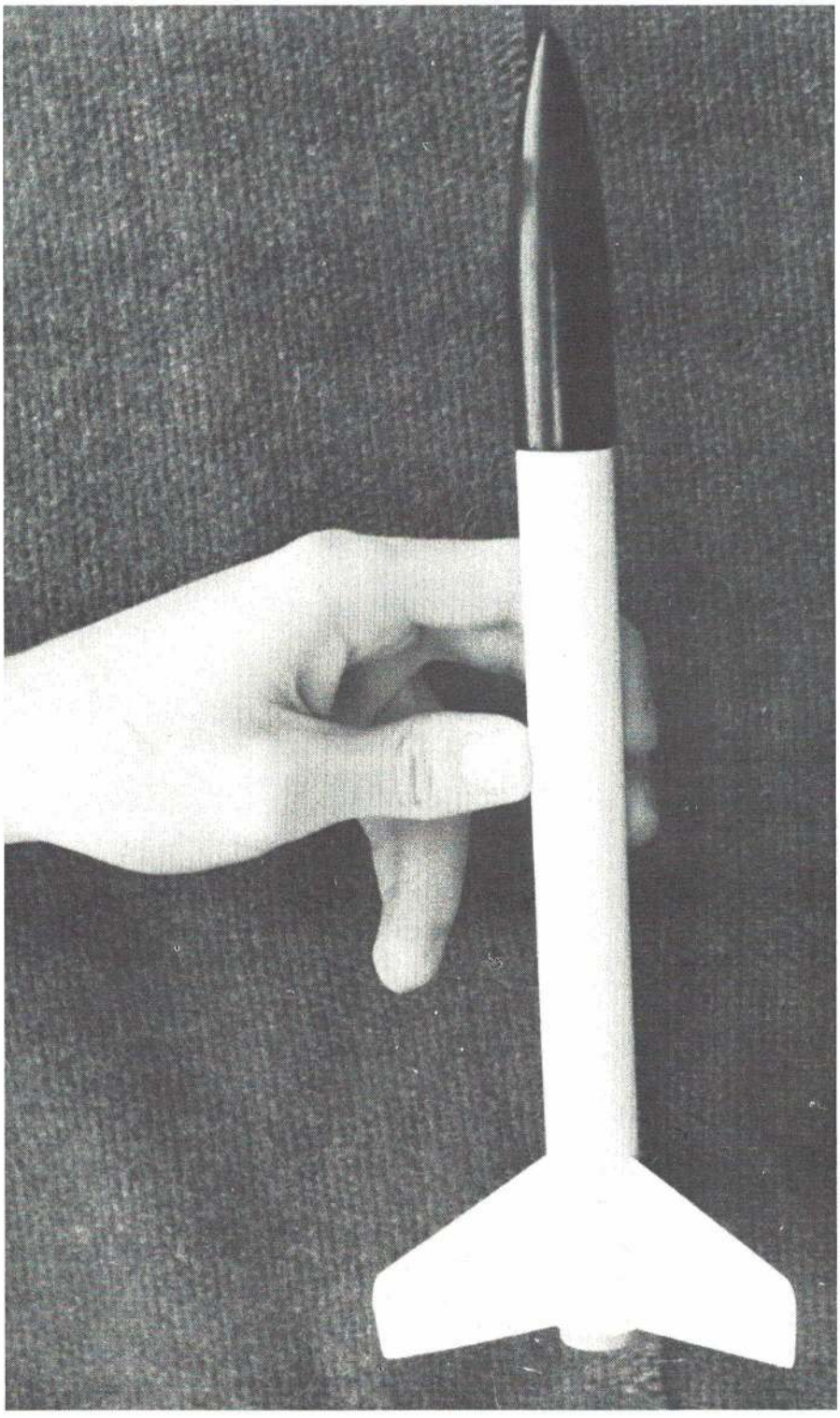
SIMPLE AND STABLE FOR THE NAR PAYLOAD EVENT IN WHICH ONE TRIES TO REACH THE GREATEST HEIGHT CARRYING A SPECIFIC WEIGHT.



ATUR

by RICHARD HYMAN

One of the challenging events in the NAR Pink Book is Payload—an altitude event, requiring the contestant to carry a lead payload that weighs about one oz. in his model. This extra weight isn't a real problem in designing and building, but the NAR payload comes in an odd size—it is only about 3/8 in. in length, with a diameter of 19mm that is the same as a standard model rocket body tube. A modeler must either use a heavier, larger diameter body tube to fit the payload, or he must make his own tube.

The Atur was designed using a self-fashioned payload tube around a 3/4-in. diameter body tube for the booster. The result is a lightweight model with low drag and high reliability.

Construction

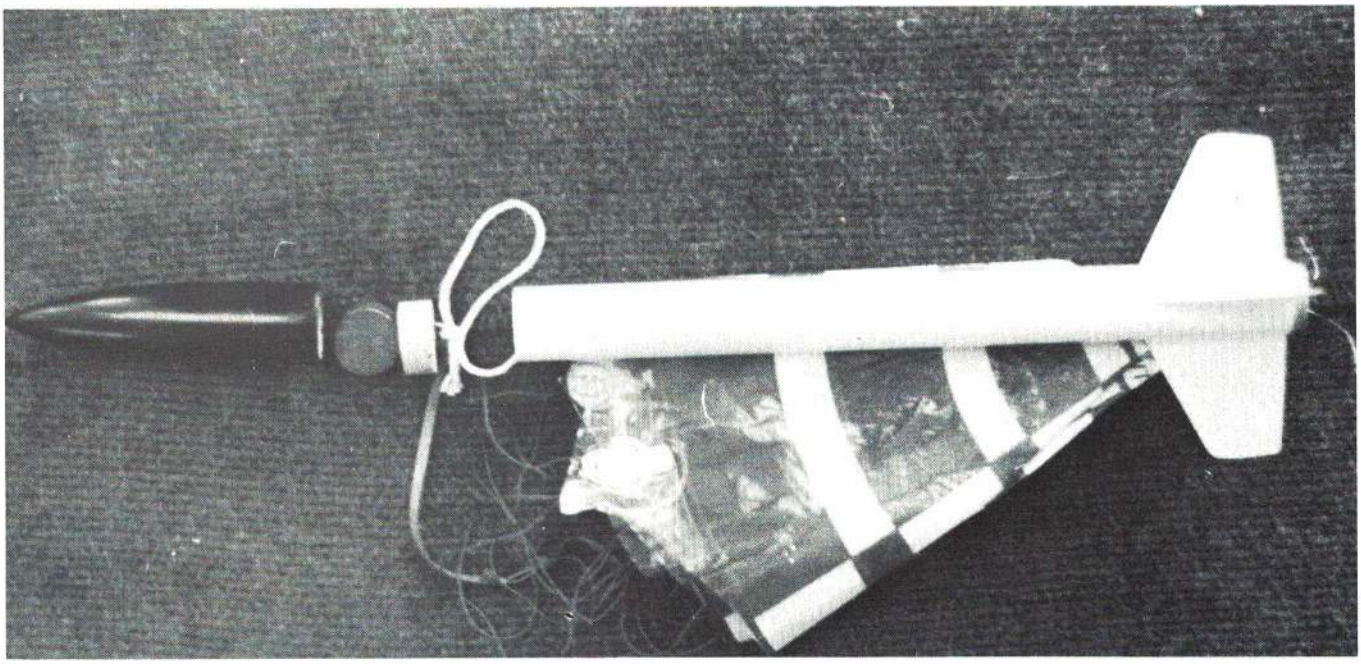
Construction begins with the payload tube made out of 1/64-in. plywood, which can easily be rolled into a tube. If unavailable from your local hobby dealer, plywood may be purchased by mail from the Sig Manufacturing Co. Cut out a piece of plywood measuring 1½ x 2-7/8". Roll the plywood around a length of body tube (Estes BT-20 or Centuri ST-7) and glue the 3/8-in. overlap together. Mask down the edges tightly, making sure you don't get any glue on the body tube.

After the payload tube has dried, sand the top and bottom edges so they are straight. Glue a nose cone to one end of the tube. You could hand turn your own nose cone on a lathe. Your hobby dealer may carry MPC or Space Age Industries twenty millimeter nose cones which fit this tube, or he may have an Estes or Centuri nose cone that is a little too big for their 3/4-in. dia. body tube and so will fit your payload tube. The exact length of the nose cone is not critical, but should be about 1¾-in. long. Before gluing on the nose cone, cut down the shoulder to ¼-in. length, and hollow it out for lighter weight if you wish.

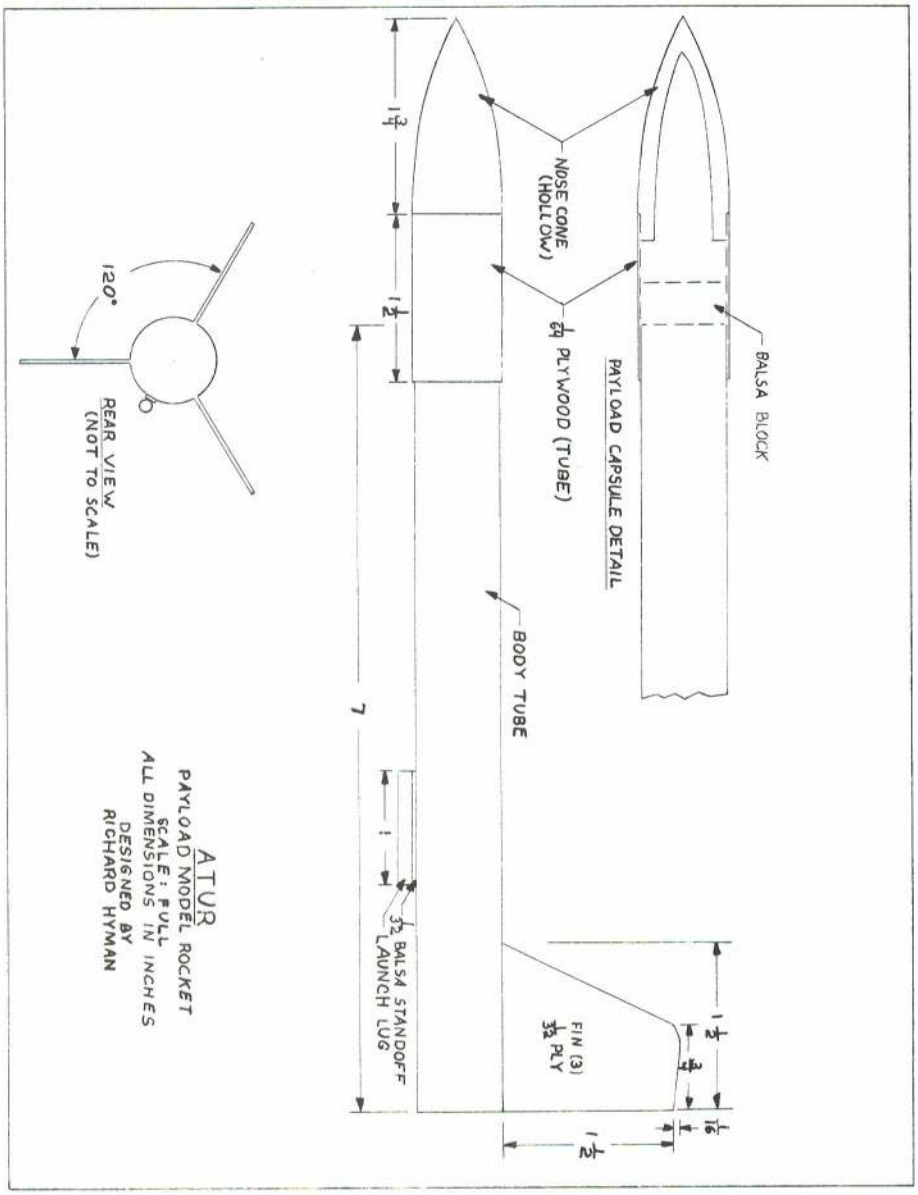
Make a block to hold the payload weight in the capsule by taking a 3/8-in. length of balsa nose block and gluing it inside an equal length of body tube. The block is also used as an attachment point for the recovery system, so a small screw eye or U-shaped piece of stiff wire must be glued into one end of the block. Tie a 4-in. length of 1/8" rubber with a small loop in the opposite end to this hook. A parachute will later be tied to the loop.

For the booster, carefully cut 7-in. length of BT-20 or ST-7 body tube. Into this tube glue a thrust ring 2-5/8 in. from one end to act as a forward stop for the model rocket engine. About one in. inside the opposite end of the tube, glue one end of a 12-in. length of heavy string for the recovery system, with a 3/4-in. square piece of gauze. Put a thick layer of glue over the gauze so the string won't pull loose.

While these items are drying, make three fins from 1/32-in. plywood with the dimensions shown on the plans. To decrease the drag, sand the fins to a



Recovery system is 12-in. parachute to bring model and the one ounce lead weight safely back to earth.



symmetrical airfoil and glue them to the lower end of the body so they are 120° apart. When the fins have dried, apply thin fillets of glue to the joints for strength, or use epoxy to be sure the fins never come off.

To complete the booster, glue a one-in. length of launch lug to the body, using a 1 x 1/8" piece of 1/32-in. balsa as a standoff. The standoff is used so that the launch rod will clear the payload capsule.

Try to obtain as smooth a finish as possible to decrease drag. The less drag there is, the more altitude you will get with the Atur. Apply several coats of balsa filler or sanding sealer to the payload capsule and fins, carefully sanding between coats. When these surfaces are smooth, colored dope can be applied. Tracking will be easier if the payload capsule and booster are painted two different colors which contrast sharply against each other.

Flying

To prepare for flight, tie the string from the booster onto the block hook. To the rubber loop, tie a 12-in. parachute, or if you are flying without a payload weight, a streamer may be substituted. Push the block into the payload capsule as far as it will go, using masking tape to keep it snug. After placing the recovery system in the booster, fit the capsule on the booster so that the lip fits smoothly, but not tightly, around the outside of the booster.

If you are flying the Atur without a payload weight, you should not use an engine larger than an A8-5 or you could lose your model. With the payload weight, a B6-6 or a C6-7 engine will give you a great flight.

Photo by Smithsonian Institution

HOW BELLANCA'S "IRISH SWOOP" RACER LIVED A LIFE OF INTERNATIONAL INTRIGUE.

Cloak-and-Dagger

by DON BERLINER

The latest airplane to carry the grand old name of Bellanca is nothing more or less than a slightly modernized old Aeronca Champion. As unexciting as this seems at first glance, it is yet one more sign that the goal of Bellanca is to do more with less than anyone else. The Champ, known throughout its long first life as one of the finest little touring/training two-seaters ever built, is now ready to provide even more economical flying than its companion on the Bellanca assembly lines—the aerobatic Citabria.

Practical, enjoyable flying at minimum cost is certainly a worthy goal, and could well be imitated by other manufacturers. But such was not always the guiding principle at Bellanca. No. . . performance and efficiency were long the qualities for which the late Guiseppe Bellanca was known all over the aviation world. And perhaps even more than for those, Bellanca was renowned for the novel ways he achieved them. Like wide-chord lifting struts, and a tri-motor transcontinental racer with two Menasco engines and one Ranger engine!

Because of Bellanca's reputation for being able to do things better by doing them differently, an order was received in the late spring of 1934 for an airplane to win the up-coming MacRobertson Race from England to Australia. The pilot, Col. James Fitzmaurice, was sponsored by the Irish Hospitals Trust and wanted an airplane capable of flying 3000 miles non-stop at 235 mph. And he wanted it to be ready to start the race in less than five months! Such was the confidence he had in the name of Bellanca.

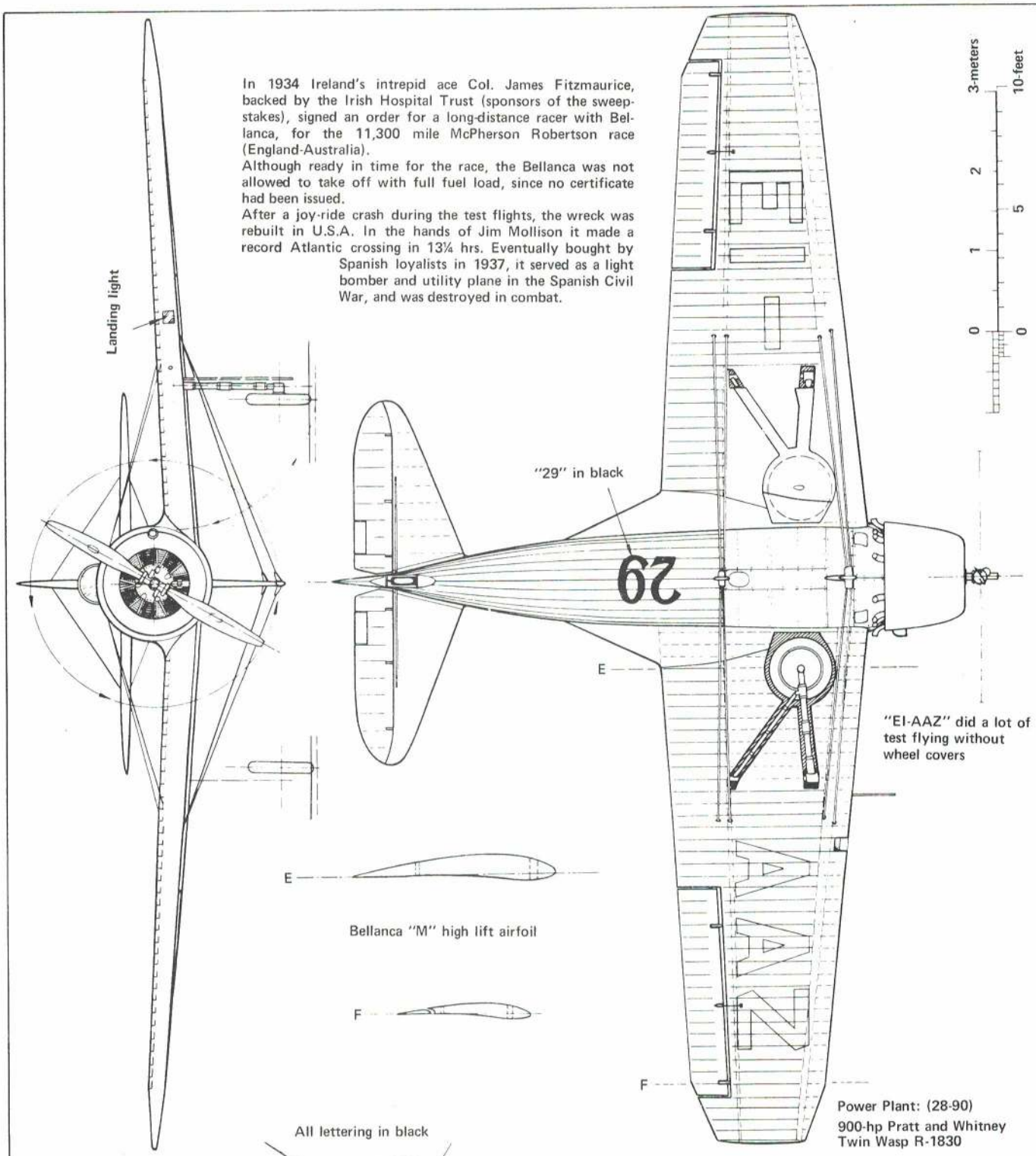
Construction began early in June, 1934 and the first test flight of the Model 28-70 (for 280 sq. ft. of wing, and 700 hp) was made three months later, on September 1. After some delays in shipping the prototype, it finally reached Mildenhall aerodrome (now the site of a USAF base in England) just four days before the October 20 scheduled start of the race. Named the "Irish Swoop" and licensed in Ireland as EI-AAZ, it was all ready to race. . .and then the officials stepped in, as they still seem to do at unfortunate times. Because of limited testing, the airplane had not been cleared at its maximum design loaded weight of 8350 lb. which was to have included some 600 gallons of fuel, weighing 3600 lb. The officials refused to let it take off at more than 5350 lb. which would have limited it to just over

(Continued on page 66)

In 1934 Ireland's intrepid ace Col. James Fitzmaurice, backed by the Irish Hospital Trust (sponsors of the sweepstakes), signed an order for a long-distance racer with Bellanca, for the 11,300 mile McPherson Robertson race (England-Australia).

Although ready in time for the race, the Bellanca was not allowed to take off with full fuel load, since no certificate had been issued.

After a joy-ride crash during the test flights, the wreck was rebuilt in U.S.A. In the hands of Jim Mollison it made a record Atlantic crossing in 13¼ hrs. Eventually bought by Spanish loyalists in 1937, it served as a light bomber and utility plane in the Spanish Civil War, and was destroyed in combat.



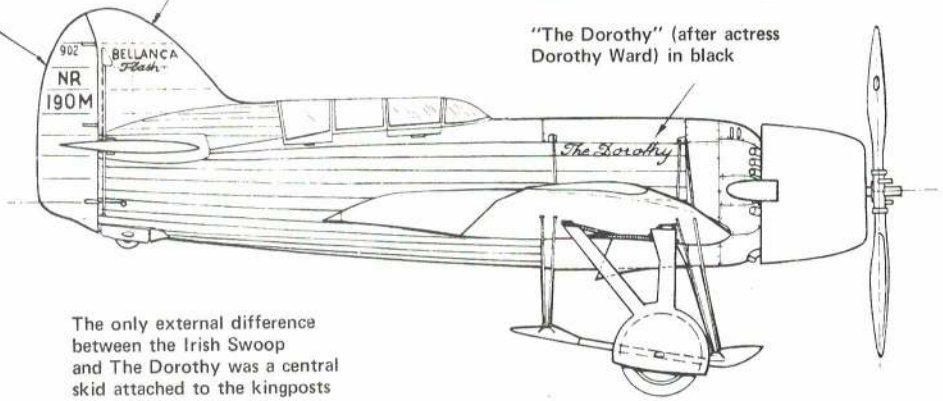
"EI-AAZ" did a lot of test flying without wheel covers

Bellanca "M" high lift airfoil

Power Plant: (28-90)
900-hp Pratt and Whitney Twin Wasp R-1830

All lettering in black

"The Dorothy" (after actress Dorothy Ward) in black



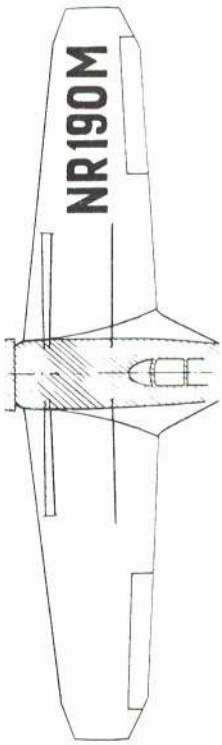
BELLANCA 28-90
The Dorothy - 1936

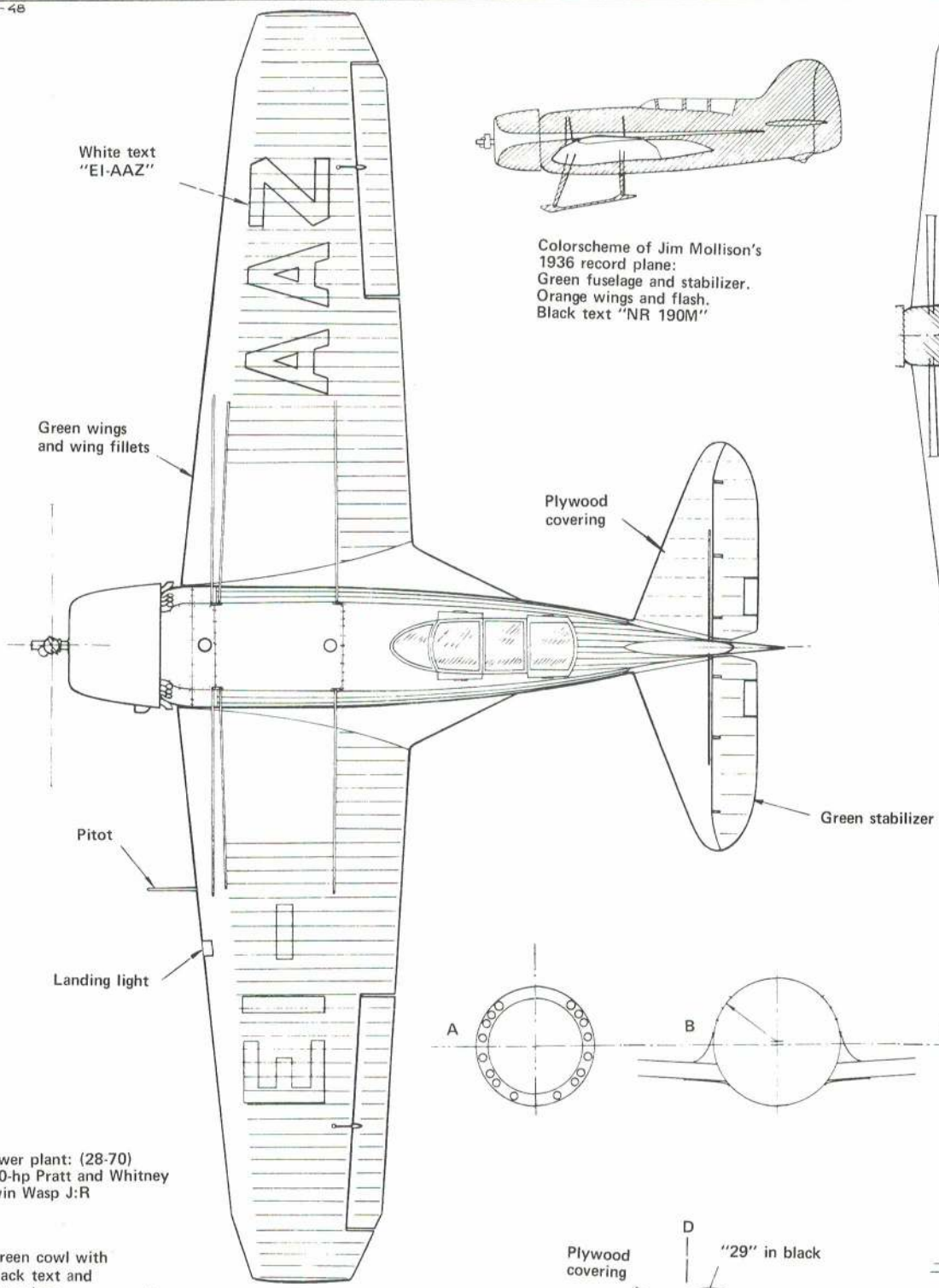
The only external difference between the Irish Swoop and The Dorothy was a central skid attached to the kingposts

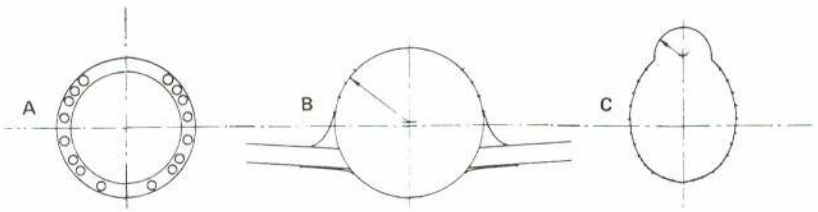
Drawn by:
BJØRN KARLSTRØM

720105-48

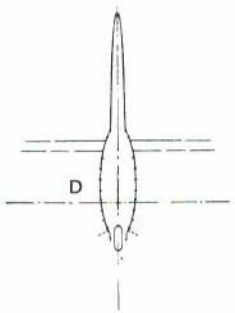
Colorscheme of Jim Mollison's
1936 record plane:
Green fuselage and stabilizer.
Orange wings and flash.
Black text "NR 190M"

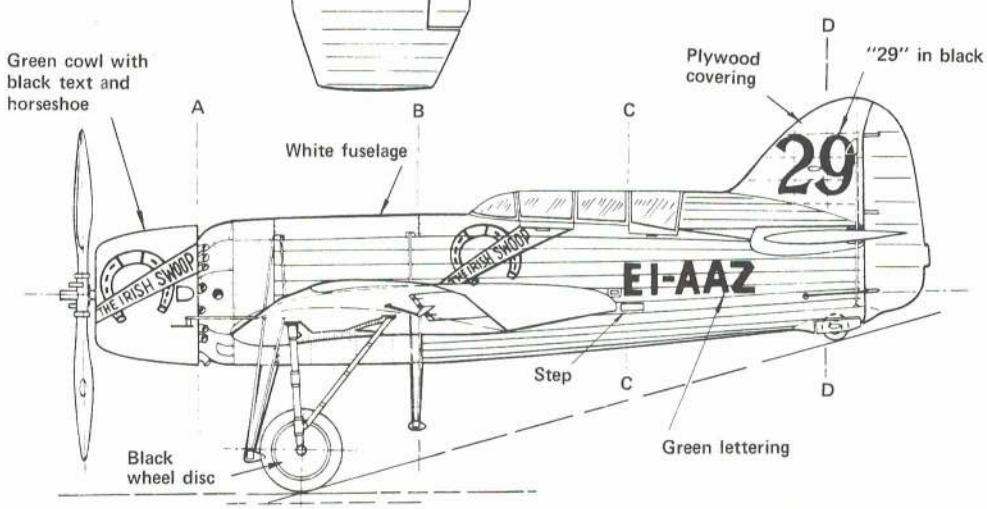






Power plant: (28-70)
700-hp Pratt and Whitney
Twin Wasp J:R





BELLANCA 28-70

THE IRISH SWOOP - 1935

Scale= 1:72

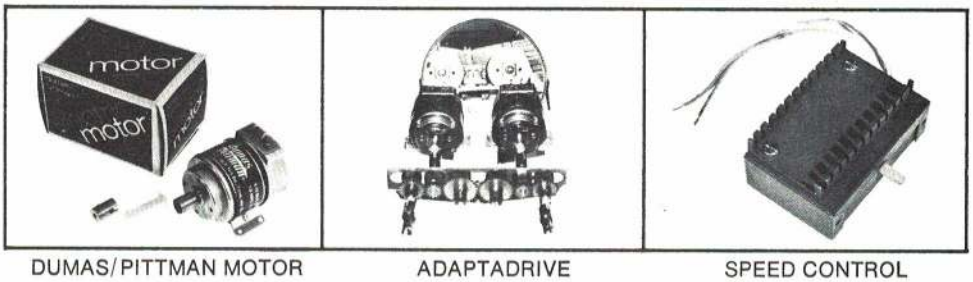
Quiet Beauty . . .
with Dumas Scale Models

TROJAN

TUGBOAT

. . . and the accessories too!

PT 109 | COAST GUARD BOAT | SPORT FISHERMAN



DUMAS/PITTMAN MOTOR | ADAPTADRIVE | SPEED CONTROL

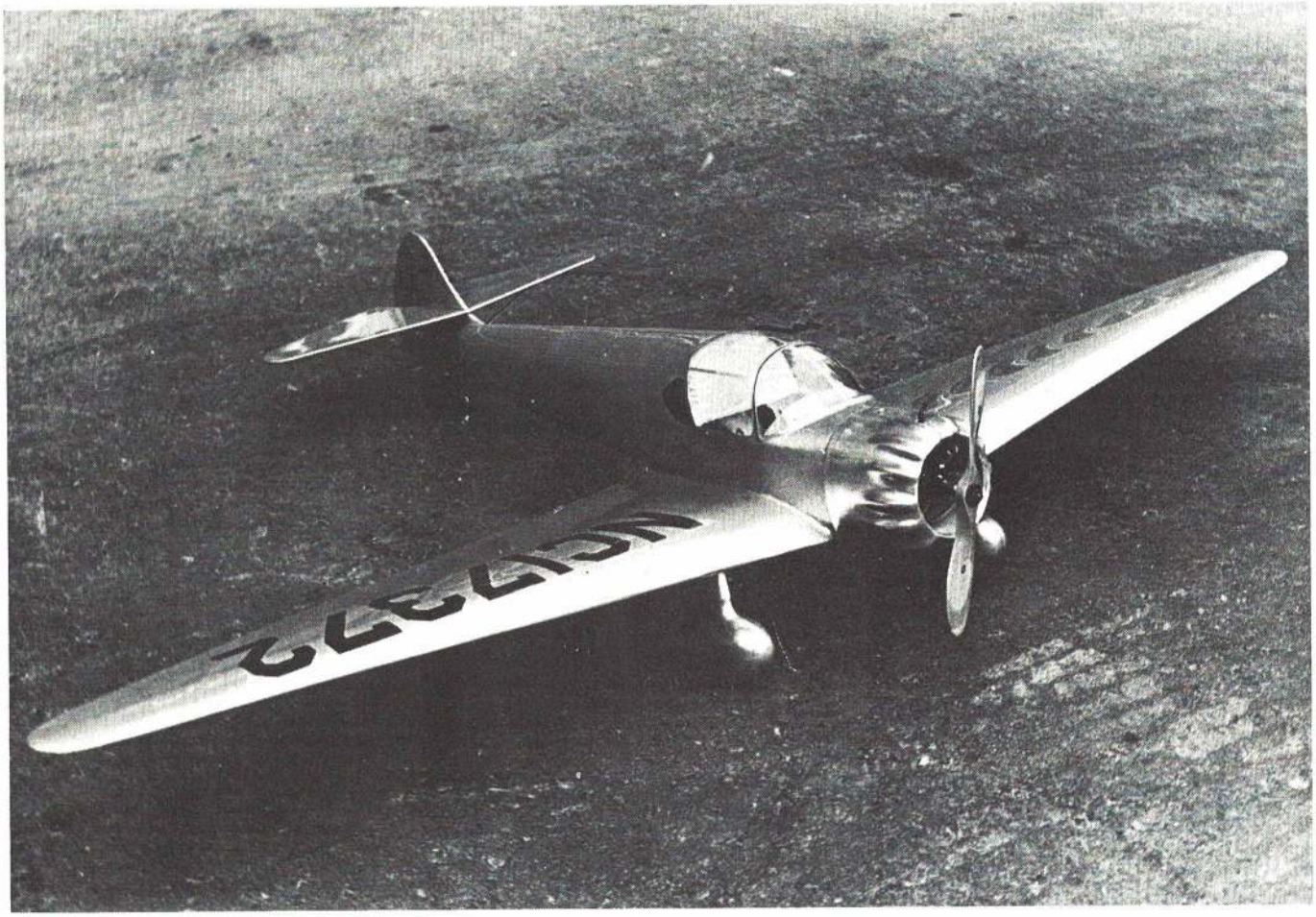
Whether you're a display model builder, a RC scale fan or want something for free running, here are two brand new models of brand new boats. The Trojan 31′ yacht model is in 1″ to 1′ scale right off the plans of the full size boat. Tough plywood construction allows installation of single or dual Dumas/Pittman motors, an adaptadrive unit, even a .19 to .35 engine . . . plenty of room for radio gear and batteries too! Then there's our new 90′ tug model . . . also right off the full size plans of the latest type tugs, but scaled down to 36″. The famous 33″ PT 109 with all mahogany construction, for electric or gas power; our two popular balsa kits; the 29″ Coast Guard 40′ utility boat and 1″ to 1′ scale Chris-Craft 35′ Sport Fisherman for electric power or display round out our most popular models. Our complete line of hardware: props, shafts, stuffing boxes, rudders, steering arms, and universals are available for gas engines or the Dumas/Pittman electric motors. The Adaptadrive transmission unit combines with our brand new proportional speed and direction control unit to provide all you need for operation of your electric model. Send 25¢, to cover postage and handling, for complete catalog.

dumas boats

Dumas Products, Inc., 790 S. Park Avenue, Tucson, Arizona 85716

Ryan SC

IN 1930's THIS PLANE WAS WAY AHEAD OF ITS CONTEMPORARIES IN DESIGN AND PERFORMANCE. HERE IS A FINE FLYING FF SCALE VERSION.



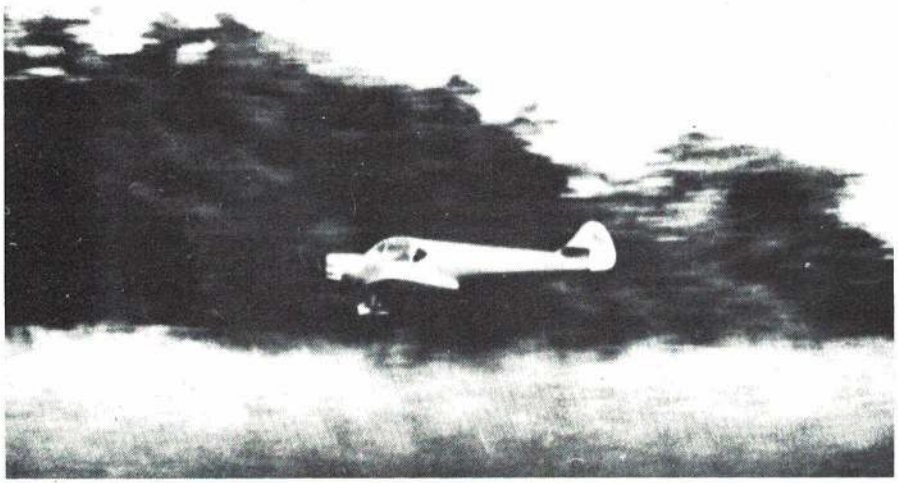
Photos by Dr. Robert Carroll

by MARTIN CARLIDGE, JR.

Tired of the same old high wing sport models? I was. While paging through back issues of **AAM** looking for something different, I came across the fine article and three-views of the Ryan SC, so this fine-looking Sport Cabin aircraft of the mid 30's became my next project.

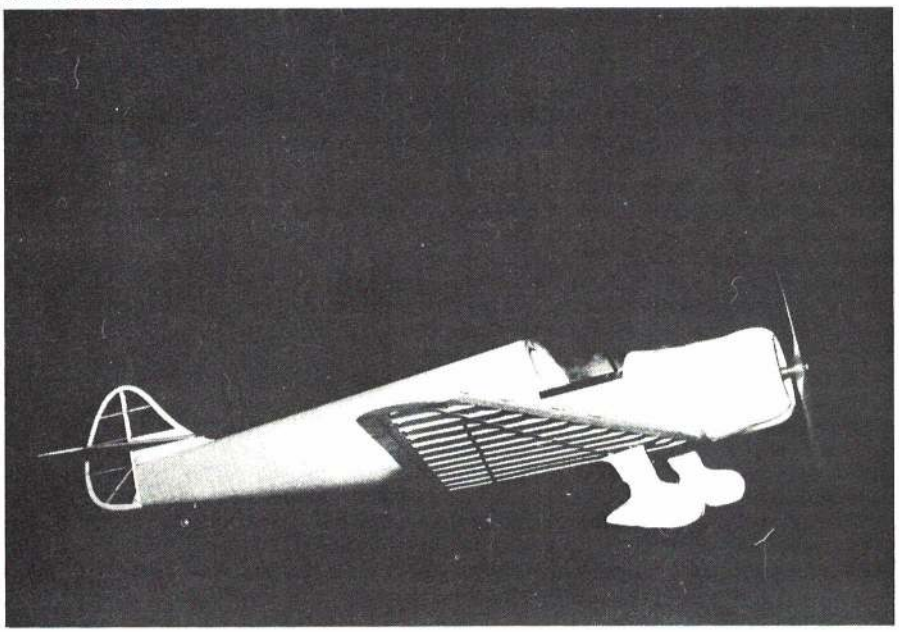
Although the Ryan SC has a few characteristics, such as extreme wing taper and small tail surfaces, which are not normally associated with good free flight performance, it was decided to give her a go anyway.

The first test flights quickly dispel fears and once you become used to the higher flying speed (she definitely is no floater) and trim her accordingly, she will turn in some fine flights.



Flight of the Ryan is fast and smooth. Built light, it glides real well. Its speed helps it handle windy contest days easily.

Construction of the ship is not particularly difficult. Fuselage is a balsa sheet monocoque assembly. Canopy, cowl and wheel pants were vacuum-formed from light plastic at home, text describes how.



Construction

The fuselage is the most difficult part of the model, so let's start with it. Begin by cutting all the bulkheads from 1/8 medium balsa. Assemble formers F-5 thru F-9 on the 1/4 in. sq. upper and lower keels, being especially careful to insure correct alignment. Install FW-1 (2 each) and formers F-3 and F-4. Butt glue 1/32 sheet balsa together to form a piece large enough for the fuselage skin. Use the template on the plan to cut the skin to shape. This is oversize and will be trimmed after assembly.

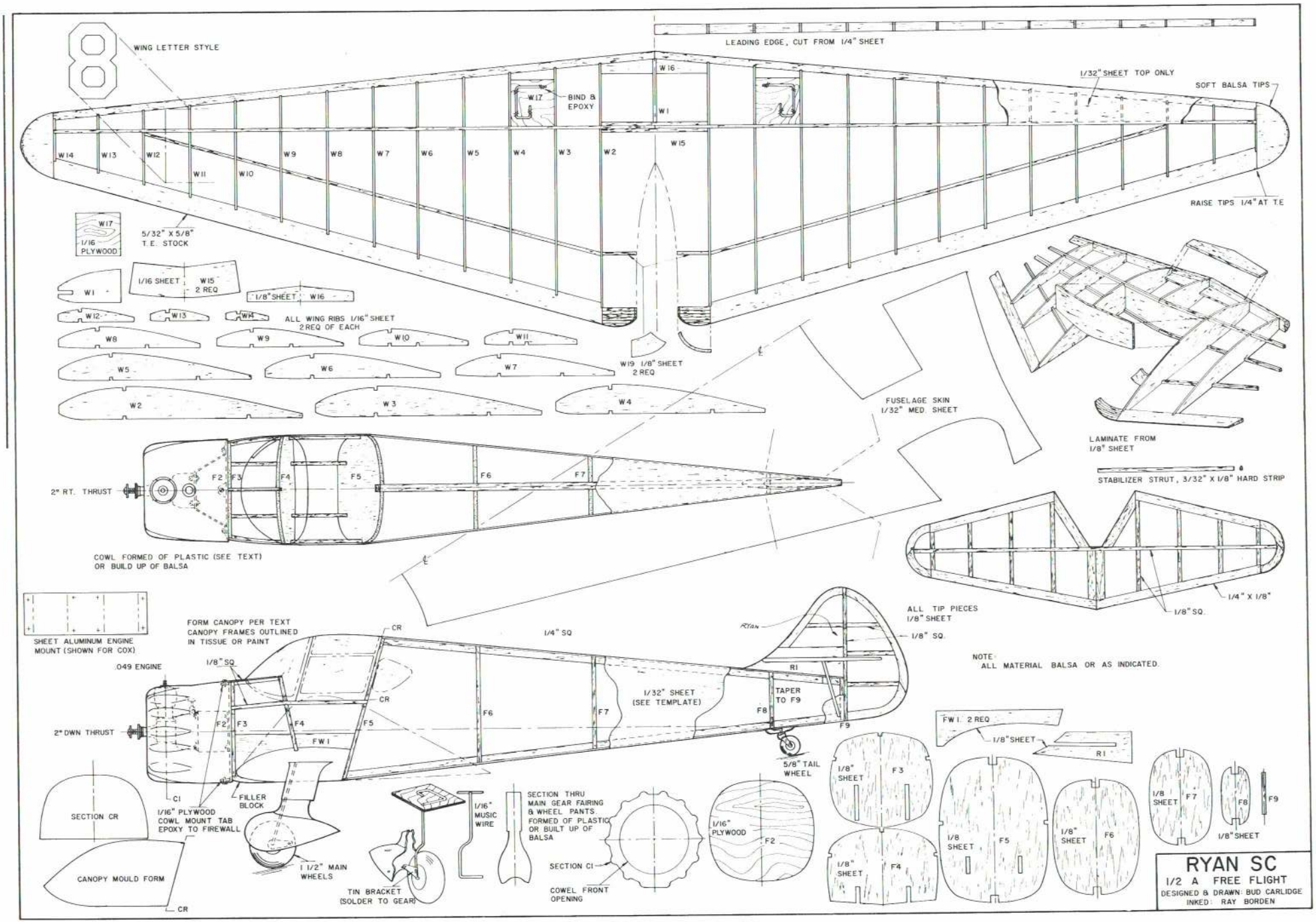
Soak the skin in very hot water for about 10 minutes. Carefully position the skin on the top keel member and wrap around the frame, allowing it to overlap at the bottom keel. Carefully pin and tape the skin in place and allow to dry. Trim the skin by cutting through the overlapping layers, leaving a good butt joint at the bottom aft fuselage and at the top, just forward of the cabin. Allow the skin to dry, then remove it from former and bulkhead assembly.

Apply cement to the former and bulkhead assembly from F-5 aft to F-9 and place inside the molded skin. Again use pins and tape to secure it. Avoid application of pressure between bulkheads, as this causes sagging. Now the skin can be glued to the bulkheads forward of F-5, and when completely dry, trimmed to shape. Do not trim the skin at the wing attach area until fitting the wing assembly. Add the 1/16 plywood firewall, being sure to epoxy the nuts for the engine mount to the back side. Add the cowl mount tabs. Mount the engine as indicated on the drawings.

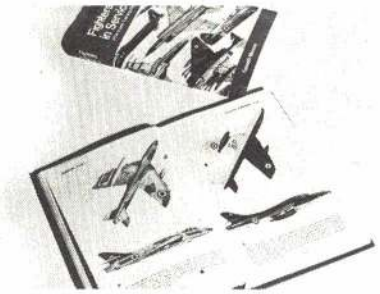
Construction of the empennage is simple and straightforward. Use medium balsa and double glue all joints to prevent warping.

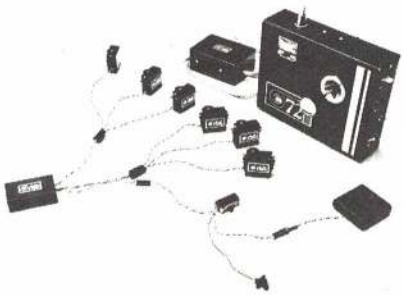
The wing panels can be built directly over the plan. Notch the leading and trailing edges and insert all wing ribs. Insert the upper and lower wing spars. Before gluing in the lower aft spar, raise the trailing edge at the wing tip 1/4 in. This wash-out is essential to good flight stability and must be accurate. Add the wing tip blocks and sand to shape. Join the wing halves using W-15 to establish the proper dihedral angle, 3 in. at each tip. Bend the landing gear wire as outlined on the drawings. Epoxy and soft wire are used to fasten the wire to W-17, the 1/16 plywood mounting plate. W-17 is epoxied into the wing. The 1/16 balsa webs are inserted between W-2, W-3 and W-4 on the forward side of the spars. The leading edge can be sheeted at this time. Wetting the outside surface of the sheeting will aid in forming the skin to

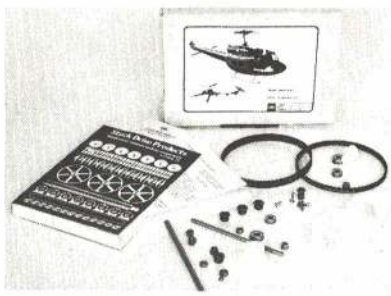
(Continued on page 79)

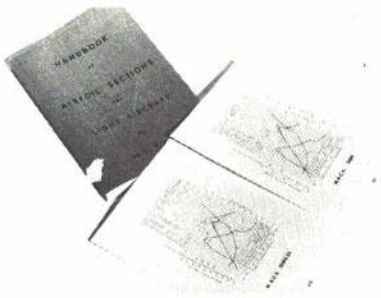

WING LETTER STYLE
LEADING EDGE, CUT FROM 1/4" SHEET
1/32" SHEET TOP ONLY
SOFT BALSA TIPS
BIND & EPOXY
RAISE TIPS 1/4" AT T.E
5/32" X 5/8" T.E. STOCK
1/16 PLYWOOD
1/16 SHEET
1/8" SHEET
ALL WING RIBS 1/16" SHEET 2 REQ OF EACH
W19 1/8" SHEET 2 REQ
FUSELAGE SKIN 1/32" MED. SHEET
LAMINATE FROM 1/8" SHEET
STABILIZER STRUT, 3/32" X 1/8" HARD STRIP
2° RT. THRUST
COWL FORMED OF PLASTIC (SEE TEXT) OR BUILD UP OF BALSA
ALL TIP PIECES 1/8" SHEET
1/4" X 1/8"
1/8" SQ.
SHEET ALUMINUM ENGINE MOUNT (SHOWN FOR COX)
FORM CANOPY PER TEXT
CANOPY FRAMES OUTLINED IN TISSUE OR PAINT
.049 ENGINE
1/4" SQ
1/32" SHEET (SEE TEMPLATE)
TAPER TO F9
2° DWN THRUST
5/8" TAIL WHEEL
NOTE: ALL MATERIAL BALSA OR AS INDICATED.
FW I. 2 REQ
SECTION CR
CANOPY MOULD FORM
1/16" PLYWOOD COWL MOUNT TAB EPOXY TO FIREWALL
FILLER BLOCK
1 1/2" MAIN WHEELS
TIN BRACKET (SOLDER TO GEAR)
1/16" MUSIC WIRE
SECTION THRU MAIN GEAR FAIRING & WHEEL PANTS. FORMED OF PLASTIC OR BUILT UP OF BALSA
SECTION CI
COWEL FRONT OPENING
1/16" PLYWOOD
1/8" SHEET
RYAN SC
1/2 A FREE FLIGHT
DESIGNED & DRAWN: BUD CARLIDGE
INKED: RAY BORDEN

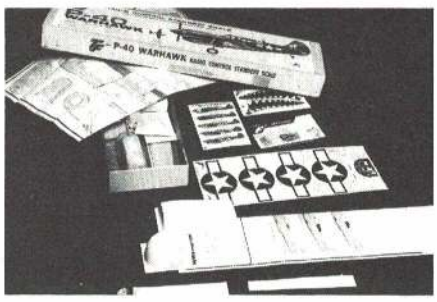
new products checklist

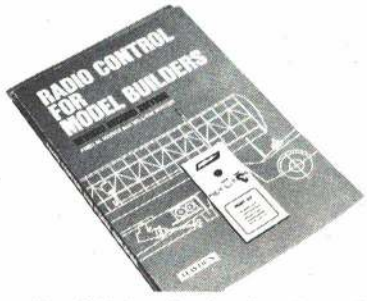












Macmillan/*Fighters in Service*. One of the most readable and beautiful of the present group of technical books, *Fighters in Service* presents an excellent grouping of representative fighter aircraft from a wide range of countries. Detailed two-views in full color plus extensive technical data on 80 aircraft from the 1960 to 1972 time frame. Indigenous aircraft from the U.S., U.S.S.R., France, Italy, U.K., Sweden, Japan, even India are presented. Text by Kenneth Munson is extensive and provides data on performance, powerplants, weaponry, production runs, etc. Illustrations by John W. Wood. 167 pages, hardbound, $3.95. The Macmillan Co., 866 Third Ave., New York, N.Y. 10022

Estes/Technical manuals. Two new pamphlets are available for technical assistance to the advanced model rocketeer. Altitude Prediction Charts (Pub. No. TR-10) discusses method by which altitude can be computed when engine thrust, drag coefficient, temperature, etc. are known. 39 pages including 21 pages of graphs with explanatory text and examples. Aerodynamic Drag of Model Rockets (TR-11) examines the principles of turbulent and laminar flow, explains the use of Reynolds numbers in determining the efficiency of rocket shapes. Serious material for the rocketeer who wants to do more than fire it up and see how it comes down. For additional information on this excellent series, write Estes Industries, Box 227, Penrose, Colo. 81240

Hayden/Textbook on RC. By two key members of the **AAM** staff, *Radio Control for Model Builders* is a complete discussion of the entire hobby from theory to practice. Boats, cars, planes are all covered. For the beginner, the various systems are described, terms defined, and circuits explained. Chapters cover transmission and reception of superregen and superhet systems, encoding and decoding, actuators, electrical supplies, system installations, much more. Text is about as complete and detailed as possible, yet is clear and easy to read, amply supplemented by photos and drawings on every page. Written by Fred Marks and William Winter. $4.45. Hayden Publications, 116 W. 14th St., New York, N.Y. 10011

Orbit Electronics/Six-channel RC. Top-of-the-line, single-stick system features integrated bridge servo amplifiers, decoding by an 8-bit integrated circuit shift register for lower current drain and reliability. Buddy-box capability, external dual transformer charger for NiCads, full complement of mounting hardware. Available on all three bands. New receiver features out-of-sight range should a shorted or dead cell occur. With four servos, $490. Orbit Electronics Corp., 17312 Gillette, Santa Ana, Calif. 92705

Aviation Publications/Tech data on airfoils. *Handbook of Airfoil Sections for Light Aircraft*, by M.S. Rice is a technical publication which is rare in today's popular book market. Describes 123 characteristic airfoils with lift/drag ratios and coefficients of lift and drag, and discusses the commonalities and specialized applications. Not for beginners but a book which should be a part of the serious model builder's library. Softbound, $3.95. Aviation Publications, Box 123, Milwaukee, Wis. 53201

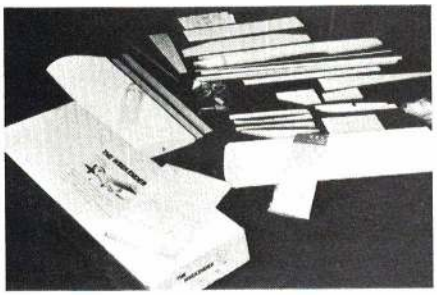
Pierce Hobby/Silver solder. For use with torch or soldering iron, "Ridgid Rod" is lead-free, a must for working with stainless steel, piano wire, copper, brass, silver. Melts at 425 and has a tensile strength of 15,000 psi. Comes in short, convenient lengths at low price of $1/package. Pierce Hobby Supply, 60 S. 8th St., Banning, Calif. 92220

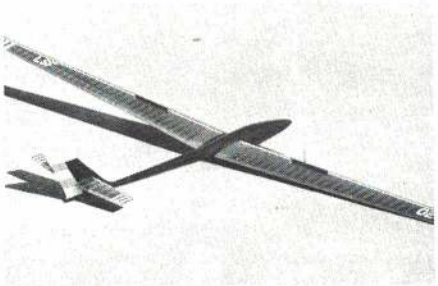
Stock Drive Products/Helicopter drive component kit. Latest release in the expanding field of helicopter modeling, kit contains necessary parts to build main and tail rotor drives for "2-B" 'copter or any model helicopter with a main rotor span of 5' and 19 to 35 power. Kit contains 31 parts such as mitre gears, bearings, bushings, etc. Also included: 516-page catalog with listing of 6500 small machined parts which are often difficult to find through ordinary supply channels. $39.95 ppd. Stock Drive Products, 55 S. Denton Ave., New Hyde Park, N.Y. 11040

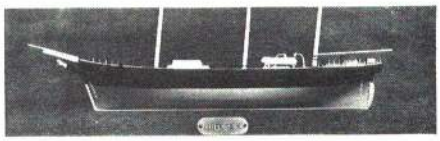
Top Flite/P-40 Stand-off scale. RC model of controversial WWII Warhawk fighter, kit uses built-up balsa construction with detailed plastic canopy, cowling, stacks. Large four-color fuelproof decals plus full-color detailed plans for squadron markings, alternate color schemes, etc. Balsa-sheet covered wings feature flaps, ailerons, room for retract gear if desired. All die-cut parts, full-length machined fuselage sides, nylon and metal fittings included. 60" span, 606 sq. in. wing area, recommended power, 40 to 60. $49.95. Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, Ill. 60616

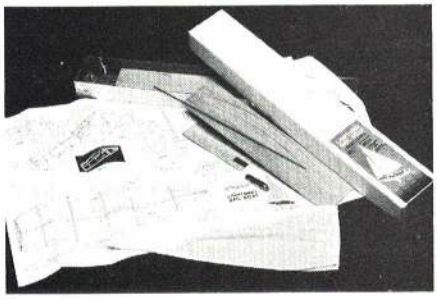
Sterling/*JN-4 Jenny*. The old favorite JN-4 Jenny would lose something of her subtle beauty with slab balsa fuselage sides and foam core wings. With this in mind, Sterling releases a 3/4" to 1' scale built-up balsa "stick" kit in Kelly Field khaki, 1917 roundels, and every longeron in place. Can be flown on rubber, CO_2, or 020 to 049 power, either free flight, CL, or single-channel RC. For scale enthusiasts, kit has full rigging, cockpit-connected control surfaces. Span, 32¾". $6.95. Sterling Models, Inc., Belfield Ave. and Wister St., Philadelphia, Pa. 19144

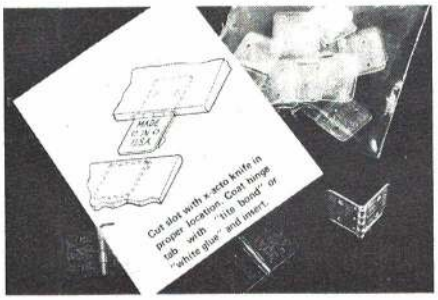
by FRANK PIERCE

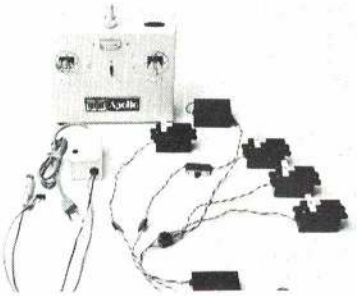


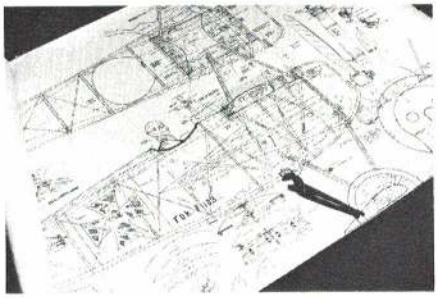


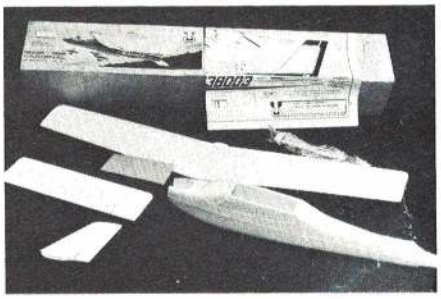












Stafford/*Weekender.* So called because a weekend is all that is required to go from workbench to flying field. Plane has a spectacular F-8 Crusader-ish look about it which belies its good handling qualities. 5½ to 6½ lb. flying weight, 63" span, 800 sq. in. wing area, all 1/4" box balsa fuselage, formed tricycle gear, foam wing precovered in white plastic. For 3- to 4-hannel RC. $39.95. Jack Stafford Models, 12111 Beatrice St., Culver City, Calif. 90230

Dumas/*Lightning.* Scale model of popular racing sport boat, *Lightning* is 1" to 1' scale, 19" overall length, 6½" beam. Kit features all-mahogany pre-cut panels, two nylon sails, rectangular mast and T-boom, operating centerboard, lead ballast rigging, many other extras. Detailed instructions. $9.95. Dumas Products, 790 South Park Ave., Tucson, Ariz. 85719

Royal/Apollo 4-channel. All-silicon transistor circuitry in both transmitter and receiver provides exceptionally long life and stability over a wide temperature range. Servo response speed and resolution are outstanding; each servo is fitted with rotary output arm and provided with a supplemental assortment of additional arm types for specialized applications. Master connector plug from receiver provides input to elevator, throttle, rudder servos (see photo) with separate aileron servo connector. Dual external transformer-type battery charger for NiCads. Operates on all 27 MHz frequencies, .55-watt output. $299.95. Royal Electronics Corp., 2119 S. Hudson St., Denver, Colo. 80222

Fliteglas/Sailplane. Semi-kit consists of fiberglass fuselage, canopy, rolled plans for wing construction (no balsa included). *Miskeet* has wing area of 1008 sq. in., wing loading of 8.5 oz. 150" span has aspect ratio of 22 to 1, NACA 6412 airfoil. Approximately nine dollars worth of balsa wood is required to build the wing, stab and rudder. $39.95. Fliteglas Models, Box 98851, Des Moines, Wash. 98188

Carl Goldberg/Klett RK-3 hinges. By Roy Klett, probably the lowest friction, lowest inertia control hinges yet. Hinge pin may be removed to separate control surface when painting and repairing. RK-3 also has holes and fine lines for more secure gluing. Size of each half is 1/2" deep by 3/8" wide. In packages of 7 for $1.25, 15 for $2.35. Carl Goldberg Models, Inc., 2545 W. Cermak Rd., Chicago, Ill. 60608

Aerotec Model Engineering/DR-1 plans. Fully detailed construction plans for Fokker DR-1, triplane using built-up construction, and providing sufficient data to permit addition of all sorts of realistic scale touches—cockpit controls, guns, etc. 3" to 1' scale on large easy-to-read heavy white rolled paper. $14.95. Plans plus ribs and formers, $38.95. Aerotec Model Engineering Co., Box 116, Lincolndale, N.Y. 10540

Sterling/Ship model kit. A resurrection of a craft which became an art form in the 19th century, patternmaker's half-hulls were used by shipbuilders to get scale templates for full-size hull designs. Later, these half-hulls were finished to make beautiful wall plaques. Now, half-hull models of Sovereign of the Seas, Cutty Sark, Constitution, are available in semi-finished kit form. "Distressed" mahogany base, about 2' long, is fully machined, requires only light sanding. Hull is preformed and shaped, requires light trim and finishing. Complete kit includes fittings, brass name plate, American eagle plaque. Much deck detail, printed deck planking lines, also die cut, first on this type of kit, as are stub masts. Houses, hatches, railings, etc. $15. Sterling Models, Inc., Belfield Ave. and Wister St., Philadelphia, Pa. 19144

Hirtenberger/HP61FR/RC. Unsurpassed for brute power, engine uses Schnuerle porting, produces 1.3 hp. Cool running 61 engine produces very little vibration for its size. Muffler included as part of integral design. $84.95. Nelson Model Products, 6929 W. 59th St., Chicago, Ill. 60638

Midwest/*Cessna Cardinal.* Semi-scale kit uses many pre-formed parts, fuselage, wing, stabilizer, fin. Fuselage has firewall, main gear mount, side rails already installed. For 1- to 4-channel RC or free flight on 049 to 15 engines. High-lift 48' wing, detailed plans to help less experienced builders. $21.95. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342

WORLD'S FIRST PUBLISHED PROVEN CHOPPER FOR THE SCRATCH BUILDER. INTENDED STRICTLY AS A TRAINER ADAPTABLE TO MORE ADVANCED CONFIGURATIONS AND A SCALE BODY.

S.S.P. HELICOPTER

by GENE ROCK

I made my first helicopter, inspired by Glen Lee, back in 1962. The model was free flight and it didn't fly simply because I didn't know how to adjust tip weights. In 1963, Ken Norris' helicopter spurred me on and the model failed—simply because I couldn't keep the motors running. In 1967, John Burkam's model in the *Challenge of RC Scale* took shape in my shop but still couldn't get off the ground. This time the problem was mainly due to poor machining practices. In 1969, I met John Burkam and started building rubber-powered models like "Penni" published in 1969 in **American Modeler**. Rubber-powered models offered a fast way to study helicopter stability. I learned twice as much in the following year as I did in the previous seven. Many evenings were spent observing John's "Super Susie" in flight. Again I tried and failed but finally this past summer the "S.S.P." emerged. Being so fed up failures, the tethering was skipped. A few short bursts of the engine was enough to trim out the model. Feeling brave, I gunned the engine and the model leaped into the air and was ten feet off the ground before the engine was throttled back—it has been flying ever since.

The "S.S.P." is similar to Dieter Schluter's helicopter in every aspect except for size and body. The rotor system is Hiller except that there is no feedback from flapping. Rotor control is achieved by applying cyclic pitch to the small paddles. This forces the gyro that the paddles are attached to, to precess 90° later in the direction of the force. When the plane of the gyro is changed with respect to the main rotor, cyclic pitch is applied to the main rotor. Like the gyro, the main rotor takes 90° to precess. Now the rotor plane is changed, changing the thrust vector. Assume that we want the model to fly forward: The swashplate is tilted so that it is high in back. This tilt gives the paddles the most pitch on the left side. This in turn precesses the gyro and makes it high in back of the model. With the gyro high in back, the rotor blades have

the most pitch on the left side. This precesses the rotor and makes it high in back. The model then flies forward.

The gyro performs many functions. When a gust hits the model, the gyro is slow to respond, thus not following the model but staying in its former plane. The gyro always makes the rotor follow until the rotor describes the same plane as the gyro. This resistance to changes applies the proper cyclic to correct the model.

Throttle is used instead of collective pitch to vary the thrust. This arrangement simplifies the control system greatly and performs just as well as collective pitch. The only disadvantage is that collective pitch cannot be dropped for autorotation. A reliable engine is a must.

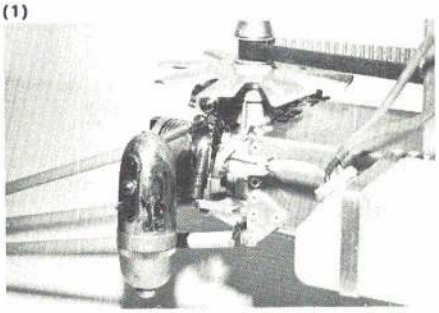
Yawing the model is achieved by changing the collective pitch of the tail rotor. The collective setting of the tail rotor is constant over the rpm range of the main rotor. When the engine rpm is changed, there exists a torque fluctuation while the rotor is accelerating or decelerating. During this brief interval the model will yaw. The "S.S.P." incorporates a tail rotor gyro to automatically adjust the tail rotor collective during this interval. With a tail rotor gyro, the pilot has one less function to worry about and the amount of time it takes to learn to fly is cut in half. A much simpler tail rotor is shown without the gyro. The "S.S.P." is the only model helicopter with a tail rotor gyro—the choice is yours.

One of the biggest factors in designing a helicopter is that the exhaust fumes are constantly circulated through the rotor when hovering near the ground. The model very quickly becomes completely covered with castor oil. Balsa wood and the like cannot stand up to this. The only wood used is in the rotor blades and is sealed as well as possible. The rest of the model is metal. The radio compartment is enclosed unlike most RC helicopters.

The "S.S.P." was designed strictly as a trainer. The large landing gear allows many pilot errors. The belt drive system

(1) Throttle linkage is spring-loaded to eliminate any slop. Precise control is essential since no collective pitch control is used. Throttle does it. (2) Two stage belt reduction to rotor shaft permits locating centrifugal clutch on midshaft and the drive to the tail rotor via another belt. (3) This is a Hiller rotor system except there is no flapping feedback. Control is through application of cyclic inputs to the small paddles/gyro. (4) Complete head assembly is free to tilt in any axis. The body or chassis tends to just hang under the rotor. The gyros keep it stable at all times. (5) Unique among model helicopters is the gyro on the tail rotor. This automatically cancels

(1)



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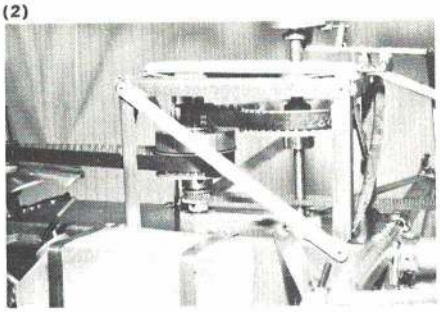

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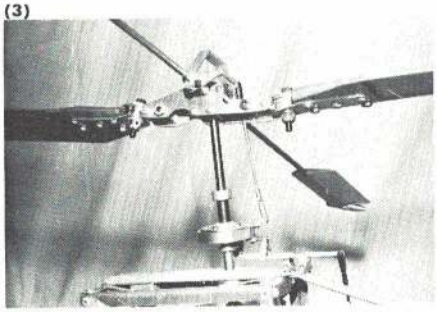

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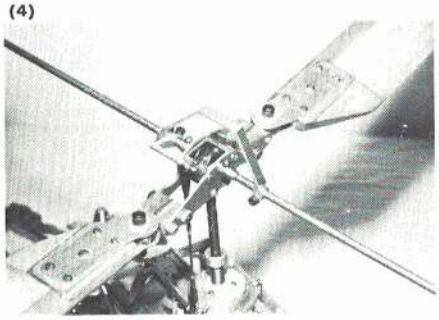

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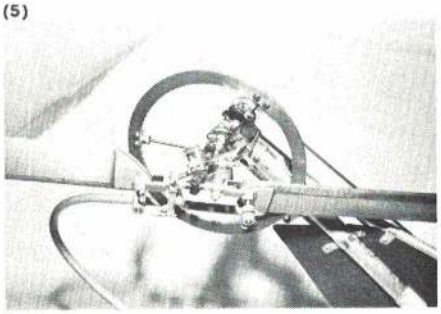

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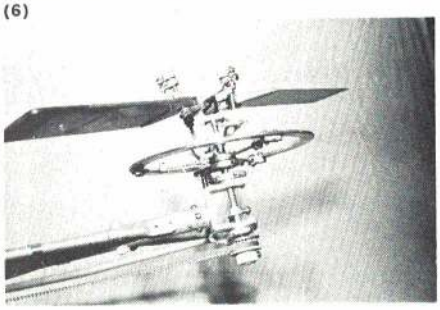

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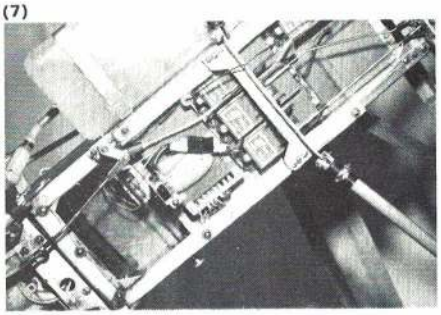

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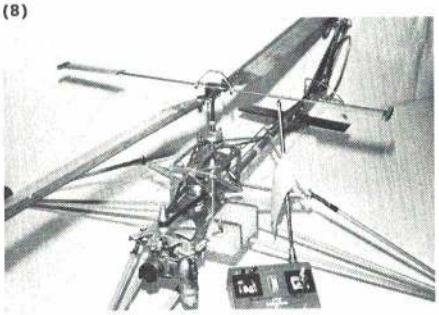


Photos by Gene Rock and the Fitzpatricks

torque variations and wind gust inputs allowing the pilot to concentrate on other flying duties. (6) Servo input to the tail rotor is via springs which precess the tail gyro. Belt drive here is simple and positive. Note rugged components. (7) Radio installation worked out to balance the model just in front of the main rotor shaft. Many Missing Links and Kwik Links are used. (8) Spindly landing gear system really helps when learning to fly a chopper. It can be taxied on the gear, too. Note visible and large fuel supply—an absolute must. Dead stick landings are crashes.

does not require complicated tools to set up. The engine has twice as much power as is needed to hover which comes in handy when heading for an obstacle. This allows you to gain altitude fast enough to keep the model out of danger. Belts also allow a better weight distribution.

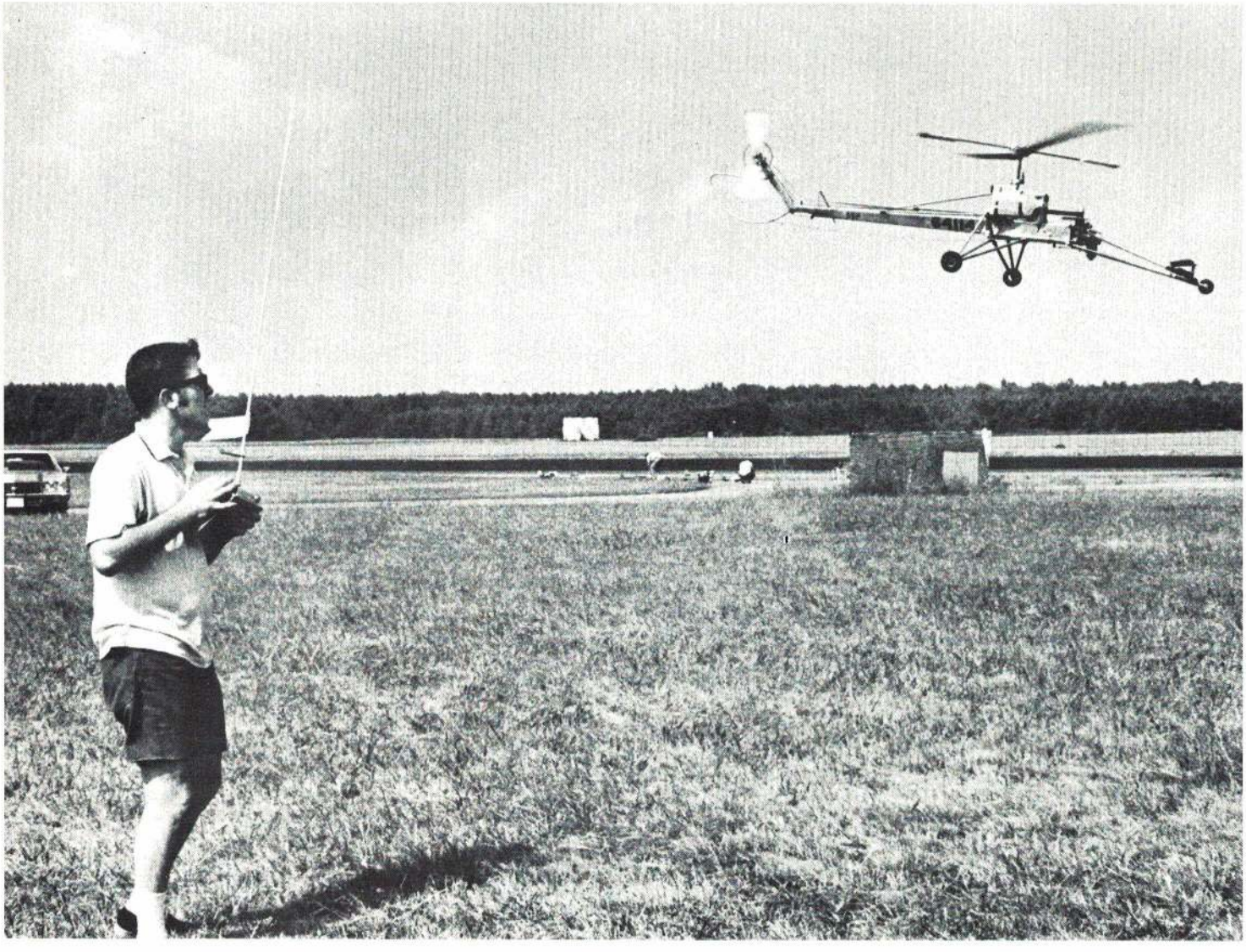
The basic tools required for this project are: a lathe such as the Unimat; a drill press (unless the Unimat is used); a complete set of numbered drills from 1-60 and fractional sizes 1/16-1/2 by 1/32ths; bastard files; a hacksaw, but a bandsaw is preferred; micrometer; taps 2-56, 4-40, 6-32 and 8-32; pop rivet gun; metal brake such as that from Lafayette Radio. The average modeler does not have all these tools, but maybe your neighbor does. Some of the machined parts can be farmed out but this is expensive.

The decision to tackle such a project is not an easy one. It requires about four months work at 20 hours a week. The cost of the project is about $120 without engine and radio.

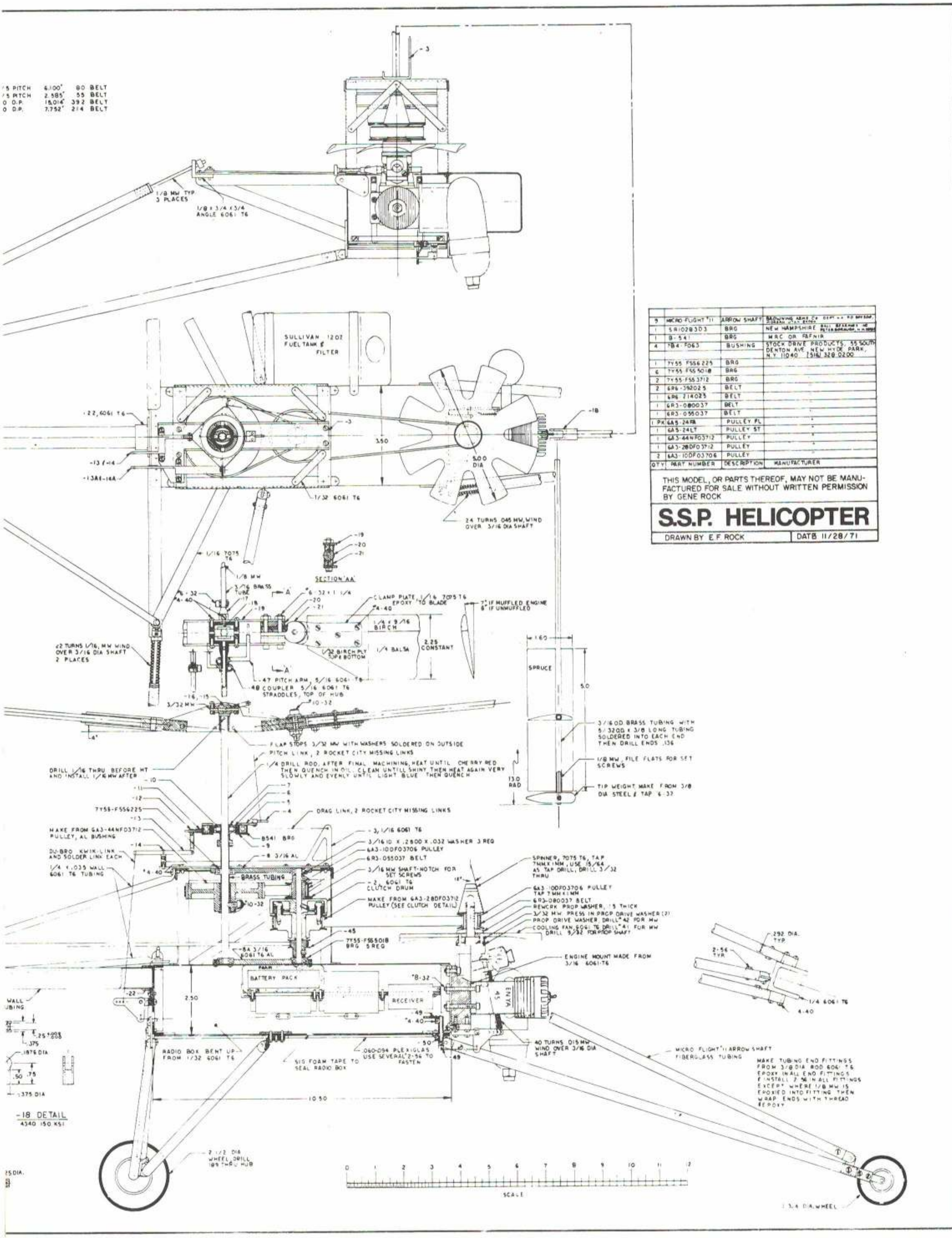
The parts that are most important have been dimensioned. The only dimensions that are critical are the ones for mounting bearings or for press fits. The majority of parts can be hand fitted. The mistake on one part can be compensated for on its mating part. When drilling holes, align the parts that have holes in common and drill or use one as a jig for the other. When drilling to match, always use the tap drill first unless a tapped hole is not required. When drilling a close hole such as for a press fit, select a drill at least two sizes smaller and use plenty of lubricating fluid. Drill again with one size smaller drill and then the final hole very slowly and well lubricated with the required drill. If reamers are available, use them instead. Since 1/16 music wire is slightly larger than .0625, a 1/16 drilled hole makes a nice press for the 1/16 mw. Always drill about 1-2 thousandths smaller for press fit. A part always looks nice and is easier on the fingers if the sharp edges are broken.

The material 2024-6061 and 7075 is aluminum. The best material, strength-wise, is 7075-T6; the next is 2024-T3 or T4; the least, strength-wise, is 6061-T6. 6061-T6 is usually called for on the drawing because of its availability. 2024-T3 or T-4 or 7075-T6 can be substituted for 6061-T6 unless the part is to be bent. If 7075-T6 is called for in a part, try to find it but the others can be used. This aluminum along with the drill rod (steel) and 4340 steel can be obtained at large steel or aluminum outlets, such as Ryersons.

(Continued on page 75)



Scene at Dahlgren, Virginia for DCRC Record Trials where Gene flew the "chopper" to a 650-ft. altitude record and attempted a challenge of the duration record.



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9	MICRO-FLIGHT II	ARROW SHAFT	BROWNING ARMS CO
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2	6R6-392025	BELT	
1	6R6-214025	BELT	
1	6R3-080037	BELT	
1	6R3-055037	BELT	
1 PK	6A5-24FA	PULLEY FL	"
1	6A5-24LT	PULLEY ST	"
1	6A3-44NF03712	PULLEY	"
1	6A3-28DF03712	PULLEY	"
2	6A3-100F03706	PULLEY	

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TISSUE COVERED
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PROP ASSEMBLY INCLUDED
FEATURES ADJUSTABLE WING

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.04

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1" SCALE
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.035 to .049 Engines-Free Flight
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Plans for Float Conversion
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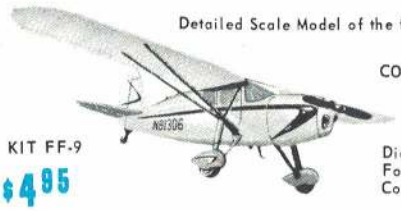
Detailed Scale Model of the famous "RANCHER" Airplane



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36" Wingspan - 1" Scale
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YAK 18P

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WINGSPAN 72-1/2"

FOR .60 ENGINES

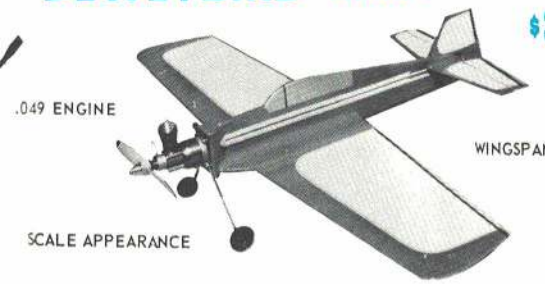
Never before has an RC Scale Model been offered that has been so thoroughly researched and so accurately scaled down from the full-sized aircraft. The Yak 18 was chosen because the basic design of the airplane was perfect for a radio controlled model. The model is easy to fly and capable of nearly all manouvers and flys with the characteristics of the full scale airplane. Months of research went into the design before the prototype was built. The plans show a wealth of scale detail that will satisfy even the most demanding modeler. Ground handling is a cinch with the wide track tricycle gear.

NUMERALS

New 1/2A Profile
DEWEYBIRD MARK I

KIT CL-15

$3.49



.049 ENGINE

WINGSPAN: 22½"

SCALE APPEARANCE

Designed by Dave Shipton, owner of Hobby Hide-A-Way, Delavan, Illinois. The Deweybird Mark I is a semi-scale control line model of Jim Dewey's midget. Dave has created a model that is very easy to build and fly. The beginner should have no trouble with this airplane, yet flight characteristics are such that the advanced modeler will enjoy it. It will perform well on any good .049 engine. There will be larger Deweybirds out soon.

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The KWIK BILT Series is a completely new concept in model building. The modeler first constructs what is basically a simple profile model. Then he adds two molded plastic fuselage shells that give the model complete form and detail. The balsa profile gives the model a great deal of strength and the resulting model is very light weight for good flying qualities, yet can be built by even a novice in a very short time. Other models in the KWIK BUILT line will be available soon.

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.049 ENGINE

SHAPED BALSA WING

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18" WINGSPAN

.049 ENGINE

SHAPED BALSA WING

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Semi-Scale

P-40 WARHAWK

*Patent Applied For

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MOLDED ENGINE COWLING
FORMED LANDING GEAR
TRAINER AND SPORT FLYER

BEAVER

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STRIP AILERONS
SCALE APPEARANCE
MOLDED ENGINE COWLING
FORMED SPRING ALUM. LDG. GEAR

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TRAINER AND SPORT FLYER

R-C SPORT

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ENGINES .15-.19 STRIP AILERONS
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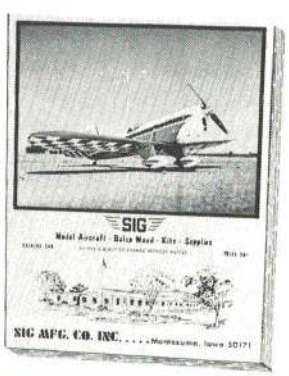
MOLDED COCKPIT CANOPY
TORSION TYPE LANDING GEAR

MOLDED FOAM WING ONLY $3.50



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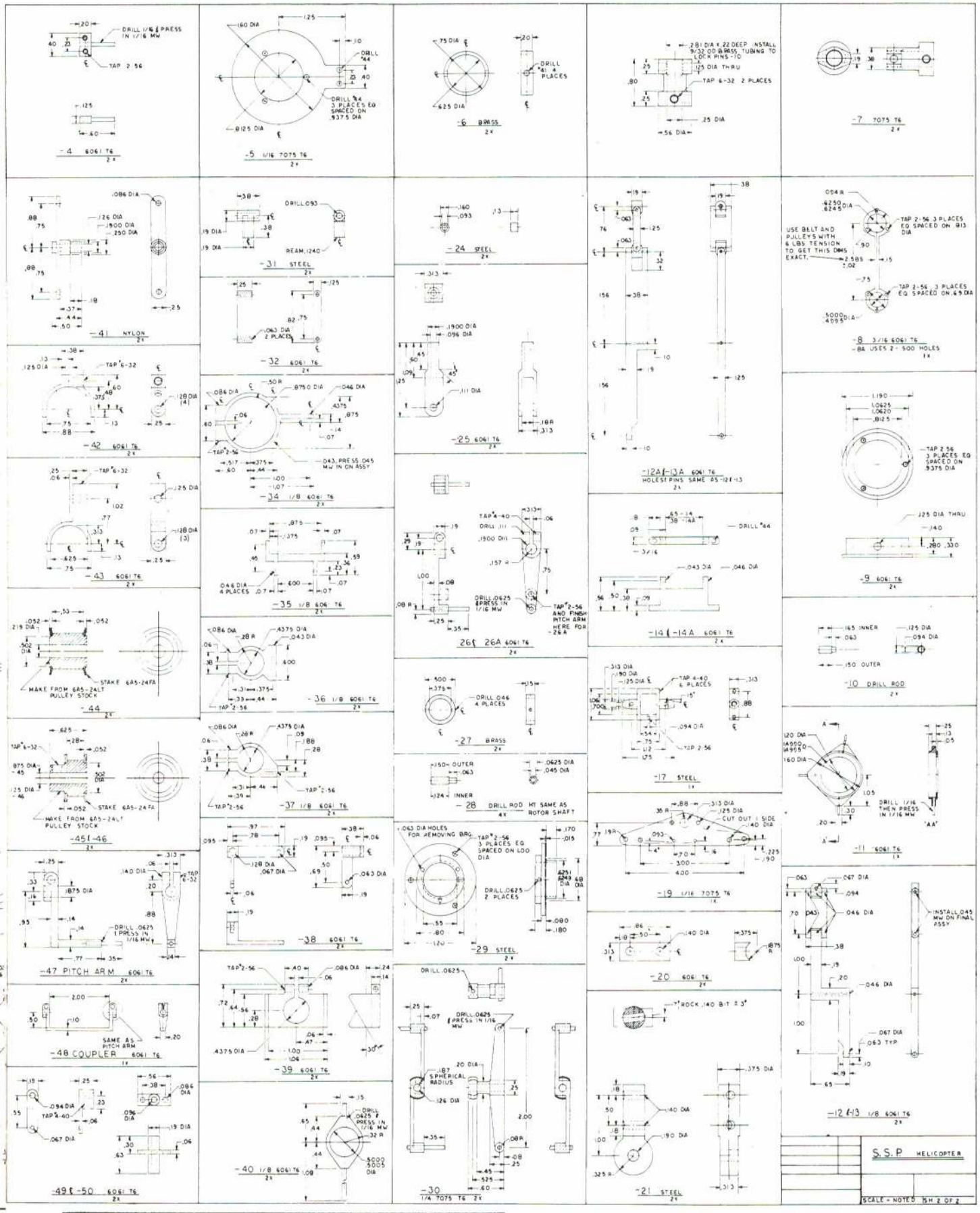
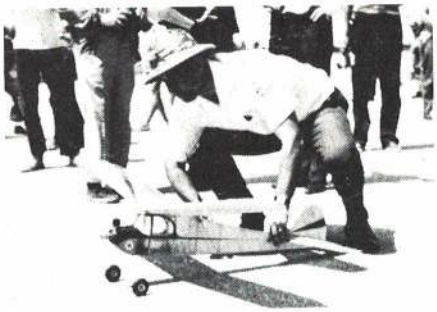
LATERAL CYCLIC
BATTERY
-8A
PULLEY CENTERS
10 → 28
10 → 44
24 → 24
24 → 24
RADIO INSTALLATION
1/8 6061 T6 SERVO PLATE
(LOGICTROL SHOWN)
SOLDER WASHER
16 TURNS .015 MW WIND OVER 3/32 DIA SHAFT (2)
-38 BELLCRANK
-37 CLAMP
DU-BRO 5/32 ID COLLAR OVER 1/8 ID BRASS TUBING
-36 CLAMP
.045 MW
-34 CLAMP ± SR02B303 BRG
-30
-32 PITCH LINK
1/8 ID COLLAR
-46
1/8 MW
-33
-35
-31
7455-FS537-2 BRG (2)
4-40
1/16 7075 T6 TYP
BALSA 1/4 X 2 1/2 X 11
.080 TYP
5.0 R
3/8 R
-23 1/4 6061 T6 TAIL GUARD
53.0 DIA
1/16 X 3/8 X 3/8 ANGLE 6061 T6 (2)
(2)
(4)
1/32 X 3/8 X 3/8 ANGLE 6061 T6
ALL RIVETS 1/8 OD POP AL OR STL SHORT- SEARS
1/16 X 4.5 X 4.5 ANGLE 6061 T6 AL, INSIDE BEND RADIUS: 1/16 THK - .120 MIN 1/32 THK - .062 MIN
-8A
-22
#4-40
#2-56 INSIDE 1/8 OD BRASS TUBING FOR BELLCRANKS TYP
BACK & FRONT END PLATES OF W/DIO BOX TO BE MADE FROM 1/16 6061 T6 AL
MAKE TAIL ROTOR CABLE CLAMP FROM ANY ALUMINUM BOLT TOGETHER & DRILL ON BUTT LINE 1/8 DIA THRU WITH 3/16 DIA HOLE IN BACK PLATE FOR 1/4 DIA CABLE GOLD 'N ROD
#4-40 TYP
#2-56
ALL LANDING GEAR STRUCTURE & DIAGONAL BRACING OF TRANSMISSION STRUCTURE TO BE MADE FROM 1/16 7075-T6 AL UNLESS NOTED
-44
PULLEY 784-F063 BUSHINGS (2)
1/8 MW & DU-BRO COLLAR
2 PLACES
GYRO 1/16 7075 T6
-29 GYRO HUB
-27 ± 28 RINGS ± PINS
-26 PITCH ARM
-25 BLADE CLAMP
3/32 MW WITH -24 PRESSED ON ENDS
#2-56
BIRCH
1/8 SPRUCE
1/32 BIRCH PLY
-31 HUB
-26
-30
1/4 X .035 WALL 6060 T6 TUBING
R6 214025 BELT
1/2 X .035 WALL 6061 T6 TUBING
-23
-43
R6 392025 BELT
2 PLACES
-42
5/8
5"
1.75 DIA
1.38
1.12
.045 MW SPRING CLIP (2)
.313
.22 (.238 BUSHING)
.10
BUSHING 1/4 DRILL ROD HT SAME AS ROTOR SHAFT
#6-32
PULLEY #6-32 ± BORE .499 5 DIA .5000
1.62
DRILL #12 (SHOES)
DRILL #56 4 PLACES
SHOE: ANY GOOD STEEL
.140
.1875
.250
.050
CLUTCH DETAIL
(SHOWN OPEN)
2.00 DIA
1.82 DIA
TAP #6-32
.1875
.42
.50
.03
.28
.62
1.75 DIA
25°
.2495
.2490
.22R
NEOPRENE CORK EPOXY TO DRUM
1/16 DIA
-2 DETAIL
.1875 DIA
.096
.375
-15 DETAIL
3/16 DIA DRILL ROD HT SAME AS ROTOR SHAFT
.096
.250
.700
.44
.1875
.313
-16 DETAIL
4340 150 KSI
SIMPLIFIED TAIL ROTOR
INSPIRED BY DIETER SCHLUTER
-39 CAM
-40 FOLLOWER WITH 7755-FS5501B BRG
-41 SLIDER
ROCKET CITY MISSING LINK 3 PLACES
20 TURNS .015 MW WIND OVER 3/16 DIA SHAFT
-26A PITCH ARM



FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

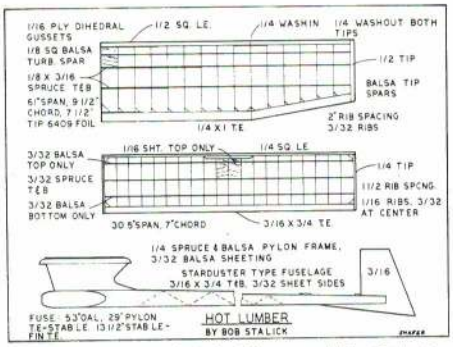
WHERE THE ACTION IS

FREE FLIGHT



Here goes an oldie. Berkeley kit Brigadier at '71 Nats.

Mike Atwood's Nordic-size Flash HLG uses tissue and foam technique described in column.



Foam For Free Flight: While foam-core flying surfaces are commonplace on CL and RC models, they have seldom made the free flight scene. Now Mike Atwood, Frank Perkins and Ben Gabriel of the Cliff Cloud Climbers are putting an end to all that; C-gas models, Nordic gliders, hand launch gliders, and even a slightly overweight Pennyplane have yielded to their hot-wire foam cutter. Why foam? A Nordic wing ready to fly in four hours at a cost of only $3 is reason enough! Expanded bead polystyrene foam weighing one lb. per cu. ft. is cut to shape by the familiar hot wire technique, which is described briefly.

Cut a piece of softwood about 1 x 1 x 40, and drill a 1/8" hole through the side at a 30 degree angle at each end. Insert an 8 in. piece of 1/8 music wire into each hole, and attach a landing gear wheel collar 1/4 in. from the projecting end of each wire. Tie two loops in a piece of nichrome wire, separated by a distance about one inch less than the distance between the music wire ends. Spring the music wires inward, slip the loops over the ends of the music wires. Heating current is supplied by a train transformer or the equivalent. The wire should be just hot enough to melt the foam. A plywood airfoil template is secured to each end of the one-in. thick foam plank, which is secured to the workbench with weights. Use the templates to guide the wire and cut clear around, starting at the trailing edge: presto—instant wing!

Spars may be glued into grooves with Elmer's or Titebond, or the wing may be cut clear through for full-depth spars. Now for the sneaky part. After the core is smoothed with sandpaper, the surface is covered with model tissue or grade-OO Silkspan. The adhesive is white glue with a bit of Knox gelatin added to prevent subsequent coats of dope from soaking through the tissue and dissolving the foam. Even so, it is best to spray on very light coats. One part glue is added to two parts water, then one part of gelatin mixed according to the package instructions is added to three or more parts of the dilute glue. You should experiment with the proportions, techniques, and materials before tackling the Ultimate Nordic. Mike recommends steel wool for the surfaces between dope coats rather than sandpaper. He made a foam Nordic wing using the Monson M-4 airfoil shown in the March **AAM**. Preliminary results indicate that it is neither very good nor very bad, but probably needs turbulators as Monson suggested.

BOB MEUSER

SPORT

NFFS Symposium Report: As you read this, Doug Galbreath's presses will be cranking out the report of the Fifth Annual Symposium of the National Free Flight Society. Under Bill Bogart's editorship the report includes papers ranging from hard core technical stuff to the nitty gritty of competition flying. Bogart himself puts his finger on the center of pressure myth, while Don Monson takes the meanness out of the mean aerodynamic chord. John Krouse discusses the effect of leading edge bluntness, and in his second paper Don Monson presents a followup to his previous paper on A/2 Nordic airfoils. Bob Meuser discusses the effects of location of ballast, Ron Evans makes some general observations on the sport, and Matt Gewain tells about wind-tunnel testing. Charlie Sotich talks about indoor flying scale models. A comparison of uniform-pitch and non-uniform-pitch Wakefield props is presented by George Xenakis. Bogart discusses the problem of locating the wing mount on the fuselage, and Maynard Hill writes something which, at this writing, can only be described as far out.

Included for the third time are three-views and articles about the ten Models of the Year, selected for their outstandingly significant impact on the sport by committees comprising two dozen modelers in the U.S. and Europe. Selections are: Vic Cunnyngham's Geodetic Galaxie; George Fuller's Dixielander; Thomas Koster's flapped FAI-Power model, Andromeda; Christian Schwartzbach's Wakefield, Little Big Horn; Hugh Langevin's towline glider, Osprey; Bill Vanderbeek's four-time Nats winner, My Coupe; Joe Bilgri's one-gram FAI indoor model; Dick (Fast Richard) Mathis's Flash HLG; Tom Stark's three-time Nats winning, outdoor flying scale Loening M-8; and an award to Erwin Rodemsky for originating the Pennyplane event.

Order either the 1971 or 1972 reports from NFFS, Box 322, Dallas, OR 97338; $3.50 for members of both AMA and NFFS in the U.S., $3.50 for residents of foreign countries, $4.50 for others. Price for *both* reports is $6 for members of both AMA and NFFS in the U.S., and for foreign residents, and $8 for others. The 1968, '69 and '70 issues were sold out but are being reprinted; same price as the 1972 report, but no combination price. It seems doubtful if there will be a Nats or an NFFS Symposium, but there will *definitely* be a Symposium report.

BOB STALICK

RUBBER, GLIDER AND POWER

Bitsa Models: A few months back, Tom Hutchinson's suggestions for new rules models were quoted in this column. Many modelers may have new rules models lurking in their older ships. Often, a change of fuselage is all that is needed to provide a new life for that older wing and stab.

A case in point is this month's feature design. Conceived as a fuselage to use popular kitted wing and stab combinations, it has suggested planform; but with little or no modification it is usable for Starduster 600, A-B Spacer, Galaxie 585 or A-B-C Scrambler surfaces. The idea is to convert these high-thrust or older designs into a modern hot pylon ship in the British tradition. If built properly, the model should weigh about 25 oz. and, equipped with a hot 29 or 40, can be flown in both B and C gas classes. A combination of light weight, powerful engine and smaller surfaces results in a rapidly climbing free flight which glides with the best, aided by its long tail moment arm.

Controlling the power of the K&B 40 with a wing area of 600 sq. in. or less can be a problem: however, the high pylon, long TMA, rear fin and wing wash-in do the job very well. If your spare wing doesn't have the required 1/4 in. wash-in, then reversing some 1/4 x 1 in. trailing edge stock and gluing a 4-to-6 in. length under the right wing trailing edge will provide the necessary twist. Another alternative is to warp the required amount over an electric hot plate. This set up, with a 0-0 degree thrust line and just a bit of right rudder should result in the fast vertical spiral climb that gets you the altitude and the max even with the new reduced engine runs. The fast right climb pattern also gives the advantage of bringing the ship to the proper attitude for a good transition into a right glide circle, which is maintained by right stab tilt.

Experiment with your own bitsa models, and don't be afraid to reduce the area or pile on the power. The British have flown 440 sq. in. Dixielanders with Torp 40s most successfully. In fact, if you look at Hot Lumber carefully, you'll notice considerable Dixie influence, with a bit of Nig-Nog thrown in for good measure. For a detailed full size plan of this month's design, drop a line to NFFSupplies and Service.

BOB HATSCHEK

GADGETS AND EQUIPMENT

The Nordic Revolution: One of the most exciting developments in free flight today is the current state of the art in glider towhook mechanisms. It is truly a revolution in competition flying that can add a good 10 to 20 seconds to the duration of any A/2, and also gives the flier a tremendous edge in locating that often elusive thermal.

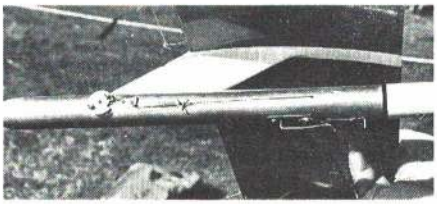
What's needed is a combination of sophisticated towhook machinery and sophisticated towing techniques. The first benefit to be gained is a zooming turn on release of the glider which gains up to 20 feet extra altitude on the launch. The second benefit is the ability to keep the glider on the line for a virtually indefinite period while roaming around the field in search of lift.

The zoom launch is achieved as follows: the model is towed aloft with moderate line tension, the autorudder providing a straight flight path. That's conventional enough. Then, when the flier decides to release, instead of slacking off on the line, he pulls harder. With the tricky new hooks, this gives a slight rudder offset in the direction of glide circle, but not all the way to glide position. As the model picks up speed and begins to bank into the glide turn, the tower suddenly releases tension and the model zooms upward.

The thermal search can be achieved in either, or both, of two ways: in moderate breezes, the model can be "kited" almost straight overhead. Or in calm air to moderate wind, it can be circled while still attached to

the towline. In this circle-towing mode, the flier can wander upwind, downwind, or crosswind as he pleases. In several cases at the 1971 Free Flight World Championships in Sweden, contestants were timed on the line for 20 minutes while searching for that vital, max-assuring lift. The common element in both systems is a latching mechanism to prevent the towline from falling free before the flier makes that decision. Circle-towing, however, is best and most easily accomplished by a towhook mechanism that provides a rudder offset greater than that required for glide turn—though offset towhooks can also provide a circle-tow capability.

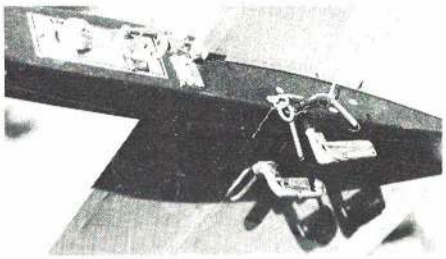
Four Ways to Do the Job: Probably the simplest type of latching towhook is the one used by Hugh Langevin in placing fifth at the 1971 World Champs. His towhook (see photo) had a very light music wire keeper that



Hugh Langevin can "kite" his Nordic for 20 minutes while searching for good air. Note spring towline keeper.

prevented the towline from falling off until he whipped it off. This system allowed Hugh to kite the model straight overhead for fully 20 minutes in a relatively light breeze while he waited for the telltale tug of a thermal.

Principal merit of this system is its simplicity. Other fliers have used essentially identical systems even on small A/1 gliders, and they can be added to virtually any standard hook in a matter of minutes. Some fiddling with wire size, keeper length, and bends will probably be necessary to get it working perfectly every time, but this shouldn't be difficult. Principal drawback of this system is that it does not provide the two additional rudder positions desirable for circle-towing and zoom-launching.



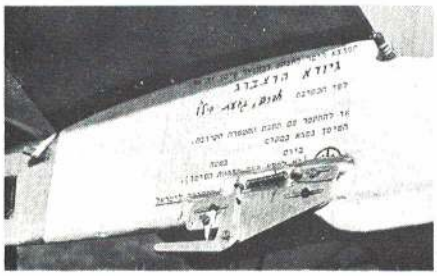
Dual latching hooks on Tam Thompson's plane. One for calm and one for windy situations.

The second photo shows an entirely different approach. This glider belongs to Tam Thompson, a member of the 1971 Canadian team. It features twin towhooks: a central one for windy weather towing (straight) that also allows kiting; an offset hook that allows circle-towing under less windy conditions. Rather than latching, both of these hooks provide a slot that the tow-ring slips down into, and a spring-loaded ejector that won't quite support the weight of the line. A flip on the line causes ring ejection when Tammy wants to release.

Other mechanical features of this glider, in addition to a rather conventional autorudder are: a two-way autostabilizer and an automatic system for varying the differential incidence between left and right wings. Operated like a standard autorudder is a cam under the stabilizer trailing edge. For calm towing, Tam sets the cam to give up elevator during tow so he doesn't have to run like mad. And for windy weather tows, he inverts the cam to provide a trifle of down elevator so he doesn't have to run like mad in the other direction. The wing halves pivot individually on a 5/32" rod through the body and the leading edge of each is held down on a stop by rubber bands. Line release simply shifts the adjustment on one of these stops for the differential trim change.

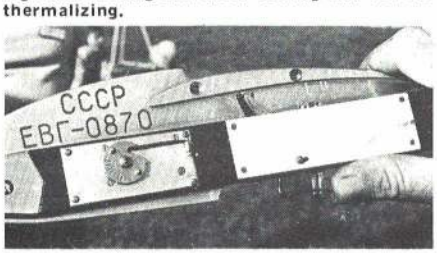
The overall system is very effective, but it leaves a lot of hardware out in the breeze, and once the model is launched there's no way to switch from kiting to circle-towing tactics, or vice versa.

Israeli team member Giora Herzberg's Nordic is shown in the third photo. This is a sophisticated latching system that stops short of the zoom-launch or circle-tow capability; but it does allow kiting and provides neat adjustment of unlatch tension, and also provides a continuous hook-position adjustment that does not affect unlatch tension adjustments.



Israeli modeler Giora Herzberg has latched hook which is minutely adjustable fore and aft to suit conditions.

Most recent Nordic developments have come from the Russians. Behind the white plate is an elaborate adjusting system for each flight segment—during and after towing and for de-thermalizing.



The Russians have been credited with inventing both the zoom-launch and the circle-towing techniques, and the final photo shows a closeup of the glider Ehtenkov used in placing seventh at the World Champs for the Soviet Union. Underneath the cover plate is a swinging hook system that latches. It provides four independently adjustable autorudder positions: straight tow, circle tow, zoom launch and glide circle.

Next month we'll unveil the Russian mechanisms—and a couple of still newer developments in the Nordic revolution.

BUD TENNY

INDOOR

Advanced Bracing: When novice indoor builders start worrying about reducing model weight, a good place to begin is with the wing. Good wing bracing techniques permit a lighter structure which still has adequate strength. It should be noted that indoor models which are braced only for flight loads will be too weak for most people to handle them. Thus, the flier who practices a lot can safely build lighter models because he can handle them.

When bracing is a design feature of the wing, two special types of ribs must be used. A tension rib (Fig. 1a) is a normal rib with wire or dacron across the bottom, and is used only at the cabane/post location. A compression rib (Fig. 1b) is built up and will absorb both tension and compression loads, while the tension ribs absorb only tension (as shown by the arrows).

The June and July columns showed primary bracing and how to apply it to wings. The main emphasis was on strengthening a heavier wing so it would hold adjustments

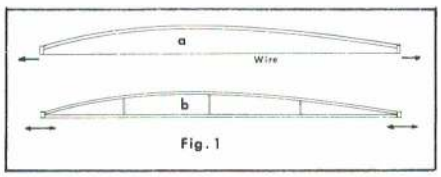


Fig. 1

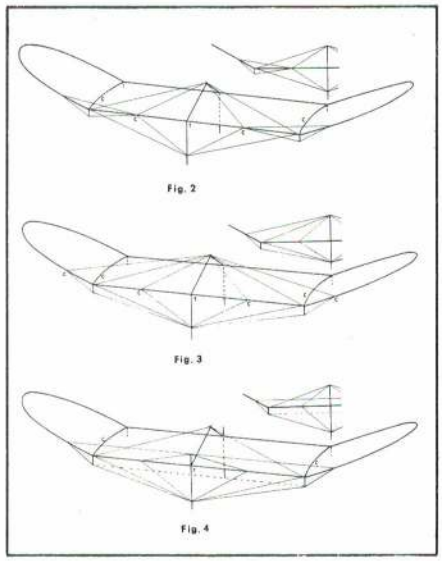


Fig. 2

Fig. 3

Fig. 4

properly. With appropriate backing, considerable weight may be saved in wing spars and ribs; do not greatly lighten the wing posts and cabane, since these must carry all the wing stress!

Bracing Schemes: Figures 2, 3 and 4 show wing-bracing schemes currently in use. In these sketches, the ribs have been omitted and only the front half of the bracing is shown. Also, a partial front view is given. Fig. 2 shows the simplest tip and secondary bracing; this scheme requires four compression ribs and one tension rib at the locations marked "t" and "p". The chief disadvantage of this type bracing is that tip loads tend to distort the wing at "a". Fig. 3 takes 6 compression ribs and one tension rib, but it has the advantage of transferring all wing loads to the post/cabane assembly; however, the lower wires sometimes get in the way of inexperienced fliers. Fig. 4 is the preference of this correspondent, since it requires only two compression ribs and one tension rib and again carries all the wing loads to the post/cabane. Note that the wing posts extend above the wing to a level even with the tip bracing points, and that the troublesome lower wires can be run to an alternate location with no loss in efficiency.

WALT MOONEY

SCALE

The Flightmasters: This club has been one of the mainstays of Scale model efforts in Southern California. The group provides a most useful newsletter to their membership. From the current calendar of events comes the following: Aug. 20—Scale ROW fun contest at Lake Elinore followed by a family picnic; Oct. 7,8—Flightmaster Annual; Dec. 3—Jumbo rubber.

In addition to the calendar they include how-to-do-it articles, three-views, and where-to-find-it hints.

Recently the group has decided to let members run little contests on their own. The member decides what he would like to have for a contest, and the club treasury helps him to a modest extent.

The most recent effort along this line was made by Jack McCracken, who had a Peanut Scale competition. Jack was the contest director, chief timer (volunteers were accepted), scale judge, and host at a lunch at his home after the contest. The weather was perfect, the flying was lighthearted, the friendly conversation was interesting, and the lunch was delicious—thanks to Mrs. McCracken. It was a perfect day for all the modelers who attended.

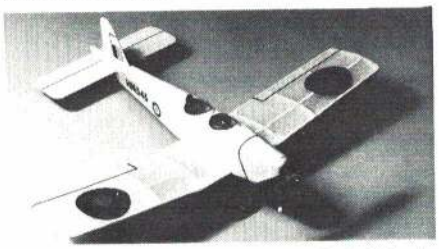
Bill Hannan was first with his Porter; Walt Mooney won best biplane with a Jungmann; Fernando Ramos got best antique with his 1911 Cessna. Everybody had Jack to thank for putting Fernando and a couple of others in a separate class. Dave Albert won first in Junior, and Douglas Mooney got the best (worst?) crash award.

By eleven in the morning almost all the fliers were satisfied with their flights when

WHERE THE ACTION IS *Continued*

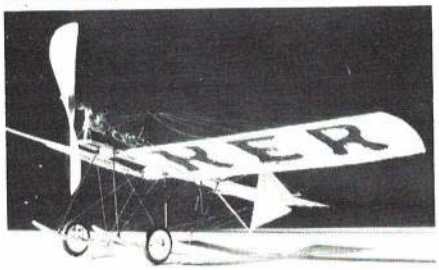
Mooney put up a 45-second flight with his Fokker V-23, which forced everyone to try some more. Finally, several of the old hands gathered around Dave Albert, the one Junior entry, and helped him trim his Peanut Scale Bede 4 to get the winning Junior flight.

The model variety was exceptional: Pilatus Porter, Bucker Jungmann, DeHavilland 5, Fokker V-23, Fokker F II, Rearwin Speedster, DH Chipmunk, Spitfire, Avro Triplane, Curtiss F9C2, Cessna 1911, Bede 4, Poullin, KR Biplane, and a Miles M-18. This last model was built by Bill Hannan from a new kit put out by Bob Peck of Peck Polymers. Bill made the model exactly according to the plans and it really looked good and flew well. It was finished just before the contest, but even with no prior test flying it was doing more than 30-sec. flights. I had a chance to look at several of the kits and was impressed by the quality of the wood and the plans; several of these were prizes.



A Miles M-18 peanut from Bob Peck kit, details in column.

Fulton Hungerford's Fokker Spider.



New Items: Fulton Hungerford, that maker of great wire scale wheels, has created a nice-looking Fokker Spider. He has come up with some scale spoked wheels, both larger and stronger than his smaller sizes. Diameters are available up to 2½ in. Fulton says he can't guarantee them for models over two lbs. with shock absorbers, or models of ½ lb. without shock absorbers. To do this successfully they have to be able to support over ten lbs. statically These large wheels have dacron spokes.

Jumbo scale model by Vern Clements is a Monocoupe.

Vern Clements of Caldwell, Idaho, likes his rubber scale models big. His Monocoupe is to the Jumbo Scale size with all the structure in the scale places; it's going to take an old-fashioned Wakefield motor to turn his propeller.

In the cockpit is your columnist, obviously enjoying himself immensely.

RADIO CONTROL

DON LOWE

SPORT AND PATTERN

Jet RC: John Kiker, an old friend with NASA at the Manned Spacecraft Center in Houston, sent along some very interesting info on a jet-powered RC that a fellow modeler, "Doc" Martin, has been experimenting with. The pulse jet as marketed by Curtis Dyna-Products and others for years has seen only limited application in RC models. This is probably due to its lack of throttleability, high fuel consumption, touchy fuel feed characteristics and high operating temperatures. So when a practical RC model comes along that uses this sensitive propulsion system successfully, that's news.

It seems that Doc has been fooling around with pulse jets for a long time and has apparently come up with techniques for licking the fuel feed problem, since he can perform aerobatic maneuvers such as rolls and loops without difficulty. John reports that Doc is also working on a throttling arrangement, although at the moment he is using simple fuel shutoff. The ship he is flying is shown in the column and has retracts and the works. Doc likes to climb very high and then come down in a series of power-off aerobatics which is very impressive. Sounds like we are on the verge of having a practical torqueless, prop-washless (is that a word?) propulsion system. The model has a deflector plate in front of the intake to keep gravel from damaging the reed valves.

Pulse jet-powered, retract gear design by "Doc" Martin of Houston is not throttled but carves nice big maneuvers in the sky.

Just as exotic as a jet, RC helicopters fascinate everyone now that we modelers know they are practical. Don Lowe with his Du-Bro Whirlybird.

RC Helicopters: I'm not trying to steal John Burkam's thunder, I just want to report that I agree with most who have tried helicopters after much experience with conventional airplanes—it's a whole new thing! I constructed one of Dewey Broberg's choppers and now have one rotor blade and one propeller to my credit(?). Operating techniques with a helicopter are quite different than with wing and tail types, and a whole new experience is awaiting you! Believe me, it's fascinating and a real challenge for those who may be getting just a little bit bored. Dewey's Whirlybird is a tough little beast and repairs are simple. It's a good way to get your feet wet with a nominal investment. Du-Bro Products has done a remarkable engineering job in putting this kit together.

Revival of Rudder-Only Flying: Remember Class I RC competition? You old-timers surely recall how it developed from the days of simple mechanization when we had single-channel systems and sequence escapements. Then people got smart and learned how to add motor control. The basic single-channel radio system was stretched in many ways by ingenious people to provide several sequenced channels of control or pulsed to provide proportional. Class I was the last stand of a model type that emerged from the simple radio system concept. Of course in its last days, modelers had turned to proportional systems and the model type had taken on very unique design characteristics to extract maximum performance from rudder and throttle control only.

Bob Aberle of the Long Island Control Society writes in the club newsletter "Low Passes" about reviving the event. He suggests the advantages of this type model in terms of its possible small size with consequent lower costs and fuel consumption of the smaller engines. Also, the savings that a two-channel radio system affords is not without importance. It is also noted that the DC/RC Club scheduled a meet this year for "old-fashioned rudder and engine control." I agree, rudder-only flying was fun and would be a kick to try again. It's challenging since control is limited. Others are turning to competition categories for simple systems, such as the Wingmasters RC Club of Dayton, Ohio. These fellows are flying a pylon event using the Goldberg Jr. Falcon with two channels of control, aileron and elevator. They flatten out the wing, aid ailerons, fix the rudder, install a hot 049 and really have a ball. I flew one of these machines the other day and it was a blast! Very inexpensive, fast, quick to build and very competitive! So it's obvious that you can have fun in RC without the investment in time and money of a full house, 60-powered, 100 mph retract special.

Will the Brown Jr. Stage a Comeback?: All the interest these days in old-timer events prompted publication of some test results on this venerable engine of yore in the Long Island Drone Society "Flyer" newsletter. They report that a 1935 Brown Jr. Model B 60 cu. in. ignition engine ran well over the entire speed range when fed a mixture of white gas and 70 weight oil. It turned up a whopping 4500 rpm on the top end using a 12-6 prop. Yep, we've come a long way when we now expect, and get, 12,000 to 13,000 and more from a 60 on a slightly smaller prop. This report struck a nostalgic spark with me since my first operable engine was a Brown Jr. I said operable since my first engine was a GHQ—remember that beauty?

Milt Woodham at Huntsville's Rocket City RC Club flying site provided by the Jaycees—hard surface and all!

Tennessee Tech's new RC Club has many active modelers. Dr. Elmo Dooley, left foreground, is faculty advisor and organizer.

WW II Scramble: Special events are really blooming this year, with another new one being patterned after the very successful Rheinbeck WW I event. The West Jersey Radio Flyers are holding a contest of four events in August similar to Rheinbeck—for WWII airplane designs. This encompasses those military aircraft built and flown in the period 1939 to 1945. Should be great, since a lot of groovy airplanes are in that category. I've got a P-38 that I might just get finished. RC modeling has almost unlimited facets—something for everybody and too many for one guy to participate in them all. For you guys that need Air Force, Army, Navy and Marine technical manuals for those WW II types, Gary Moore writes that he has located a source after much diligent searching and will provide the address to those interested for $1. If interested, write him at 103 Apt. F, North Romney, Bayside Gardens, Charleston, S.C. 29403.

Safety Reminder: Are RC models dangerous? To a large extent it depends on us and how we operate. Prevention of accidents through proper safety procedures is the key. I hadn't seen a report previously on any incidents, but the Crescent City RC Club newsletter "Fly-away II" for March carried a report from AMA on this subject. Their records show five major incidents of people, both modelers and spectators, being hit by RC models. In addition, one young boy was tragically killed, the son of a flier. Sobering, isn't it? Fly safely!

CLAUDE McCULLOUGH
SCALE

Taped: In our October 1971 column we discussed the use of Silkspan or onion skin paper strips, torn on a serrated edge for a pinking tape effect on fabric-covered scales. Keith Ward of the Chicago Scalemasters has developed some variations on this theme while detailing a Gere Sport biplane model. He uses the steel cutting edge from Cut-Rite Waxed Paper, soldered to a strip of brass with a rubber strip glued to it to keep the paper from slipping. At the suggestion of Bob Talchik, he got best results and clearly defined notches with Clearprint 1000H pre-gridded rag vellum tracing paper, obtainable at drafting supply stores. The light blue lines made it easy to tear off uniform strips. In full scale size, 2 in. pinked tape is generally used on top of ribs and stringers, and 3 in. is wrapped around edges, such as the leading and trailing edges and tips.

Keith's application procedure follows: lightly sand the area of the pre-doped surfaces where the rib tapes are to be applied; dip tape into a cup of water to which two drops of liquid detergent have been added as a wetting agent; apply, using thinned Elmer's glue (thin with water 50/50 and add a drop of liquid detergent). Now press and stretch into place, keeping the rib tape wetted with water and Elmer's glue and wipe off residue with a damp cloth. Apply stitching to ribs, top and bottom of wings and also horizontal and vertical tail surfaces. Using unthinned Elmer's glue (dope will stick better to Sig Bond or Tite-Bond) in a hypo-type glue gun or oil dispenser, space "rib stitches" of glue approximately 3 in. apart on the wings and 4 in. apart on the tail. Cover with a coat of thinned clear dope and paint, then stand back and take a look. The surface detailing of your fabric-covered aircraft is well on its way to warming the cold, cruel heart of any scale judge.

Walt Moucha, Sr.'s new 1/3rd size BD-5, exact scale. Many are making this pretty bird.

From Complete-A-Pac plans, a Bob Holman Zero.

Framed: Outlining the framing structure on a canopy is often done with strips of Scotch plastic colored tape, which, while quick and easy, lacks a certain amount of finesse because of the overlapping required. A finer method is to outline the frame with masking tape as though it were going to be painted. Smooth on a coat of Sig Epoxolite putty. When cured, carefully sand flush with the tape edges before removing the tape. To prevent scratches, the entire canopy should be protected by tape during the process. This method works out particularly well with a canopy whose design blends into the contours of the fuselage, since a fillet of Epoxolite fairing the two together can be applied at the same time as the framing. For large canopies, a double layer of tape will give a more pronounced edge effect to the framing outline.

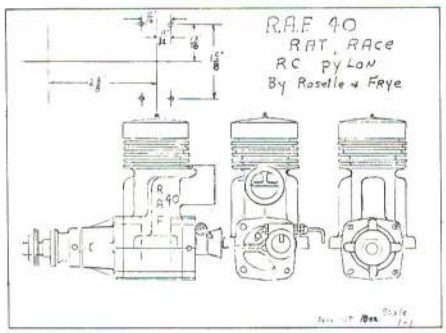
Long List: Bob Holman specializes in goodies for scale builders. He features the extensive Complete-A-Pac line of plans and kits but with an exclusive touch, since he packs many of the kits in this country. Hardware and Sig balsa are added to the pre-cut and formed parts from Scotland in a heavyweight box that insures delivery in the best of condition. In addition to the CAP plans, drawings of scale models featured in the English magazines *Radio Modeller* and *Radio Control Models and Electronics* are available. Reprints of many of the top-notch three-views from *Aeromodeller* are stocked and he will soon carry the entire series. A recent addition is the fine elite plans line from Dennis Bryant, well-known English RC flier and Scale International team member. A catalog of these and other designs, plus books and accessories, is available from Bob at Box 741M, San Bernardino, Calif. 92402 for 25 cents.

BOB STOCKWELL
PYLON

Questions, Questions: By the time this appears we will know the answers to some of the questions that are worrying me right now: Where will the Nats be this year—Los Alamitos, Oshkosh, nowhere? How will the various racing 40s make out? Will the new K&B wipe out the Supertigre? Will the new R.A.F. offset the advantage of the K&B? Will there be more HPs coming into the country, and will they compete successfully with either the K&B or the R.A.F.? What will be the effect of these new and relatively expensive engines on the racing game? Will newcomers be discouraged by the price or, on the contrary, encouraged by the fact that with one of these they will have an engine as good as the very best that anyone else has, and therefore feel that the guys with factory support no longer have any edge on them. I hope it will be the latter, but I'm worried; the sport is too expensive already. But flying is better, radios are increasingly reliable, crashes are not so frequent, you can still build a good balsa racer for less than $50, so maybe by cutting corners elsewhere we can stand the rising cost of engines.

Bob Root's rendition of the 1938 Russell Chambers "Chambermaid" for the FAI event.

Jim Duda is ready for the 1972 season with a Stafford Minnow and a Sig Mustang. Photo by Dave Lawson.



Engine Competition: By now I hope everybody has heard about the latest legal entry into the engine competition—the R.A.F. Just in case you haven't, here are the details: The R.A.F. 40 is available from Roselle and Frye, 217 W. Wenger Rd., Englewood, Ohio 45322, for $100 (or if you want the FAI version, $125 including the muffler). It's an ABCD (brass chrome sleeve plus Dikes ring), hard chrome backplate surface, one-piece crankshaft, machined piston, rod and head all from bar stock 2024-T4; crankshaft 4140 steel heat treated, hard chrome crank pin, with crankcase, front plate and backplate cast 355-T7 aluminum. The exhaust is out the rear, which requires some modification in the standard Formula I cowlings.

While I'm noting new products, I'd like to call your attention to Terry Prather's recent output (Terry was Formula I and NMPRA Champion in 1970, Nationals Formula I Champion in 1971 and repeated his NMPRA Formula I Championship in 1971, the only two-time winner of that prestigious title). Under the name Prather Products, 1660 Ravenna, Wilmington, Calif. 90744, he is marketing an exceptionally handsome starting battery with a plug tester and battery tester built in. For a racer who doesn't want to get stuck on the line with a dead plug or a low battery charge, it's pretty nearly an indispensable accessory. Terry has also designed a neat set of nose weights for people who insist on building tail-heavy airplanes. These weights put the extra ounce in the very front where it will do the most good. It goes without saying that they shouldn't be necessary at all, but who's perfect?

Dave Gierke's spectacularly trimmed XP 40Q racer. He actually races this masterpiece!

Joe and Kent Nogy were 4th in FAST Club's races and had top handicap position. Starter Jim Jensen stands by.

Season Champs: The racing season got an early start down in Florida, with the second race on March 19, the third on April 30. Jim DeMerritte jumped into an early lead in the NMPRA Season Championships with 277.3 points after the second race, followed closely by Ed Weitock with 274.2. I'm just guessing at this point, but it looks as if it will take about 700 points to win the Champs this year. This, of course, is under the new NMPRA point system, which gives only a very slight advantage to the larger races on the West Coast. Anyone who can manage to participate in seven races with an entry list around 20 has just as good a chance of winning as the West Coast fliers (who have previously had it all their way because of numbers); in fact, probably a little better chance because he won't have to beat as much hotshot competition.

In Northern California the team of Garry Korpi and Luke Roy got off to a good start by winning the first race at Sunnyvale with a time of 1:34.7—with a 1971 K&B modified by Roy, who is apparently one of the best engine men around. His K&B for FAI competition also turned over 18,000 on FAI fuel and Korpi flew it to a time of 1:46.0, which I believe is a new record speed, though on the standard AMA/NMPRA course. At least it is faster than any of our team (or any other team) at the Internats last year, though I don't think it will stand up very long this year.

Perhaps the most exciting race of the early part of the 1972 season was the Talent Promotion Race at Mile Square in Southern California, sponsored by the FAST Club. The entry list was strictly controlled: you couldn't get into the race if you had any significant amount of previous experience in Formula racing. There were 37 registered entrants and the fact that there were only two or three times below two minutes indicates that it was an honest and successful screening job. The race was won by Paul White, and though Paul has flown in a couple of races before—and though he is certainly no novice when it comes to building or to reworking engines—as a flier he *is* a novice and he was a legitimate entry. Heartiest congratulations to Paul, to the FAST Club, and to all the sponsors who put up ten trophies and ten plaques so that almost no one went home without something to show for his participation in the Rookie Race of the Year.

Protection: On the subject of safety, the Southern California Committee chaired by Mel Santmyer is strongly recommending hard hats for all officials and fliers—in fact for everyone in the danger areas. They also recommend earmuffs of the type used to deaden jet engine noise, because the scream o the 40s on the starting line is in fact capabl of gradually damaging your hearing. Protec yourself! It's a small investment with ver high dividends in the long run.

Bob Noll, in Endicott, New York, has developed a light board for the number one pylon which displays *all cuts* at that pylon so that no one can be in any doubt about whether he or his competition had a cut or not. We suggest you write to Bob for details (96 Pine Knoll Rd.), because it's a great idea.

By next month there should be lots of race results and we'll start publishing the National Point Standings. Good racing!

CARL MARONEY

GLIDERS AND FAI

What is Stability?: Something is stable when it is disturbed by a force and tends to return to its original state. The best analogy to present has been used many times before in physics books, but it is worth repeating. In

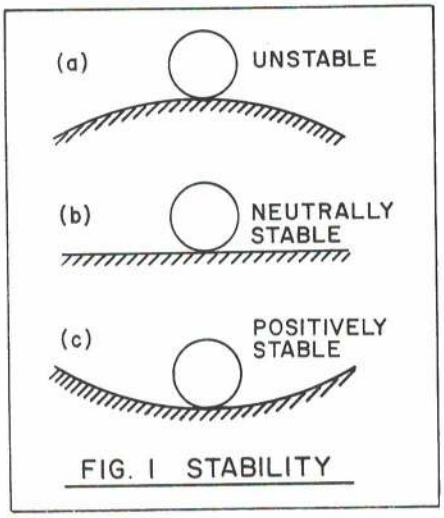


Fig. 1 (a) a ball is balanced on top of a curved surface. Give the ball a push and it will roll away off the surface no matter how gently it's touched. The ball is *unstable* because any disturbance increases of its own accord. In Fig. 1 (b) the ball is resting on a flat level surface and in this case a gentle push merely means that the ball will move and come to rest again in a different position. It does not try to roll away and it does not try to come back to its original position. This is called *neutrally stable*. But in Fig. 1 (c) the ball is resting in a shallow saucer and if moved, it will return again to its original position. This is *positive stability:* the ability to return unaided to a given state of flight, when disturbed, is a very useful quality in a glider.

An unstable glider would be a menace, because this would mean that if the nose of the glider were heading at some down angle, then the glider would dive away more steeply unless some up elevator control were given. A neutrally stable glider can be tolerated, since this means that if the glider is disturbed from its flight it remains in the new state without any attempt to make the disturbance worse. That is, if the nose of the glider drops for any reason, it will stay in that attitude. A positively stable glider will try to return, of its own accord, to the state of flight for which it is trimmed.

Go West young man—soaring is neither for the old or rich as evidenced by this scene at Torry Pines, California. Photo by Lloyd Hunt.

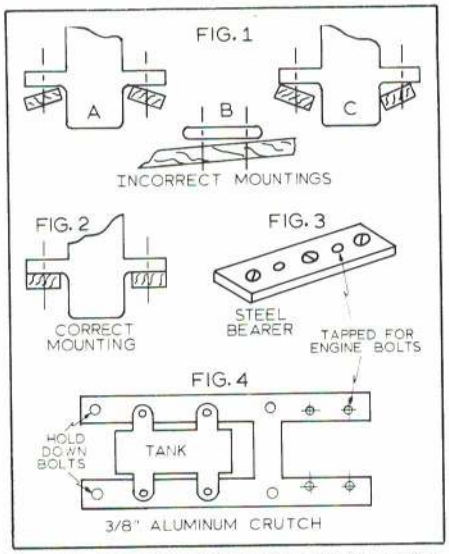
Soaring in Iowa and Nebraska: During January 1972 the Mid America Soaring Society was formed through the efforts of Mary Wilken, Floyd Richards and Jim Simpson. The first meeting took place at Council Bluffs, Iowa with 36 soaring enthusiasts in attendance. The governing body will be a council, composed of two members from each club which desires to affiliate. It was felt that this organizational structure would allow a reasonable working group. The primary objective of MASS is to build individual sailplane flying proficiency. Current plans call for at least 12 soaring contests to be held throughout the summer flying season. Contests will start at 1 pm on Saturday afternoons and will be designed to give contestants at least three chances to fly. MASS contemplates assembling a strong team to represent them at the Nationals. Membership is not geographically restricted: for further information write to MASS, c/o Jim Simpson, 2736 Ellsworth, Omaha, Neb. 68123.

CONTROL LINE

BILL BOSS

SPORT AND SCALE

Get the Most out of Your Engine: One of the items probably overlooked most often in trying to get optimum performance out of your engine is its mounting. Many modelers will go to great lengths to have their engines reworked, pistons chromed, etc. and neglect to do a good job of engine mounting. Then they wonder why it vibrates, overheats and just doesn't give them the extra performance they expected. So to help you get the most out of your engine, Gerry Manser provides us with a few tips on engine mounting.



Correct engine mounting can add to performance and durability. See details in text.

The normal method of mounting an engine is to use hardwood bearers. If done very carefully, the results are good. However, proper alignment of the bearers with one another is never an easy job. Fig. 1 shows some of the common faults (exaggerated for illustration of problems) with engine mounting. In the cases of A, B and C, engine bearers installed with any of these faults puts unwarranted strain on the engine crankcase when the engine is tightened in place. Distortion of the crankcase leads to vibration and overheating. Fig. 2 shows the correct method of engine mounting onto hardwood bearers. Note the clearance that should be provided between the hardwood mount and the engine crankcase.

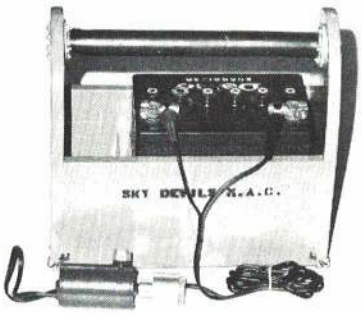
Even correctly installed hardwood mounts can be improved upon by installing 1/8" steel engine bearers as shown in Fig. 3. This method entails additional work but is worth the effort for additional vibration dampening and a smoothly running engine. Before adding metal bearers make sure you have correctly installed the hardwood bearers as shown in Fig. 2. Now make and mount the steel engine bearers, and use the following procedure to make sure the engine is seated properly.

Using a flat plate as a master, rub a little engineer's Prussian blue on it and gently slide it back and forth along the bearer plates. This will leave small patches of blue where the master plate has touched. Gently rub these high spots away with emery paper; repeat process until a constant marking of blue appears on the bearer plates.

When you have finished the flattening process, place your engine in position and

hold firmly in place by hand. With a 005 feeler gauge, check that the engine is seating properly by trying to enter the gauge at the four corners of the engine mounting lugs. If the gauge can be entered, blue the engine mounting lugs as you did the master plate and rub as before. You will see just where the engine is touching: rub off high spots as before. When completed you can be sure that the engine and the bearers are flat and parallel; when the engine is bolted in place no unnecessary stresses will be placed on the engine.

If you're looking for the ultimate in engine mounting you might try the engine crutch shown in Fig. 4. The crutch is made of 3/8" aluminum or magnesium alloy which can be bolted into the airplane structure. The crutch arrangement allows you to mount the tank to the plate, thus giving an engine/crutch/tank unit. Engines properly mounted and free from unnecessary vibration can give you the extra rpm that might just get you to the winner's circle.



Owned and maintained as Club property, this unit gets every model started at the Sky Devils field.

Dope Applicator: Get away from cleaning paint brushes by using this simple method. That small plastic sponge used by many women in the kitchen can be used for applying dope.

Pour some thinned (or straight) clear dope into an aluminum TV dinner tray and dip the end of the sponge into it. When sufficiently wet (saturated but not dripping), apply the dope chordwise to the wing. Before the dope dries, go over the wing spanwise. Two coats should do the job. With a little practice you may find one coat adequate. When finished, simply cut off the used end of the sponge and save the unused portion for the next job. This method works well on silk and nylon covered wings. Tip provided by Aero Modelers of San Jose in a recent newsletter.

HOWARD RUSH

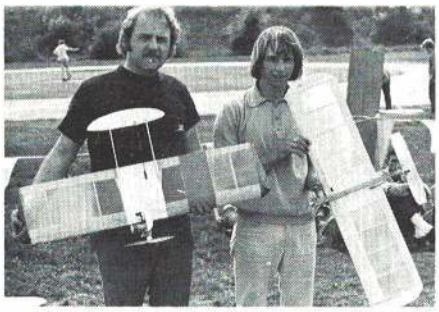
COMBAT

FAI Combat at the Nats: An afterhours FAI Combat event will be held at the 1972 Nationals, probably Friday evening. Organizer is Dick "Fast Richard" Mathis. Detailed FAI rules were printed in the April AMA Competition Newsletter.

Slow Combat, Too: The Queen City U-Control Club of Cincinnati is sponsoring unofficial Slow Combat at the Nationals. Event will be flown by QCUC rules, published in brief in this column (June 1972 **AAM**). Write W. Messerly, 1122 Eight Mile Rd., Cincinnati, Ohio 45230 for details.

Organization: A meeting will be held at the Nationals to organize a National CL Combat Association. Purposes of the Association will be to gather contest results to choose a high-point Killer of the Year, to put on one colossal annual contest, and maybe to publish a newsletter.

Jr. Satan Modifications for FAI: The Carl Goldberg Jr. Satan makes a competitive FAI Combat plane when modified as follows: A 2 x 8" stabilator is cut from ¼" sheet, sanded to a 12% symmetrical airfoil, and hinged at its leading edge 4" back from the wing TE. Lead-outs are moved back to 3-3/8" and 4-3/8" from the LE at the left wing tip. No weight is added to the right tip. There is plenty of room in the wing for a baby pacifier compartment. A tank capacity of about two oz. is necessary—these littie critters drink fuel almost as fast as the 35s. Powered by a Super-tigre 15, my Jr. Satan burns an ounce of 40% nitro fuel in 75 sec. while tooting along at better than 90 mph. It has hit the deck several times without damage, a big advantage if you'd rather fly than build.



1971 Combat Champ, Jerry Haupt (right), lost to his runnerup at the Nats, Neal Rose, in the big Combat season opener in Cincinnati. Top five places at the meet went to Nemesis II models.

Combat Matching Schemes: An elimination tournament works perfectly only if there are 2, 4, 8, 16, 32, etc. contestants. For other numbers of contestants some byes must be given. Byes can be given in any round, but probably the fairest method is to give them in the first round, where they can be spread out most uniformly. Enough byes are used to fill the matching tree out to 8, 16, 32, 64, etc. For example, if there are 11 contestants, five (16-11) byes are given in the first round, so five contestants move to the second round free. The remaining six are matched together and the three winners go on to the second round. There are now eight people in a round and no further byes will be needed.

Dan Patton suggests an alternative scheme. For rounds in which there is an odd number of people, the contestant left over after the others have been paired and flown off is matched against the loser of the round who scored the most points. If there are nine in a round, for example, eight are matched together. The four winners go on to the next round. Of the four losers, the one who scored the most points while losing flies against the ninth man. The winner of this match also goes to the next round. Because there is an odd number (five) in the next round, the process is repeated. This method of matching has the disadvantage of often leaving three people in the finals, the remedy for which is to draw a bye.

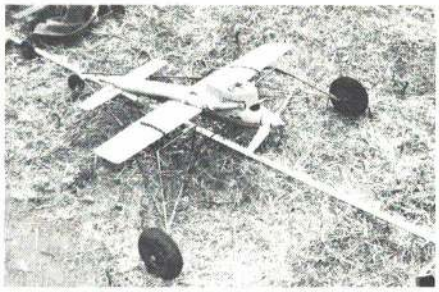
JOHN SMITH

SPEED AND RACING

Stockton-Jehlic on FAI Team: The team of Stockton and Jehlic will compete with the U.S. FAI CL Team this month in Europe. Although they placed fourth in the finals, they were moved onto the team when Marvin-Albritton dropped out, due to lack of good engines.

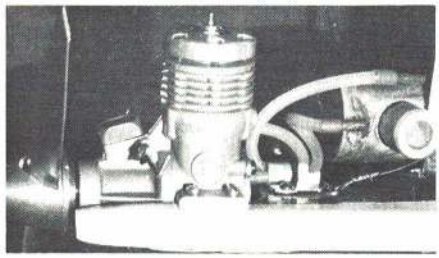
This should be noted by U.S. engine manufacturers, as the problem is acute in this country. Years ago, the manufacturers used the "basement engineering" of many top speed fliers—incorporating their modifications in production units which set the world on fire. Now the competition engine scene has changed: native manufacturers have turned their collective backs on the serious speed, rat and TR pilots. If you want to fly fast—and each year there are more people wanting to do so—you have two choices. Either use European engines or go the custom engine route.

Although the racing engine will not make any manufacturer rich, more and more people are shelling out $100-$200 for each engine they buy from the custom builders; the ranks are growing each year. One wonders how many more guys we'd have in the circles if the U.S. engine builders would once again offer good reliable contest-proven speed engines. It's a shame that unless one is blessed with a thick pocketbook for the custom stuff, you have to go to our European friends for good equipment. Let's hope things will change in the near future.



Father and son Speed team of Gene and Bob Patty flew this ST 15-motivated plane to 2nd at a big meet in Dallas—and with two-line control!

A fuel control system that resembles a snake! Just a shut-off device to make pit stops quicker in the Goodyear event.



Gene Patty carving special props for his "Swee Pea" racer.

Nylon 1/2A Bellcranks: We had some nylon bellcranks, 1/2A size, distort during pull test. Distortion was so great in some cases that all control was lost. They returned to shape after setting awhile, but if you use them check frequently to see if things are still in line.

NATS Note: As this is written, the '72 Nats picture is a bit uncertain as to where our Annual Fun-In-The-Sun bash will be held. One thing is certain: regardless of the area, we will not have the fine Navy help as in past years. This may have some effect in CL where many extra helpers are needed. Thirteen in speed alone are necessary. If you are flying one day, and have a day off before your next event, make yourself available to your event directors or to AMA. Your help will be more than appreciated by everyone. It's going to take a lot of cooperation from everyone to run the Nats the way we have been used to.

JOHN BLUM

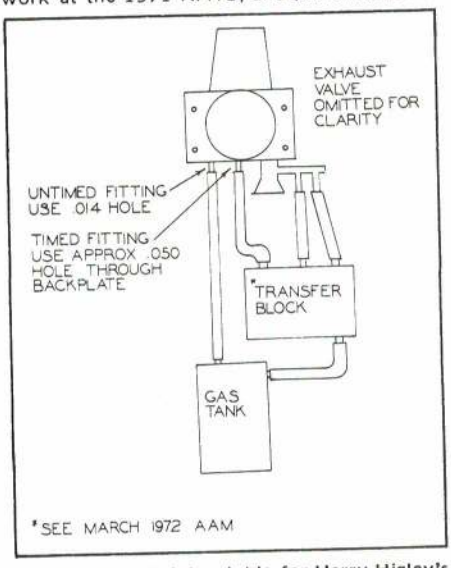
CARRIER AND STUNT

Photos Available: Write General Services Administration, National Archives and Records Service, Washington, DC 20408, if you are looking for Guardian or Skyshark photos. Ask for photo number 80-G-707773 for the Skyshark; 72-AC-100H-3 for the XTB3F-1 Guardian; or 80-G-634399 for AF-2S Guardian making an arrested landing. Glossy 8x10 black and white prints will cost you $2 each.

For a three-view of the XTB3F-2S Guardian, refer to the 1950-51 *Jane's All The World's Aircraft.*

RPM Control: Harry Higley of Glenwood, Illinois, forwarded the sketch of the throttling and fuel control system. (For full explanation, refer to March 1972 **AAM**, page 29.) Adding this sketch to the complete article enhances full understanding. Harry relates ability to idle a ST G40 at 2000 rpm with this system, but engine must be fully broken in.

Had a chance to watch Harry's equipment work at the 1971 NATS, and performance is

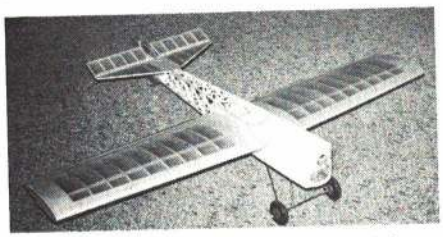


A new and helpful wrinkle for Harry Higley's RPM control system of March 1972 AAM article. See text.

very impressive. The method gives means to control at least one group of known engine throttling variables. Now, if Harry can come up with something to control the humidity. . .

Shock Absorbing Gear: Mark Bauer of Norridge, Illinois, likes old-timers. Model depicted is quite similar to one flown at 1971 NATS. Also see three-view in June 1971 **AAM**, page 37. The model shown is 20 percent larger and features a "swept" wing leading edge. Model is covered with yellow silk and clear dope.

Other photo shows a very effective shock-absorbing landing gear. The rear diagonal braces are affixed solidly to the fuselage and gear axle. The bend at the fuselage, by nature, is slightly flexible. The vertical gear brace wire is formed in one piece, fixed solid to the fuselage. Note that brackets are attached to the axle with holes that allow the vertical wire to pass through both brackets. Note the fixed keepers just above



Mark Bauer's latest old-time stunt model now fitted with adjustable features a la Al Rabe and a ST 40.

the springs. In assembly, the upper keepers are attached, the springs installed, the axle (with brackets) is installed, and permanent keepers are attached to the ends of the vertical brace wire. The expansion springs push against the upper keepers and the axle brackets, creating a shock-absorbing gear.

It is most adaptable to the subject type aircraft and similar designs, but offers possibilities and thought. Any ideas? ....

Throttle Bellcrank: Barry Telfair of St. Louis, Missouri, offers suggestions on the dual bellcrank (throttle bellcrank made from two conventional bellcranks) as depicted in the May 1972 **AAM**. If the nuts are not soldered, it should be used only where it can be frequently checked. The bolts sometimes work loose due to vibrations, so it shouldn't be buried inaccessibly in a valuable model. The general construction, as presented, results

To help earn maximum landing points, Mark finds a simple shock absorbing gear useful.

in a rather tall assembly, compounded by the 1/4" spacer placed under the bottom crank. The height places a sizeable bending load on the crank mounting platform and the mounting bolt. Barry suggests countersinking the bellcrank bushings and using flat-head screws in place of the roundhead screws furnished. Use a 1/8" thick maximum spacer so that the throttle wire will just clear the bellcrank platform.

special interest

CLIFF PETERS

RC BOATING

IMPBA 1972 International Regatta: The Internats will be held in Flint, MI, Aug. 9-13. *The biggest yet* is the fond hope of all those working hard to make it exactly that.

The proposed schedule of events follows: Aug. 9, Open Water (practice permitted;) Aug. 10-11, Time Trials; Aug. 12-13, Heat Racing & Scale Events. All events will be run in accordance with IMPBA rules in effect at the time of the event; the two-boat rule will be in effect.

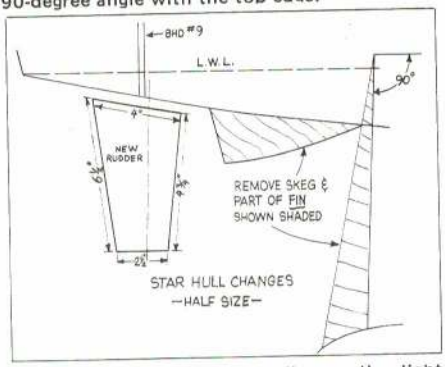
Entry in the 1/16-mile straightaway will be limited to those boats which have previously recorded times within 25 percent of the IMPBA record in their class. Entry in the 1/3-mile oval events will be limited to boats which have recorded times within 15 percent of the record in their class. Speeds will be based on those as published by IMPBRA January 1, 1972. These speeds must be documented by presenting an authenticated timing certificate to the Contest Director prior to the event. Record Trials will be held Aug. 10-11 from the conclusion of the Time Trial events until sunset, as time permits. Documented proof of performance within 10 percent of the current record will be required and boats will be run in the order that entries are received. The two-boat rule will not apply to record trials.

There will be two heats of racing on Aug. 12 and one heat on Aug. 13. No qualification will be required for Heat Racing. Scale events will be held at a separate site on Aug. 12-13.

The annual IMPBA banquet will be held Aug. 12 in Flint, MI.

Pre-registration for the regatta is heartily encouraged—$10 has been added to the registration fee for those received after Aug. 1. Further information regarding the regatta can be obtained by writing to Paul Binkley, 414 N. Michigan Ave., Howell, MI 48843.

"Star" Modifications Improve Speed, Maneuverability: The Dumas Star 45 originally was designed for the prototype of the popular International Star Class boat which is several decades old. Recently it was determined that with a few simple changes, which have been made, an excellent racing craft could be made from that first docile Sunday Sailor. As once kitted, the Star was unable to make the abrupt turns at a buoy or an instantaneous change of tack which is a must in today's RC racing. The changes are simple and have been incorporated in all kits now supplied. The drawing is almost complete in the matter of physical improvements recommended for current racing activities. The skeg is eliminated, the rudder is balanced and the area is approximately doubled, mounted just forward of bulkhead No. 9. The aft edge of the keel plate or fin is trimmed slightly (as shown in the drawing) so that it makes a 90-degree angle with the top edge.



Where winds are normally on the light side, the mast can be given a nice taper—beginning about a third of the way up from the deck to the top of the mast. Lateral balance and appearance are both improved by a little extra work on the mast; however, keep in mind that a little taper is much better than a lot. There should be a healthy mast at the top—none of this toothpick appearance! For competition, simultaneous control of the jib and mains'l may be preferred by some owners. However, separate control, as available, will appeal to skippers who like to be able to add that fine personal touch. Both methods are shown in the kit drawings.

One more change should be made in order to take advantage of those already recommended. If the boat is balanced on the design waterline as shown in the plans, the bow will have a tendency to plow as the wind increases. To eliminate this effect, the boat should be balanced with the center of gravity far enough aft that, underweigh, the bow will ride high enough to obtain eight to ten in. of forward overhang before the static design waterline begins. All testing should be done with RC, sails and rigging mounted. Placing the batteries for the sail-trimming mechanism near the transom is recommended.

Credit for the design changes should be given to Ben A. Hogenson, former AMYA Secretary-Treasurer, and Jay Brandon of Dumas Products, Inc.

New Transmitter for Sailboats: The Ampro modification of a conventional three-channel RC transmitter for sailboats is pictured. Rocker switches control the main and jib sheets. For those who prefer to make the modifications themselves, a kit of parts is sold by Ampro. Those who would rather have the job done by Ampro, should send their transmitter, receiver, one servo and power supply to Aero-Marine Products, Inc., Box 3134, Burbank, Calif. 91404. After the equipment is received, it is modified, checked out and en-

The AMPRO modification of a conventional 3-channel transmitter with rocker switches for main and jib sheets. See text for details.

route back to the owner in a 7-day work week. The charge is $35.00 including return postage.

JOHN BURKAM

HELICOPTERS

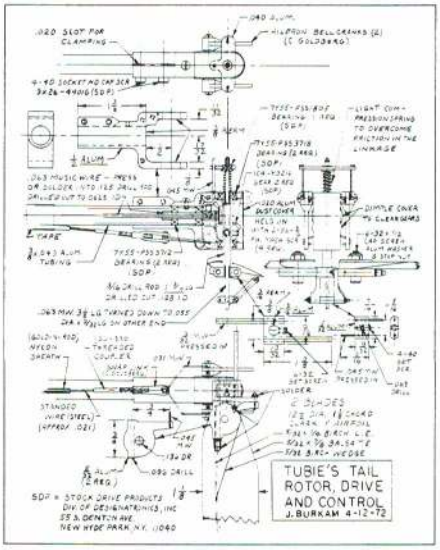
Rotor Discussion: The Hiller rotor, with its servo paddles for stability and control, has been the most popular rotor for RC helicopters. It has good stability and control; response can be slowed down for beginners by adding weight to the ends of the servo rotor, the pace can be quickened by lightening the paddles. It is fairly simple if collective pitch is not used (see this column, Nov. '71 and Jan. '72). It doesn't seem to have any unstable quirks at high forward speed.

Recent tests at the University of Maryland wind tunnel on a 5½ ft. hingeless rotor helicopter seem to indicate that a hingeless (rigid) rotor helicopter could be flown by radio control without any stabilizing device other than a large horizontal stab on the tail. Definitely not for beginners, though. The rotor would have high aerodynamic damping in pitch and roll, but also high control power. Extremely maneuverable. A characteristic of rigid rotors is that the faster they go forward, the more statically unstable they are. An increase in angle of attack produces increased nose up moment, and vice versa. That is the reason for the large (3-4 percent of rotor disk area) horizontal stab. It might be advisable to control the angle of the stabilizer with the same servo that controls longitudinal cyclic pitch.

A further aid to flying might be a bobweight near the nose of the helicopter, connected to the moveable horizontal stabilizer or to the longitudinal cyclic, or both. A weight on the front end of a lever which is hinged on the back end is held in a horizontal position by a spring. Vertical accelerations cause the weight to bob up or down, motion which is transmitted to the longitudinal control system. They are used in full scale helicopters and airplanes to limit G forces.

Tubie Tail Notes: Since the tail rotor turns at 4.8 times main rotor speed (see drive system, May **AAM**), the tail rotor diameter should be about 1/4.8 times main rotor diameter, or 12.5 in. Blades are held on by brass sleeves soldered to 3/32 M.W. spindles, which are pressed into hub. Get a good press fit by drilling hub .089, then filing end of spindles down to about .001 interference. File flats on shaft and use epoxy to make setscrews hold. Both the light compression spring on the control shaft and the tennis racket effect (centrifugal force) help make the blades go to flat pitch. These forces keep tension in the control cable and eliminate the backlash which would make the tail wag like a happy puppy's.

Tail rotor shaft and control shaft are called out 1/8 in. longer than shown on the drawing to give more clearance between the 6-32 stopnuts and the gear box. The dust cover is dented out about 1/32 in. to clear the gears, whose O.D. is slightly more than ½ in. Lubricate gears with light grease. The tail rotor drive shaft may be enclosed in a nylon sheath to prevent whipping; it should be supported every foot or so. Minimum bend radius permissible is about twelve in. A slip clutch should be used somewhere in the tail rotor drive system to prevent twisting off the shaft if the tail rotor gets hung up. A kit of 31 stock parts (bearings, belts, pulleys, gears and catalog) for the tail rotor and main rotor drive systems is available from Stock Drive Products (address on drawing) for $39.95.



FRED MARKS

AERODYNAMICS, ELECTRONICS

New Development in the Servo Field: The introduction of servo mechanisms by an independent firm, D and R. A number of other companies are beginning to use the D and R mechanisms. This stimulates competition in the field—which is what it's all about.

There were several systems which incorporated integrated circuits for decoding; however, some have been using them for several years. One of the most likely to evolve is the DM8570 eight-bit shift register which is now available at a low price and which will decode from one to eight channels.

The other major effort is in the area of receivers. Some have added stages of IF; another has introduced the use of field effect transistors which were selected to specification, in the front end. Another has introduced the use of a double conversion receiver (i.e., one which has a second IF strip at 10.7 MHz) to improve selectivity of the receiver. Multiple conversion, no matter how many stages, is designed to do this. Each stage increases selectivity a bit more. A sophisticated spectrum analyzer incorporates many stages of conversion and can reduce selectivity to less than one Hertz.

Some manufacturers have a dual line: the deluxe, professional set and the lower cost sets which don't incorporate the "goodies". Goodies include buddy boxes, extra tight stick assemblies, dual frequencies, multiple selection of servos, etc. The real guts of the thing is dedication to better performance, more interference resistance, and better reliability—at steadily decreasing cost. We also understand the gleam in the eye of the guy hanging over the counter at the booth when he sees the goodies but doesn't understand the technical aspects. Our manufacturers have done a pretty good job of satisfying both.

The unknown quantity—what kind of service will a buyer receive on his set? There is no answer right now but there must surely be a better measure than hearsay. Think about it and let's hear from you.

The expansion of the number of IC servo amplifiers was noted with World Engines, Kraft, Orbit, Heath and EK displaying IC chips made for them. With the exception of Heath, these are all bridge amplifiers requiring just three wires per servo. The Heath servo requires a battery center tap, thus needs four wires. A number of other manufacturers purchase the IC from one of the preceding to produce their own servo. In some, all active components are on the chip. Others use a set of complementary output transistors in addition to the chip. In all cases, passive external components are used for circuit optimization. (Resistors, capacitors and inductors are passive, transistors and such are active components.)

Our experience with these IC servos, as well as our own, indicates to date that the servo amp can be made as tight as wished. However, increasing the resolution beyond an undefined point begins to bring a new set of problems. The electronic switching required to compensate increasingly shorter error pulses begins to impress voltage spikes on the power supply line in addition to motor noise. This can be corrected readily by filtering the power supply to the receiver and/or decoder such that they do not respond to the electrical noise. However, a second problem arises in that the servo is so tight that it now senses even minute variations in pulse-to-pulse error. This shows up as a noticeable hum in the servo as it attempts to correct this pseudo-error; the servos don't make extraneous movements, they simply sit there and try to ease the backlash out of the gear train. The latter is a limitation that must be accepted as servo resolution becomes better and better. At this time, there seems little point in further improving resolution.

I would like personally to thank the following for the discussions at Toledo: John Camp of Min-X; Ed Thompson who has just entered the field of manufacturers; Bill Hannah of Heathkit; Bob Elliott of EK; John Elliot and Chuck Speer of Orbit; Sid Gates of Royal Electronics; Bill Cannon; Jim Martin of Hobby Lobby; Jim Fosgate of Pro-Line; and Butch Lanterman of World Engines. We were also quite pleased with the display of the AAM Commander by ACE R/C.

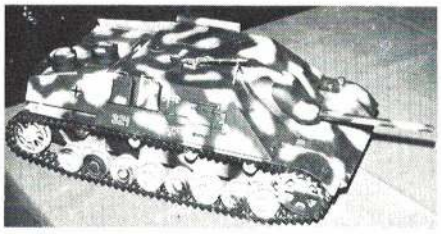
BOB BECKMAN

RC CARS

These Are Cars? Two unusual and interesting items from extremes of the RC car field: the first is the model tank that won first place for Cars-General at the Seattle RAMS RC Conference. It is obviously a well-planned and -executed model that must be fascinating to watch in operation. At the same time, I wouldn't want to meet it on the back straight.

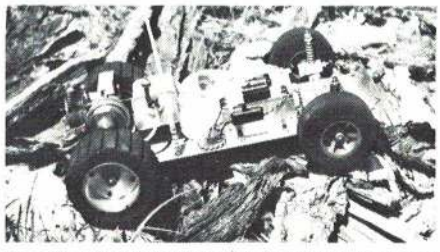
The second is the dune buggy, or All Terrain Vehicle, built by ROAR ex-president Larry Robbins. If you met this on the track, it would just climb over you and go on its way. It moves right along on pavement, but isn't the greatest at high speed cornering. Where it does shine is out in the rough. With 4" diameter rear wheels, 3½" fronts, and 1½" of ground clearance, it takes a lot to stop it. At full throttle it climbs a 60-degree grass bank, accelerating all the way.

One of the most interesting features of the buggy is the engine/axle mount assembly. It is machined from a single piece of aluminum, with oilite bearings for the axle. It was designed to put the maximum weight on the rear axle and to get the mesh point of the gears as far off the ground as possible.



In the CARS-GENERAL division at recent RAMS trade show this vehicle won overall against some nifty RC racing machinery. Has a 4-channel radio inside. Ken Stuhr built it.

Larry Robbins' All Terrain Vehicle ready to do its thing.



Tire Capping Adhesive: A few issues back we talked about capping tires, and one of the adhesives mentioned was 3M Weatherstrip Adhesive (Black) Part No. 8011. Since then, more tests have been made and this adhesive looks better and better. It dries quickly and seems to hold more firmly than others we've tried. You have to work quickly to spread it evenly, but the fast drying lets you do the second half of the cap after an hour or less.

Screw Loose? The only thing worse than a screw that loosens when it shouldn't is one that you can't get loose when you need to. Loc-Tite and similar products are fine for permanent installation of screws, but not when it has to be removable. In most cases, silicone rubber is the answer. A little on the threads when the screw is installed will prevent vibration loosening the screw, but it is easily removed.

The silicone rubber won't always help short set screws, but using the right type of set screw will. Most common ones have plain cup ends. Knurled end set screws are much more reliable in our applications. Look for them in manufacturers supply houses or the better hardware stores.

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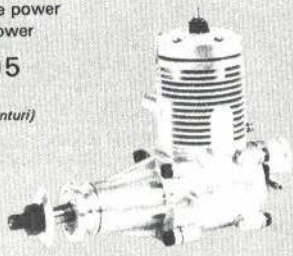

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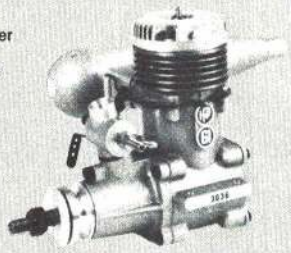

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Cloak and Dagger

(Continued from page 41)

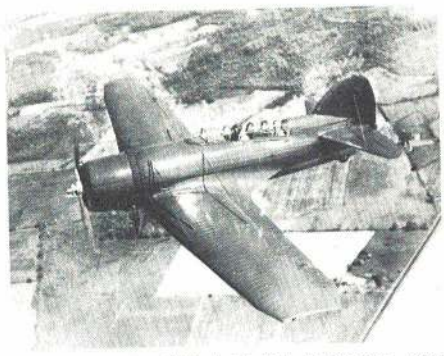
100 gallons and forced it to make about 20 refueling stops. Fitzmaurice felt he would thus have no chance to win the race under such a restriction, and so he withdrew.

The Model 28-70 was returned to the factory, was slightly modified with an improved engine cowling, and then was seriously damaged in a landing accident during the continuing test program. It sat around until 1936, when it was rebuilt with a 900 hp Pratt & Whitney R-1830 Wasp engine in place of the original 700 hp P&W Twin Wasp Jr. The designation was changed to 28-90 to reflect the increased horsepower, and it was registered in the U.S. as N190M. At this time, a central skid was added to the bracing posts under the fuselage.

Re-named "The Dorothy," it was purchased by English long-distance flier James Mollison, who immediately set up a new record from New York to London of 13 hours, 17 minutes, or about 260 mph. This was in October of 1936. A month later, Mollison headed south from London with the intention of breaking the record to Capetown, at the southern tip of Africa. A broken fuel tank forced him down along the banks of the Nile River, unfortunately, and the flight ended there.

Sometime in 1937, he flew the airplane to Madrid and sold it to the Spanish Republican government, which apparently used it for high-speed reconnaissance during the Spanish Civil War. Even before they bought Mollison's prototype, however, the Spanish had ordered 20 of Bellanca's Model 28-90, by now called the "Flash." The order was made in the name of Air France, in order to get around the Neutrality Act which then forbid the export of military aircraft to certain foreign countries at war. The planes were painted up in Air France colors, even though it was common knowledge they were headed for Spain, but before they could be delivered, the law clamped down.

Despite the fact that the Chinese-Japanese War was in full swing, the neutrality rules somehow failed to cover China, and the 20 Flashes were shipped to Shanghai. Military equipment was installed in China, but most of the airplanes were destroyed by the Japanese before they could be sent into combat.



Renamed the "Flash," 42 Bellancas were purchased by Spain during its civil war, 20 more by the Chinese to fight Japan. Some ended up in Mexico where they were equipped with machine guns and bombs.

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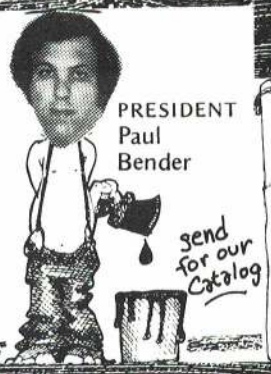
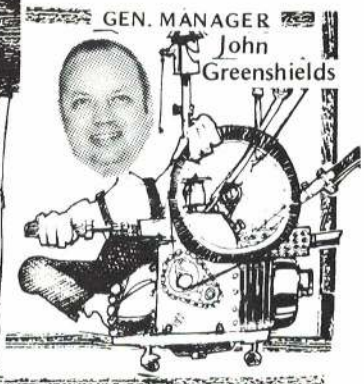


PRESIDENT Paul Bender



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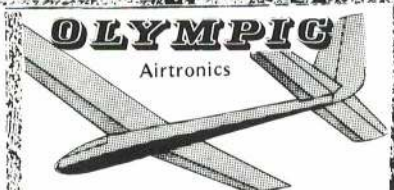

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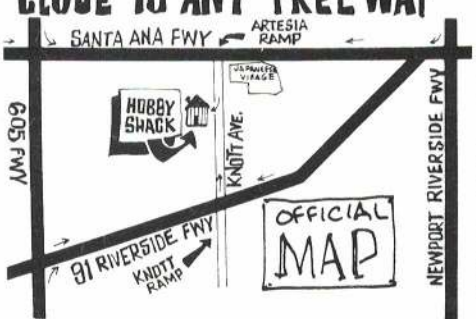

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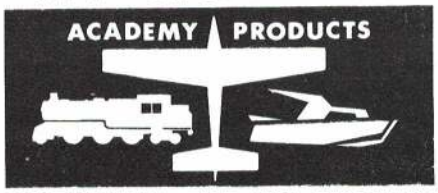

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Another shady order for the Spanish was received by Bellanca in late 1937, this time for 22 airplanes in the name of a Greek flying school which did not even exist! The export application was turned down, but the airplanes were built anyway—all 22 being completed in just three months. Before they could be sneaked to Spain via Mexico, the Spanish Republicans were defeated by the Fascists, and Mexico took over the model 28-90B's to cover part of the debt owed them by the Spanish. A brief period of active service with the Mexican Air Force ended after two of the Flashes had crashed fatally, and the remaining aircraft were grounded.

The Mexican Bellancas were set up to carry a pair of forward-firing .30 cal. machine guns, and a third .30 cal. in a moveable mount in the rear cockpit. Bomb racks could carry eight 120-pounders.

Construction of the wing was quite conventional, with two spars and closely spaced ribs, covered with fabric. External bracing was composed of tie rods from the upper surface to the fuselage, and from the lower surface to steel supporting struts extending down from the belly. Fixed tail surfaces were plywood covered, while the control surfaces were welded steel tubing, covered with fabric. One of the novel innovations (for the time) was a cockpit canopy made of plexiglas.

In the long-range Model 28-70, all fuel was carried in front of the cockpit, in a 480-gallon main tank and a 120-gallon auxiliary tank. In the limited production Model 28-90, there was a single 150-gallon tank forward of the cockpit.

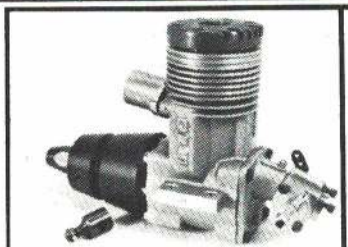
And so, to the best of our knowledge, ends the saga of the Bellanca Flash. There were 43 built, with all apparently ending up in Spain, Mexico and China. According to all official records, not an airplane remains, though intriguing rumors occasionally float up from Mexico of mysterious airplanes in scrap yards. So far, none of these has concerned any of the flashy Bellancas, but it's always a possibility that at least part of one remains, somewhere. And if even a few miscellaneous parts can ever be found, the way will then be open for some ambitious antique restorers to work their magic.

But this is probably only a dream.

Specifications of the Model 28-90

Dimensions:
Length—25' 11"
Wingspan—46' 1¾"
Wing Area—278.8 sq. ft.
Height—8' 8"
Empty Weight—4450 lb.
Loaded Weight—7099 lb.

Performance:
Top Speed—281 mph at 5000'
Cruising Speed—250 mph
Maximum Range—800 mi.
Initial Rate of Climb—2800 ft./min.
Service Ceiling—30,500'



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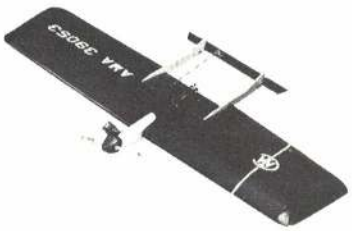

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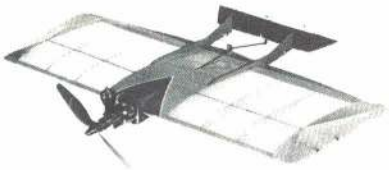
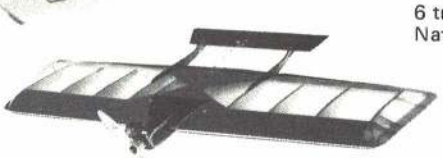
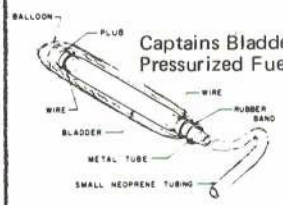


UC ½A Guillotine
.049 to .09 engines
Kit C102 – $3.50
(Kit only)





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Modeler Mail

(Continued from page 10)

Uneven swap

Would the person who took my Veco .61 engine (identification number 37) from the Swap Shop at the Toledo RC Conference and who apparently could not locate me please send me the $25 I was asking for it.

Terry Edmonds, 1 Lakeview Knoll,
Iowa City, Iowa 52240

Appreciates Paul Harvey's concern

I commend your wonderful article on Paul Harvey in your May issue of AAM. I have done aircraft modeling for the last 39 years and still love it. In fact, the love of aircraft was instrumental in changing employment from private industry to a government installation where I have been employed as a budget analyst for the past 13 years.

Paul Harvey is a man after my own heart—he has condensed a lifetime of aircraft modeling in his interview. It is people like Mr. Harvey—concerned hobbyists—who motivate and expose this field to the fullest extent.

At 51, I find modeling a fascinating youthful hobby; I only worry about the day when I no longer can contribute to the hobby. It personally saddens me to see not nearly enough interest is being generated by the youth of today. The

(Continued on page 95)

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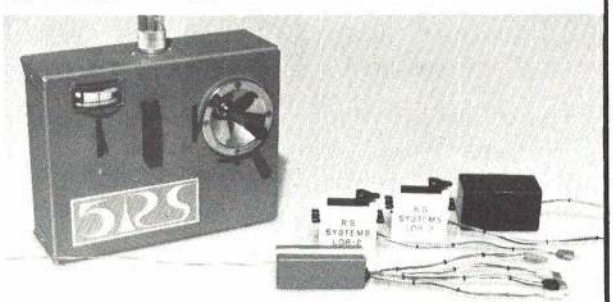

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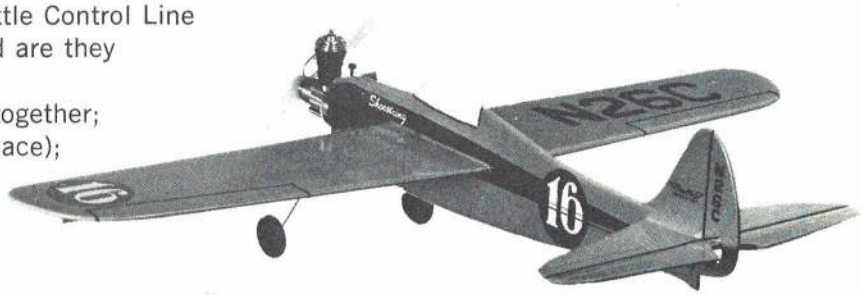

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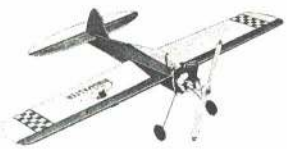

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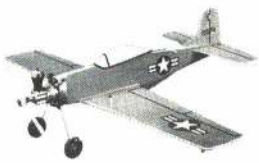

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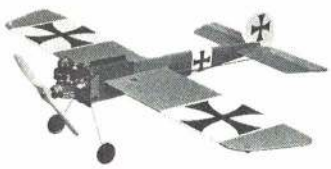

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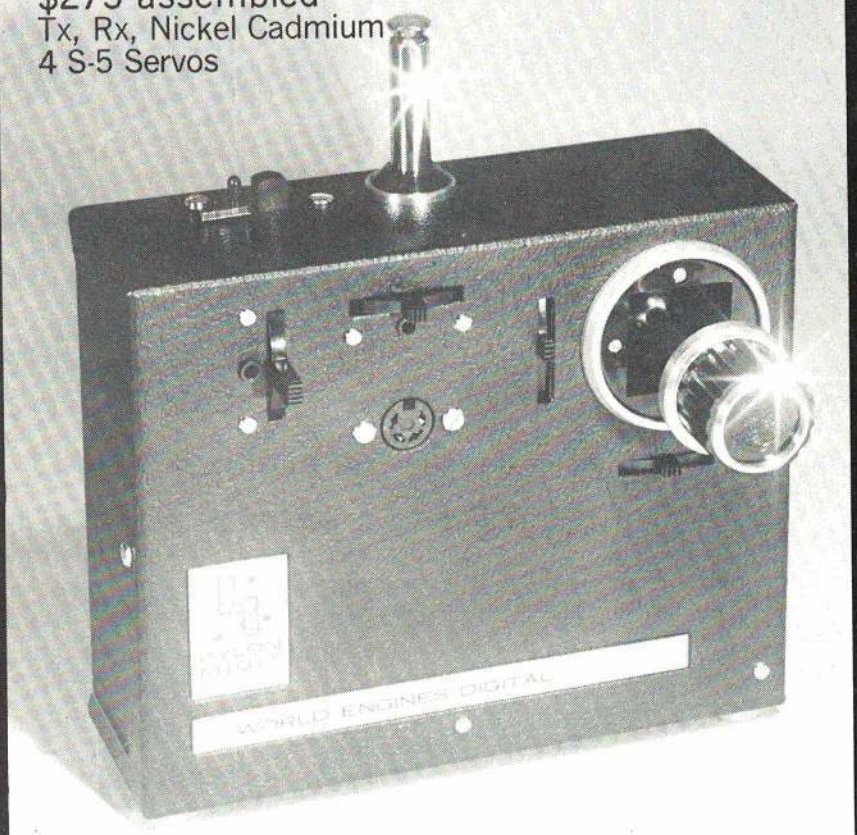


PYLON MIGIT SINGLE STICK

PYLON MIGIT SYSTEM

Our Pylon Migit 4 channel single stick is the top of our Digit Migit line. The system features a three axis single stick and the system comes with four servos.

Did you ever notice that many top fliers fly pattern with dual stick, then they switch to single stick for Pylon? Our Dave Brown (who is coming up in the world of pattern fliers) likes this single stick for a couple of reasons. First—the stick is close to the edge of the transmitter case so that the third and little finger of the right hand can hold the case while the other two fingers and the thumb operate the stick. Having your hand around the edge of the case, Dave says, gives you sort of a reference feel so that you know how much rudder you are cranking in. Notice also that we've got a set screw brake on the rudder trim lever. This brake permits varying amounts of trim lever drag to suit your fancy. Everyone at World Engines is proud of this new product. This is one product that has come out much better than we anticipated from the standpoint that the transmitter is just plain cute—it is almost irresistible.

KIRKLAND 1ST AT HUNTSVILLE

Huntsville is one of the largest contests in the South (the springtime contest season opener). Jim Kirkland placed first using World Engines Digital equipment in pattern. Second place, Don Lowe, using World Engines Receiver and Servos. 3rd, 4th, and 5th places went to Coleman, Whitley, and Chidgey using Pro-Line. Our Dave Brown was right on their heels in 6th place. If you wonder why we are crowing about these contests wins in our advertisement, we will be glad to elaborate!

First, it takes a high precision system to compete in this type of fierce competition. After all, Chidgey was last year's national champ and Whitley just won at Phoenix this past winter. So, naturally we are proud of our boys and their accomplishment. The above Pylon Migit has the same features incorporated in the Expert Series that Jim and Dave used at Huntsville except for the custom gimbal sticks.

WORLD ENGINES
INCORPORATED
8960 ROSSASH AVE. CINCINNATI, OHIO 45236

Apteryx

(continued from page 18)

Using a long knife, cut out between the leadout holes in the inboard wing panel for the bellcrank assembly. Also, cut a groove for the pushrod. Cut a 1/2" wide notch in the outboard panel to accept the motor mount assembly. Cut a firewall out of medium balsa, and cut out a notch for it in the outboard panel. Also make a slot for it in the inboard panel. Connect the leadout wires to the bellcrank. I use a Pylon brand nylon bellcrank and drill a hole in it as shown on the plans for the pushrod.

Without gluing, pre-assemble the wing panels with motor mount, spars, bellcrank assembly, leadouts and pushrod. Trim any balsa and/or foam to be sure that leadouts will work smoothly and that there is a good tight fit between the wing panels. Good tight joints mean less epoxy will be needed and less weight will be added to the airplane. Using sandpaper, rough up the Mylar where the epoxy will come in contact with it.

Disassemble and epoxy the center spar with the bellcrank in the inboard panel. Also epoxy in the firewall to the outboard panel. When dry, epoxy together the motor mount and the outboard panel to the inboard panel. While drying, use masking tape to keep the wing in alignment.

Make up a pen bladder tube. We use a fiberglass tube that is made over a polyethylene golf tube. The ends are balsa plugs. Cut a groove for it in the outboard wing and epoxy in place. Epoxy a Mylar patch over the opening. Carve a pod to shape and epoxy to the motor mount.

Make up a stab from ¼" balsa and booms from 3/32" plywood or 1/8" basswood and assemble with 1/16 wire hinges. Use epoxy or General Electric Silicone Seal to attach the stab assembly to the wing.

Make up wing tips and braces and epoxy in place. Install leadout guides. Carve and sand tips to shape and cover with Topcote (FasCal) or Super Solar Film. The temperature needed to apply Super MonoKote is higher than the melting point of the foam, so it must be used with great care.

Fiberglass the pod and a one-in. area around it, as well as the stab. Apply three coats of clear dope to the booms. Use a control horn that will give you about 15° movement in each direction for your first flight and adjust from there. The airplane should balance about 1/2" ahead of the spar.

I shouldn't make any claims about the speed or the maneuverability of the Apteryx because a lot depends on how well you build the airplane and how good an engine you hang on the front of it. However, with .018 lines, an 8-8 pylon prop and 40 percent nitro fuel, my Apteryxes (Apterii?) have been good for about 115 mph without a streamer and a little over 110 mph with one. At first glance, 115 mph may seem slow in comparison to many of the 120-plus claims that have been made, but after several years of contest flying

Dan and I have decided that these claims are highly optimistic, to say the least.

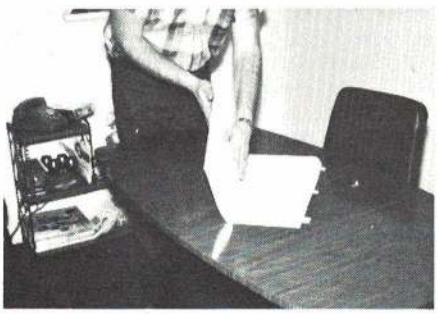
The Supertigre G21-35 engine that I use on the Apteryx was out of date five years ago in comparison to a custom-built engine that a couple of speed engine builders have threatened to create, but until an engine like this becomes available, the Tigre is the way to go. I have tried the Fox 36X ball bearing but it doesn't put out quite as much power as the Tigre. On the superlight airplane the Fox may work well, but at 21 to 22 oz. the Apteryx is out of that class.

In case you haven't guessed by now, the Apteryx is not an ARF. The foam wing is used because of its superior flight characteristics and not because it is easy or quick to build. If you consider the time it takes to cut, prepare and cover the foam wing panels, it probably takes the same amount of time to construct an Apteryx as most of the kitted combat ships on the market today.

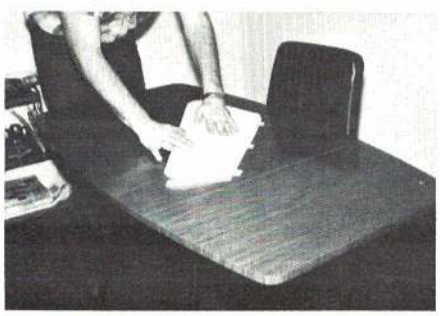
I want to thank Howard Rush for doing a first class job on drawing the plans. My thanks also to John Hart and Field Enterprises Inc. for the use of the Apteryx.

Last but not least: Do me a favor and don't build an Apteryx, because I know what it will do and I don't want to have to fly against one!

Mylar covering taped to table, contact cement is set.



Pulling against tape, wrap covering around uniformly.



Smooth out the covering to make a perfect airfoil.

NEW PILOT ARTF'S

This sharp looking aircraft is designed to fly on elevator, rudder, and motor. It is a relatively large 3 channel airplane, 52½" span. The manufacturer recommends a 20 but would probably fly on a 35 O.K. Nice vacuum formed fuselage, balsa elevator, molded foam wing with solid dihedral brace. Model also includes steerable nosewheel. A little larger than the Pilot Cherokee and Olympia. Worth the additional $5.00.

This model features the same type of vacuum formed fuselage and foam wing construction used in the popular Pilot Cavalier. The wing span 49.6". Length 39.37" (1 meter). Wing area 461 sq. in. Engine .4 cu. in. Weight approximately 5 lbs. This almost ready to fly pylon racer with racing lines, wheel pants, should make active pylon racing possible for the modeler too busy to build. This is particularly important in this rugged event.

The Phantom is an almost ready to fly U/Control model constructed of vacuum ABS plastic and wood. A very striking looking sidewinder. Wing span 25". Length 25". Wing area 192 Sq. in. Recommended engine 15 to 19. Flying weight approximately 1.35 lbs. Here is a chance for some U/Control flyers to enjoy the advantages of an A.R.F. package.

This is a U/Control combat trainer for a 20 engine. Wing span 30". It is a composite wood and vacuum formed aircraft. Even the name is a ringer.

This glider is the Pilot Thermal's little brother. Foam wings. Vacuum formed fuselage with a plywood pod. Manufacturer recommends an .06 engine. .049 engine would probably work well.

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Getting Started in R/C

(Continued from page 12)

cellulose glues provide good strength and quick drying, but are not fuelproof. Confused? Most kit manufacturers recommend the types of adhesives to be used in various locations on their models.

Covering: If you are an experienced builder you may opt for a silk and dope covering. This applies to silk, rayon-nylon blends, etc., which are usually applied wet to a doped framework and are then filled and finished with dopes or lacquers. The novice builder might favor one of the heat shrink coverings such as MonoKote, Slic-tac, or Solar Film. These coverings have the advantage of not requiring special surface preparations, fillers or finishes and are less apt to induce warps in control surfaces. One disadvantage is that, in order for the covering to adhere properly without air bubbles, it is necessary to leave the framework unfilled. This leaves the wood soft and vulnerable to "dings" under the covering. The covering maintains the aerodynamic shape of your flying surfaces so it should be free of wrinkles, sags, bellies and ragged edges. The covering must also seal the framework to prevent fuel and oil penetration; techniques are normally provided with the covering material.

Here is a partial listing of kits by many manufacturers which can be considered in the trainer category: Goldberg Models—Falcon 56, Sr. Falcon, Skylane 62, Ranger 42; Top Flite Models—Headmaster, Tauri, Top Daug; Sterling Models—Fledgeling; Aamco—S-Ray, H-Ray; deBolt—Jenny, Champion, Cub; Jensen—Das Ugly Stick; J&J Industries—J-Craft Trainer; G-line Products—Tomcat; Lanier Industries—Transit, Comet, Pinto; Du-Bro Products—Cardinal; Midwest Products—Aristo-Cat, Sky Squire, Tri-Squire, Whiz-Kid; ACE Radio Control—Dick's Dream, Ace High. This is by no means a complete list but is representative and will give you some ideas for your next trip to the hobby shop.

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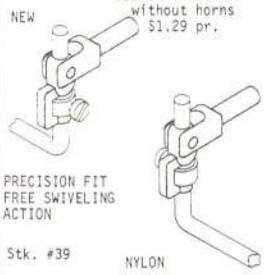

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07	Push Rod Retainers	.59 4	27	Antenna Exit	.59 4
08	Push Rod Exits	.59 4	28	Throttle Detent (Kraft)	1.29 ea.
09	Steering Arm	.59 ea.	29	Aileron Swivel Links w/Horns	1.59 pr.
10	Shock Absorbing Steering Arm	.59 ea.	30	Safety Back Razor Blades	.59 12
11	Missing Link	.79 ea.	31	Servo Output Arms (Kraft)	.98 2
12	Missing Link w/o hardware	.79 pr.	32	Transmitter Switch Lock	1.59 ea.
13	Dual Output Servo Screw	.59 3	33	Adjustable Servo Arm	.98¢ ea.
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S.S.P. Helicopter

(Continued from page 52)

All machine screws and nuts should be epoxied on final assembly, or use self-locking nuts. The only exceptions are those that will be used frequently.

Before starting, study the plans carefully and understand fully all mechanisms. Next, make up a material list of all raw material needed and order it. Order Part No. HK 102 from Stock Drive Products and ask for their catalog. The total cost of these parts is $59.95. The kit HK 102 contains the 44 parts needed for the main and tail rotor transmissions. The bearing for the swashplate and gyro-stabilized tail rotor can be ordered from a local bearing outlet. The fiberglass arrow shafts were purchased at an archery store. Set screws and machine screws are available at an industrial hardware store. Sometimes machine screws can be purchased at an electronic supply store.

Construction

Radio Box: Practice bending on scrap material to find the difference between the final bends and the original distance that you layed out. Use this difference in laying out your flat pattern so that you will have the external dimensions desired. Be very careful in making up the end plates—make sure they match or shim. Drill all rivet holes but only install those rivets that do not hold any additional part. Next, install all landing gear structure.

Engine Mount: Make all of mount from 3/16 aluminum. Holes to lighten this mount may exist if desired. Make sure that the two surfaces on which the engine is mounted are parallel to one another and perpendicular to the top of the radio box.

Cooling Fan and Engine Pulley: The cooling fan is bent into shape with a ball peen hammer and then filed to the final shape. The fan must be keyed to the prop shaft of the engine. The Enya .45 has its prop drive washer keyed to the shaft and this makes an ideal part to key the cooling fan to. Make sure that the engine used has .8 horsepower at 13,000 rpm without muffler. The transmission would have to be changed if the engine did not meet these requirements.

Tail Rotor Boom: Machine -22 and use to align the four No. 4-40 tapped holes in the back end plate. Next rivet -22 to the 3/4" OD aluminum tubing. Cut the tubing slightly longer than shown and crimp the aft end over 1/2" thick block. Then drill through with 1/2" drill at 45° angle for 1/2" aluminum tubing. Remove top and bottom material from end to 1/2" dia. hole. Wrap around 1/2" tubing and butt in back. Cut 1/2" OD tubing 1/2" longer than required and install with eight rivets. Remove tail boom from radio box.

Intermediate Shaft: Machine the clutch shoes as one piece, preferably while bolted to the pulley. Mark some identification so that when cut apart they can be installed on the pulley in the same relationship that they were

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At last! A true flat matte finish is available in a true epoxy. HOBBYPOXY's new FLAT HARDENER gives you that military look without rubbing. Brush it or spray it. Curing time is the same as regular hardener.

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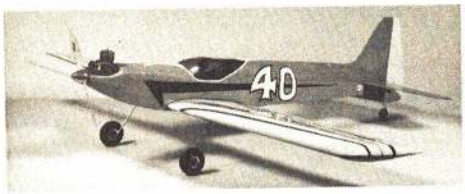
STRATO 210

THE SUPER STUNTER



A competition model that YOU can fly. A plane that will do the complete pattern, knife edge, spin, etc., and still maintain complete control. You can even fly-by on low motor INVERTED and still be able to waggle the wings and tail without dropping off!

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- 40 size engine
- 59" wingspan
- Fast assembly
- 572 sq. in. wing
- Balsa & Plywood
- Complete hardware
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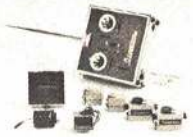
FOR BEGINNERS STRONG AND GENTLE

The Skydozer was designed to give maximum flyability and strength. Just what the beginner needs. We have been developing this plane for 3½ years, building and modifying little by little until we were convinced that it was just right. Super flyable—super strong!

- Solid block nose section
- Super strength tail section
- Absolutely complete plans and instructions
- Super fast assembly
- .40 size engine
- 53" wing span
- 580 sq. in. wing
- 4½-5 lbs.

$34.95
Dealer & Distributor inquiries invited

SILVERTONE MARK VII



The Mark VII Radio is handmade in small quantities to fill the needs of those flyers whose requirements go beyond the normal production line equipment. Over 75% of all Australian R/C Records have been set by flyers using Silvertone Radio 4-5-6 Channel equipment available. Prices start at $419.00.

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CONVERTS ANY PULSE SERVO TO FAILSAFE. JUST INSERT BETWEEN SERVO AND PLUG—NO EQUIPMENT MODIFICATION NECESSARY. FAILSAFE RETURNS SERVO TO END IN EVENT OF RADIO FAILURE.

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THIS CAN BE USED TO SHUT DOWN THE THROTTLE OR TO THROW FULL RUDDER.

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(Division of Warehouse Systems)
Rt. 6, Scranton/Carbondale Highway, Olyphant, Pa. 18447 (717) 383-0551

S.S.P. Helicopter

(Continued from page 75)

machined. Part marking is a good practice to insure proper final assembly. Cut apart and machine to final shape. When gluing the cork to the bell housing abraid the housing first. Machine -45 pulley and assemble intermediate shaft. File flats on the 3/16 mw for the set screws. Spin the assembly to 1000 rpm and check clutch engagement. Adjust spring clips until 1000 rpm or greater clutch engagement is achieved.

Swashplate: Machine all parts as shown. -11 is a press fit over B-541 bearing. If hole is turned larger than shown, epoxy -11 to bearing. The pins should be left slightly long and ground on final assembly. Make sure the gimbal does not bind with ±15° tilt. Remove any interference. The 9/32 brass tubing is to lock inner pins when swashplate is removed from rotor shaft.

Machine all remaining parts for the hub, gyro and rotor controls. Next, install -18 on rotor shaft.

Transmission: Install transmission structure to radio box and tap the top 1/16 thick angles No. 4-40 for -3, do not install -8 or -8A. Now align -8 and -8A using the long belt from the engine to the intermediate shaft. Make sure the intermediate shaft and rotor shaft are perpendicular to and in the center of the radio box. Put about six lb. tension on the belt and fasten -8 and -8A. Align large pulley on rotor shaft and file flat for cap head screw. Then heat treat rotor shaft.

Rotor and Rotor Controls: Install the swashplate, -12, -12A, -13, -13A, -14, -14A for rotor controls, the hub and gyro. Do not forget to file flats for set screws on 1/8 mw for gyro, and use brass tubing for spacing the swashplate on the rotor shaft (same as spacing for large pulley).

Tail Rotor: Install tail rotor transmission by using three to four lb. tension on belts. Machine and assemble desired tail rotor and install. Finish bracing tail boom and add tail skid and tail guard.

Landing Gear: Make up landing gear and set aside. Remove rotor shaft by removing -3.

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BROWN CO_2 ENGINE

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Cartridge holder necessary

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Car completely assembled. Only radio and engine installation required. Hi-impact plastic body, Exact scale, Mag wheels, coil springs.

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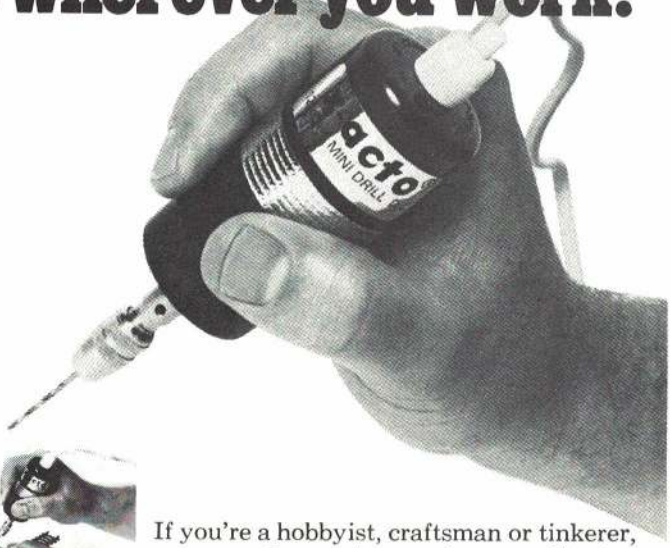
Rotor Blades: Rotor blades should be the easiest part. The finish on my main rotor blade is a 5 thousandths layer of fiberglass which just about makes the blades indestructible. The tail rotor blades are given a coat of Pettit Hobbypoxy and then doped. Make two extra sets. Quick blades can be had by using MonoKote. The main rotor and tail rotor blades are held in place by a friction clamp. This allows the blades to fold when striking an object. Static balance your blades by adding small lengths of mw or the equivalent. Drill into the light blade tip hardwood leading edge and epoxy in required weight. The dynamic balance is taken care of by the hardwood leading edge.

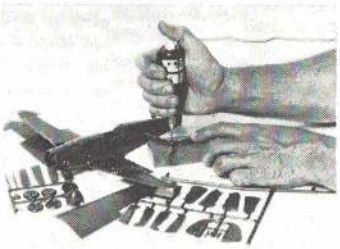
Radio Installation: My radio is installed on a 1/8 aluminum plate. The installation is optional. The right stick on my transmitter controls cyclic; up is forward, down is aft, right is right cyclic, etc. The left stick is yaw and engine control, up is advance throttle, right stick is yaw to the right which means the tail goes to the left. Lowering tail rotor collective makes the model yaw to the right, etc. Remember when hooking up the swashplate that the rotor tilts in the same direction as the swashplate. Installing a spring at the end of the tail rotor cable to keep the cable in tension is desirable and is a must if the simplified tail rotor is used. The engine throttle should also be spring loaded. Completely assemble model.

Next Month—How to fly an RC chopper.

The new X-acto power drill works wherever you work.



If you're a hobbyist, craftsman or tinkerer, you never know when or where you'll get an irrepressible urge to do a little work. So you want a tool that goes wherever you go. On a boat. In a car. At home. Or out in the field. The "Mini Drill" is pocket size. Yet sufficiently fast and powerful to drill, polish or burnish wood, plastic, aluminum, copper, brass, gold, silver—and even mild steel. Perfect for model making, ceramic work, jewelry making, glass etching. Great for small repairs around the house. Easy to handle, lightweight and safe where water is used. For $10.95, the "Mini Drill" comes with three chucks, a drill bit, a starting punch, and a dual connector for operating off a 12V transformer or carlighter cord. 12V transformer is $4.75; carlighter cord, $2.00.



A larger unit, the "Power Plus" Drill with up to 9,000 rpm and greater torque, comes with four chucks, drill bit, starting punch and dual connector for $18.95. 12V transformer for this unit is $5.95. Or get the whole works, in a gift box, for $17.50 for "Mini Drill," and $26.75 for "Power Plus" Drill. Available at leading hobby, art, hardware and department stores.

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Ryan SC

(Continued from page 46)

the rib curvature. The skin overlaps the leading edge and is sanded smooth.

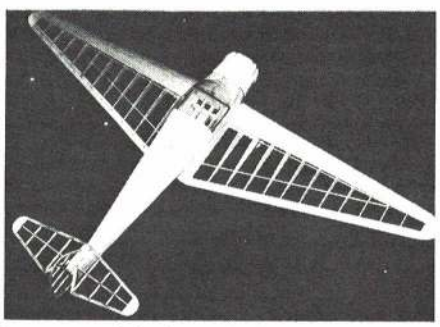
The cowl, canopy and wheel covers of the original were vacuum-formed of 1/16" styrene plastic. This is a simple but interesting process which may be used for numerous modeling projects. Carving the forms may seem like a lot of work, but the results are well worth the extra effort and add a custom touch to the finished model.

A simple vacuum box of pine or ply is necessary. The box is open on the top only, with a hole in one side to accept the vacuum hose. The plastic is stapled to a frame which has the same dimensions as the vacuum box.

The plastic is heated in the oven until it just begins to smoke. Turn on the vacuum and quickly remove the frame containing the heated styrene from the oven. Place the frame over the vacuum box containing the form. The vacuum will draw the plastic down tight over the form. Shut off the vacuum and allow to cool. It will be necessary to slit the cowl on its lower surface in order to remove it. A small amount of acetone will join the parts together. Be sure the cowl mold is recessed on the forward edge and a vacuum hole is provided to draw the plastic into the recess.

The cowl and wheel covers may be built up in the conventional manner. The canopy can be draw-formed by pulling a sheet of heated clear plastic over the canopy form.

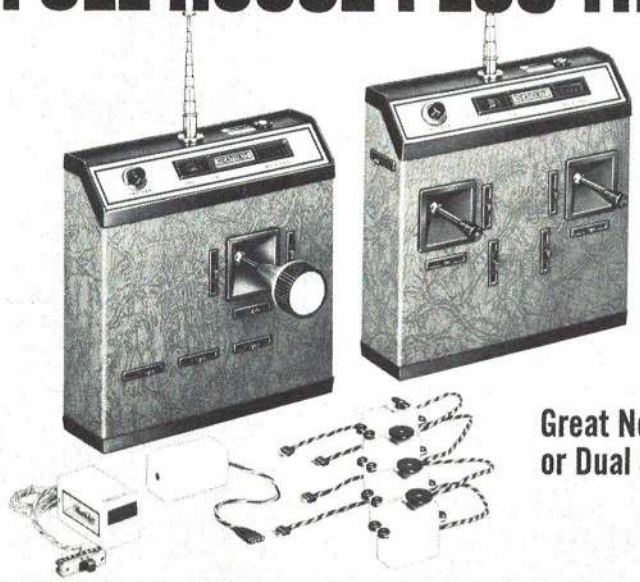
The wing should be joined to the fuselage at this time. Carefully position the wing in the fuselage cutout and ad-



Long, graceful, tapered wings and stab are beautiful.

(Continued on page 82)

"FULL HOUSE PLUS THREE"



Great New Single or Dual Stick Designs

Eight independent channels in a package no bigger than conventional full-house transmitters. Choose either single or dual-stick control in 27, 53 and 72 MHz operation – with adjacent frequencies at no extra cost. Both transmitters have a two-position switch for landing gear, finger adjust tabs for auxiliary channels; trainer link jacks and "buddy button"; external charging jack for simultaneous charging of transmitter and receiver batteries; eight range controls for adjusting servo travel. You can order your Heathkit Eight-Channel System with any combination of four GDA-405-4 Miniature Servos or GDA-505-4 Sub-Miniature Servos. With receiver, battery pack and four Miniature Servos, airborne weight is 13.3 oz. Substituting four Sub-Miniatures, shown in illustration, brings the weight down to 11.3 oz. If you want eight-channel flexibility, the GD-405 systems, at build-it-yourself Heathkit prices, are the only way to fly.

Kit GDA-405-S, Single Stick Transmitter only, 4 lbs. **$139.95***
Kit GDA-405-D, Dual Stick Transmitter only, 5 lbs. **$119.95***
Kit GDA-405-2, 8-Channel Receiver only, 1 lb. **54.95***
Kit GDA-405-3, Receiver Battery Pack only, 1 lb. **9.95***
Kit GDA-405-4, one Miniature Servo only, 1 lb. **24.95***
Kit GDA-505-4, one Sub-Miniature Servo only, 1 lb. **24.95***

SAVE ON A SINGLE STICK SYSTEM: consisting of transmitter, receiver, battery pack and any four servos. Batteries included. List model numbers separately.
Special System Price **269.95***

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NEW CONCEPT IN PULSE RUDDER-ONLY

For 1972 the improved Commander has a Drain Brain switching arrangement in the receiver to reduce total battery drain and increase flying time from 50-80% per battery charge! Plugs are wired into the airborne unit which allows you to switch receiver from plane to plane with a minimum of effort. COMPLETE Flite Pak weights, including nicads, run from 2.5 to 4.8 oz. Transmitter has increased output to overcome interference.

Fully Proportional—Rudder follows directly movement of your stick.

Versatile—The same receiver and transmitter can be used with airplanes from 18-72" span.

Interchangeable—Plug-in wiring allows switching of receiver from plane to plane.

Lightest—Weights 2.5 to 4.8 oz. include Nicad batteries and are TOTAL weights.

Simple—Easy installation; actuator has only one moving part. Minimum maintenance.

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COMMANDER '72 R-O SYSTEMS

Completely wired and tested, with transmitter, receiver, actuator, nicad battery airborne pack and charger, switch and connectors. Transmitter battery not furnished.

10G15—Baby System '72	$69.95
10G15T—Baby Twin System '72	$72.95
10G16—Standard System '72	$71.95
10G17—Stomper System '72	$74.95

26.995, 27.045, 27.095, 27.145, 27.195

Please Specify Frequency

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Here is what makes the '72 Commander so versatile. All you need to put in plane for extra installations. With connectors, so you just plug in receiver.

15K15—Baby/225 ma Batt.	$11.95
15K15T—Baby Twin/225 ma Batt.	$14.95
15K16—Standard/500 ma Batt.	$13.95
15K17—Stomper/500 ma Batt.	$16.95

FLITE PAK WEIGHTS & RECOMMENDATIONS

Complete weight of each unit and suggested application:

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48" gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders
Standard	4.4 oz.	.049 to .10
Stomper	4.8 oz.	Tee Dee .049-.23

ACE MINI FOAM WINGS

These jobs are being used by more and more modelers to come up with their own designs. See recent issue of AAM for P38 and RCM for Mr. Mulligan. Ideal for 1/2A Racing--and other planes of semi-scale or fun types.

Constant chord measures 35" span, 5½" wide, area 192.5. Weighs 3+ ounces.

Taper section is 35" span, center 5½, which tapers to 4"; area 166.25. Just over 2 ounces.

13L166—Ace Mini Foam Taper Wing	$2.95
13L192—Ace Mini Foam Constant Wing	$2.95

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Highly Recommended for Beginners

† 34" Foam Wing--Moulded sections
† Top grade die-cut wood parts
† For .020 engines
† Commander Baby or Baby Twin
* Owen Kampen design

No. 13L100—Dick's Dream Kit $6.95

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† 70" Foam Wing -- Moulded sections
† Precision Machine cut and sanded wood
† For .049--Power Pod parts supplied
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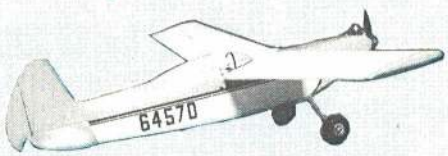
* Owen Kampen design

No. 13L104—Ace High Glider Kit $14.95



SKAMPY KIT

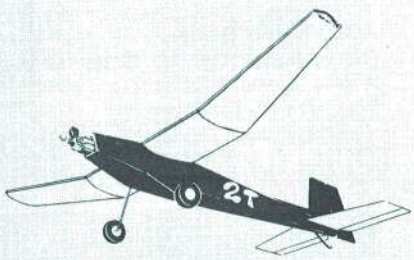
If you have mastered Rudder-Only pulse proportional flying, and are looking for new ventures, the Skampy is for you. Resembles a stand-off Goodyear Scale Racer. Owen Kampen touches in both the design and kit assures the experienced modeller of a satisfactory RO pulse experience. It is NOT recommended for beginners.

Has 30" span wing cut from Ace mini foam tapers. Construction of the fuselage is a bit harder than a box type, but still simple for modellers with experience. Fuselage is 23½", recommended power is Tee Dee .020. Recommended radio installation is Commander Baby Twin. This makes total weight of 12 to 13 oz.

Kit contains taper foam wing set, precision band sawed and sanded top grade balsa and hardwood parts. Bent landing gear, wire for torque rod and plastic bearing, and hinge material is also supplied. Wheels and engine mounting hardware not included.

Full step by step instructions make this a simple job for the experienced RO flyer.

No. 13L103—Skampy Foam Wing Airplane Kit $6.95



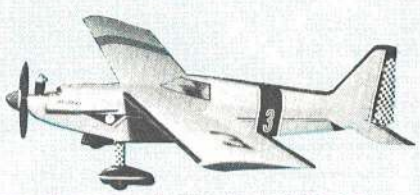
2T KIT By Ron Jacobsen

Uses two sections of the Ace Mini Foam Taper Wings, and one Constant Chord section for a total span of 50 inches, 262 sq. in. Coupled with an .049, the 2T was designed primarily for the two channel Brick type digitals that are on the market, or two servos of any digital system.

Also, when constructed correctly, it performs exceptionally well on Rudder Only using the Commander Standard or Stomper. Motor control can be added to at a later date by using the KRD motor control.

Kit contains three wing panels, all balsa wood completely band sawed and precision sanded, bent landing gear, and miscellaneous parts. Is of the same general high caliber as previous Ace kits. Hardware for hinges and linkage and wheels is left to the buyer.

No. 13L106—2T Foam Wing Airplane Kit	14.75
No. 13L206—Three Foam Wing Sections For 2T	5.00



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† Top grade band sawed wood
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† Two channel operation
* Owen Kampen design

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ACE ALL STAR BIPLANE KIT

Designed by Roman Bukolt

★★★★★★★★★★★

FOR UP TO .15 ENGINES

Models Tricia Bukolt and All Star. Beautiful!

A Show Stopper at the Toledo Conference!

Plans were published in the July 1972 R/C Modeler.

The ALL STAR Bipe by Roman Bukolt is a real winner--and will appeal to old timers and newcomers alike. Fashioned after some of the EAA home builts as well as the nostalgic planes of the 30's, this design overcomes most of the problems encountered in the building of bipe simple and easy construction of the N struts and cabane make this a cinch to build, and makes alignment a lead pipe cinch.

To get around the difficulty of building two sets of wings, modified Ace Foam Taper sections are used--again a simplification and an assurance of exact duplication.

Span is 34". Area 350 square inches. Designed for .049 to .15 power. Use with .15 and three channels, .09-.10 for two channel OR with .049 and Rudder Only Pulse! Truly an All Star. With 3 channels and a .15 this will out perform some of the big jobs. It isn't a 6 foot bomb--but don't sell this design short!

Kit contains 60 precision band sawed and sanded balsa, spruce and ply wood pieces, two sets of Ace taper foam wings, miscellaneous wire parts, and complete step by step building instructions. (Wheels and pilot are not supplied.)

This is a highly pre-fabbed kit and meets the standards that have made the Ace airplane kits synonymous with TOP GRADE.

No. 13L200—Ace ALL STAR Deluxe Biplane Kit $21.95

ACE R/C INC. digital commander

As Presented in AMERICAN AIRCRAFT MODELER April, May, June, July 1972
By Fred M. Marks

- **Two channel system using IC's and latest state of the art; may be expanded to 4 channel.**
- **Receiver-Decoder will work with ANY modern 4-6-8 channel digital transmitter on same frequency! Reads aileron and elevator signals--ignores the rest.**
- **Receiver-Decoder works any modern digital servo.**
- **Receiver-Decoder offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.**
- **At present available only on 27 mHz**

Ace R/C also is offering PC boards and individual components separately. These are listed in our 1972 Handbook-Catalog. Send for your copy today. Price is $1.00 via third-class mail, $1.50 via first-class.

digital commander FLITE PAK KIT COMBO

If you intend to use Commander Digital with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

No. 12G30—Flight Pak Combo (Please specify frequency) $69.95

digital commander RECEIVER-DECODER KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is conventional double tuned front end using discrete components. Complete with detailed step by step instructions.

No. 12G20—Digital Commander Receiver-Decoder Kit (Please specify frequency) $27.95

digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

No. 14G20—Digital Commander Servo Kit $25.95

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IC's make the encoder a cinch, and easy conversion later to 4 channel. Built up to a standard of excellence; not down to meet a price. Complete kit with step by step instructions.

No. 11G20—Digital Commander 2 Channel Kit (Please specify frequency) $49.95

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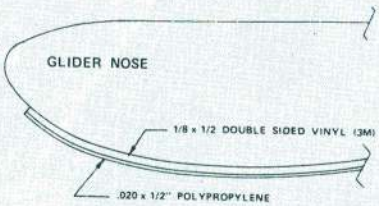

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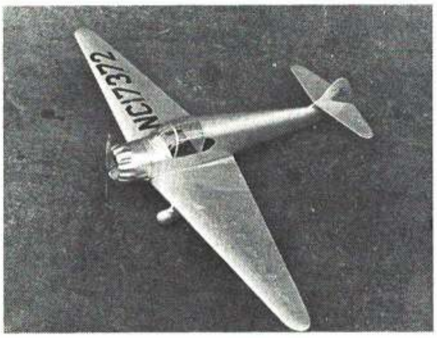
Ryan SC

(Continued from page 79)



The Ryan could be adapted to rudder-only RC but do add a bit more dihedral. Model is MonoKoted.

just for approximately +3° incidence. Use soft balsa to fill in between the leading edge and former F-3. The wing fillets are added now. Insert W-19 and the laminated trailing edge blocks. Cement the lower fillet skins in place first. Soak the top fillet skin in hot water and cement to the top of the root ribs and the sides of the fuselage. Pin as necessary to hold in shape.

The original model was covered with silver MonoKote. Undoubtedly, colored tissue and clear dope would result in a lighter model—the choice is yours. Glue the horizontal stabilizer in place after covering. If MonoKote is used, be sure to trim it away in the area to be cemented. The cowl and wheel covers are painted silver, as were the canopy frames. Wing and tail numbers can be added using black tissue, MonoKote or paint.

Flying

If possible, find a flying site with tall grass for the initial test flights. Add weight to the nose or tail so that the model balances when held at the center of the wing tips. Adjust the balance until a nice flat, fast glide is obtained. First powered flights should be at reduced power. Add downthrust if stalls develop under power and adjust for wide turns. Remember, the high taper wing will not readily recover from steep turns, so avoid them.

Properly trimmed, the Ryan is a fine performer. Don't hesitate to try a few ROGs—they are something to see.

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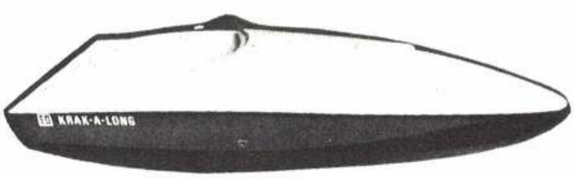

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Capstan

(Continued from page 31)

lines and then sand all the edges round. The rudder can be hinged to the fin in your own pet scheme, but remember if you're using a galloping ghost system to make the hinges as frictionless as possible. The fin is attached to the fuselage after the tailplane has been glued into place; it is cemented to the tailplane at the back and located at the front by the notched piece of 1/8" sheet.

For the radio, the prototype used a double-ended magnetic actuator which was located in the fuselage under the wing. If you intend to use this type of controller, then reinforce the floor of this compartment using a scrap piece of 1/8" sheet with a piece of 1/16" ply glued on top. Dope this plywood well, then attach the actuator with servo tape. A small notch will be required in frame F2 for the wiring. The receiver and batteries are, as mentioned before, located in the cockpit area and provide almost all the necessary ballast.

The wings are made of two sections—the forward section is an airfoil shape, and the rear a constant thickness section. The combination resembles a small chord wing with an enormous flap. This wing type is simple to build, rugged and easy to repair. Begin by first shaping the leading edge from a sheet of 3/8" balsa. Carve this to the airfoil section shown on the plan. Make all the ribs, and pin these down to the plan

(Continued on page 86)

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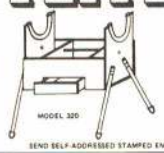

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Capstan

(Continued from page 83)

(note at this stage all ribs remain the same size). The root rib is cracked slightly to conform to the fuselage contour. Cement into place the carved leading edge piece. Cut the trailing edge section from a sheet of 3/32" balsa and cement it into place, making sure that a good joint is obtained between these two pieces of sheet. The overhanging portions of the ribs can now be cut away, and the resulting corner trimmed to the shape indicated on the plans. Make the left wing on the reverse side of the plan in a similar manner to the above, and then join the two wings using W1, checking also that the correct dihedral is obtained. Additional strength for the wing joint is provided by the two fairings on the upper surface. These are carved from block, and then trimmed to the final contour after completion of the fuselage.

The powered version is built in a similar manner to the glider, and then the power pod is added. This pod is mainly block balsa with a 1/8" ply plate on which to mount the engine. Begin by carving the pod from a sandwich of two pieces of block with an 1/8" sheet core temporarily pinned together. When the correct shape is obtained, remove the 1/8" sheet core and replace it with the 1/8" sheet alignment piece. Glue this lightly in place to the wing in the correct location. Then from underneath the wing, drill the holes for the mounting dowels all the way through the wing and into the pod. This operation has to be done very carefully with the aid of a long 1/8" drill. As each hole is drilled, insert a temporary piece of dowel to provide additional stiffness. Once all the holes have been drilled, remove the pod and replace the original core piece into the pod. This complete assembly can now be cemented together, the engine mounting plate added, and then installed on the model. Before the glue is dry, make certain that the pod is lined up correctly. Use a fuelproof finish for this version.

Flying

We could probably go on and on about flying the model, but if you're like me you don't want to read about flying—flying is something you do (or at least the model does). So we'll give a

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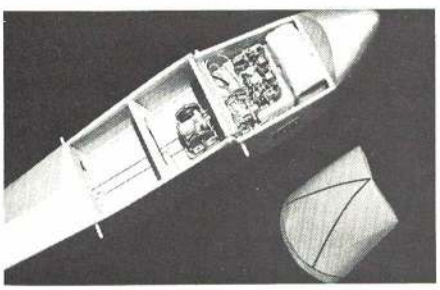

Equipment shown came out of a Testor's ready-to-fly RC Skyhawk. Range is excellent and magnetic actuator powerful enough for Capstan's big rudder. Small digital could be used, too.

few basic suggestions, and then the rest is up to you. First balance the model at the CG shown on the plans, and re-check to see that no warps have crept into the model. Try some small glides to determine if this CG is the correct one for the day. If the model stalls, add more nose weight (and vice-versa). If it won't fly upwind, also add more nose weight. The only additional step is to establish that you've got enough control in both directions, and then you're on your own. So happy flying—and soft landings.

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Canadian Champs

(Continued from page 32)

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Since the Nats is at St. Jean, on what is commonly known as the "south shore" in Quebec, we recommend that you obtain accommodations south of Montreal.

Further information may be obtained by writing the local Zone Director: Carl Larson, M.A.A.C. Vice President, 1411 J.F. Kennedy, Box 192, Terrebonne, Quebec, Canada.

Nemesis II

(Continued from page 18)

cedure on the same side of the other wing. When dry, run a knife or razor blade along the bottom front edge of the LE to cut off excess top sheeting. Save the excess to make cap strips. Now sheet the bottom of the LE. Add cap strips and center section sheeting. Cap strips are easier to work with and follow the rib shape better if they are cut from very light sheet such as that used for the LE sheeting. Strips of balsa available in the hobby shop are usually made from very hard stock.

While sheeting the center section, check alignment of the two 1/8" ribs by looking at the structure from behind to make sure the TE is parallel with the rest of the wing across the center section. Twist out any warps in this section *now* because they are hard to get out after the glue on the sheeting dries. The pushrod exits through a 1/16" dia. hole made from a notch in the TE and an

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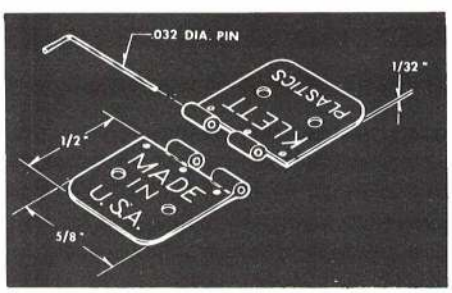

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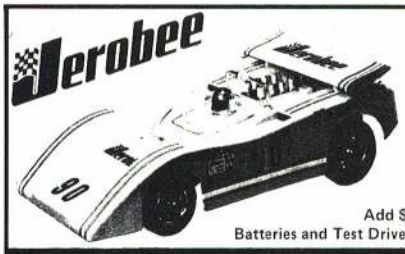

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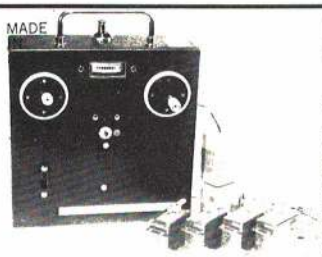

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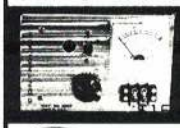

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adjacent notch in the center sheeting. This hole serves as a pushrod guide. Because the pushrod is straight, 1/16" music wire is more than adequate.

Sand the entire wing using a block and silicon carbide paper. Make a template to check the leading edge contour against the plans. Note that the LE is quite blunt. Finish sanding with No. 400 paper on a block. Be sure to remove any sharp corners or discontinuities in joints at the surface. Radius slightly the rear edge of the 1/16" LE sheeting to avoid a sharp corner in the covering material.

Now add the nacelle and wing tips. No tip braces are used because they are structurally unnecessary and they cause nasty air flow. Epoxy brass leadout guide tubes to the tips. Carve and sand the engine pod to shape; cover it with silk and dope. The wing is now covered with either pure silk or FasCal; other covering materials are unsatisfactory for this type of structure.

The stabilator is carved and sanded to an airfoil shape and is covered with silk. Shaping is easier if a centerline is drawn around the uncarved stab; place a ballpoint pen on a table top so that the point is exactly 1/8" from the surface of the table; then, holding the pen stationary, move the stab past the pen point to draw the centerline. While covering the stab, wrap a two-in. bandage of silk around the basswood booms just behind the TE to keep them from splitting. When silked, the bass booms are much stronger than plywood

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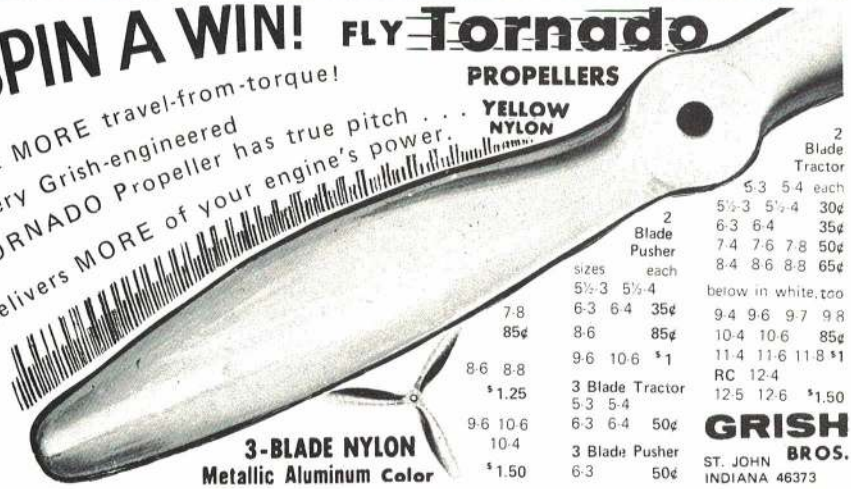

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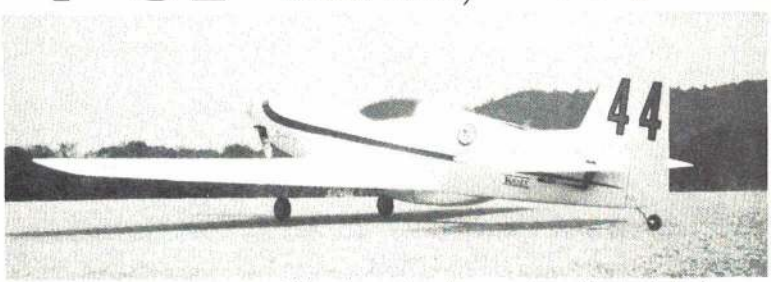

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booms of the same weight. Cut grooves in the stab for the wire hinges, notches for the booms. Remove covering material from the wing where the tail booms attach. Epoxy the booms and stab in place.

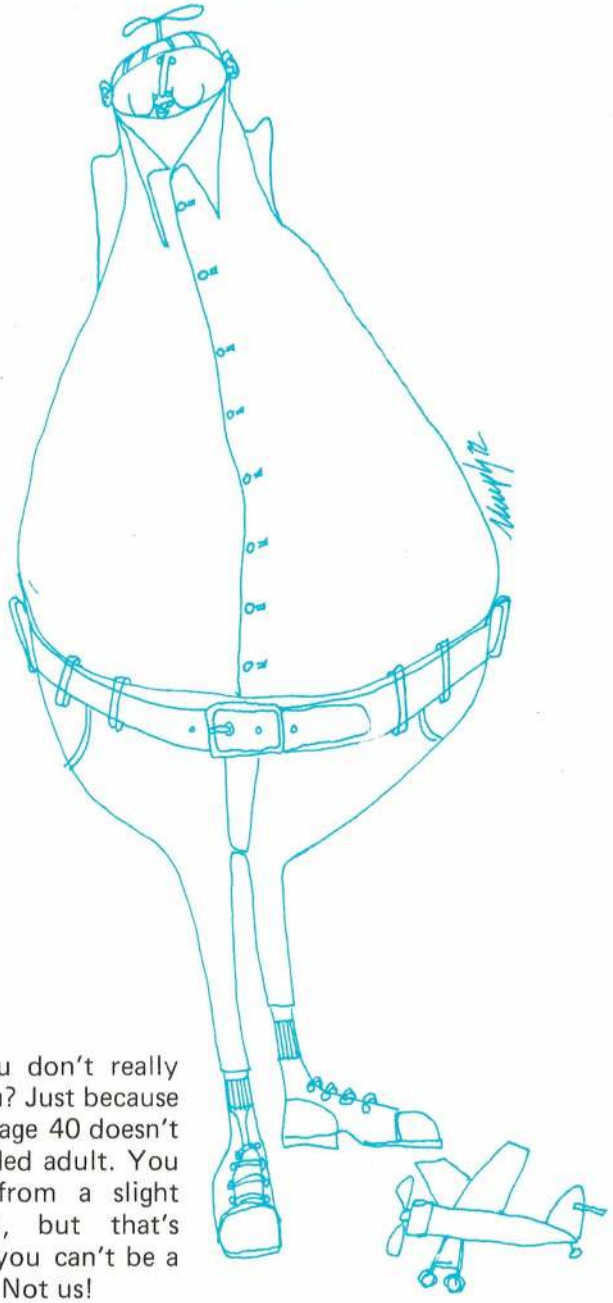
Carve out the engine pod until an engine fits without being forced in place since this can bend a crankcase. Cut pen bladder access and vent-drain holes; fill in any gaps around the holes between the bladder tube and LE sheeting. Finish the plane to suit your fancy.

Install control horn with both bolts and epoxy. Ascertain that a line from the pushrod holes in the horn through the stabilator hinge is perpendicular to the pushrod, with the stab in the neutral position. This ensures equal control sensitivity with the same stab deflection up or down and minimum sensitivity in neutral.

It is essential that all warps be taken out of a Nemesis before flying. Look at the wing directly from the rear. The TE should be exactly centered on the wing along the entire span. If not, pour boiling water on the wing while twisting to remove the warp. A hot iron works well with plastic covering, but boiling water works best for a silked structure.

Flying

When you are sure that all warps have been removed, it is time for the test flight. Pick a windy day so maneuvers can be kept downwind until the plane is adjusted: the Kwik-Link makes on-the-field adjustment easy. Plug it into a hole in the control horn about 7/8" above the hinge line and adjust the stab throw so there is equal movement up and down. Using an 8-8 prop and hot fuel, fly it. Check to see that in level flight the plane is banked neither in nor out. Now turn it upside down (this won't take long) and check again. If it flies in a banked attitude or if there is a difference in line tension between upright and inverted flight, you missed removing a warp. Fix it before attempting any loops. Next, do some wide maneu-



HEY...

Aw. . .come on! You don't really look like that, do you? Just because you're a beginner at age 40 doesn't mean you're a retarded adult. You may be suffering from a slight middle age spread, but that's maturity. Who said you can't be a beginner at your age. Not us!

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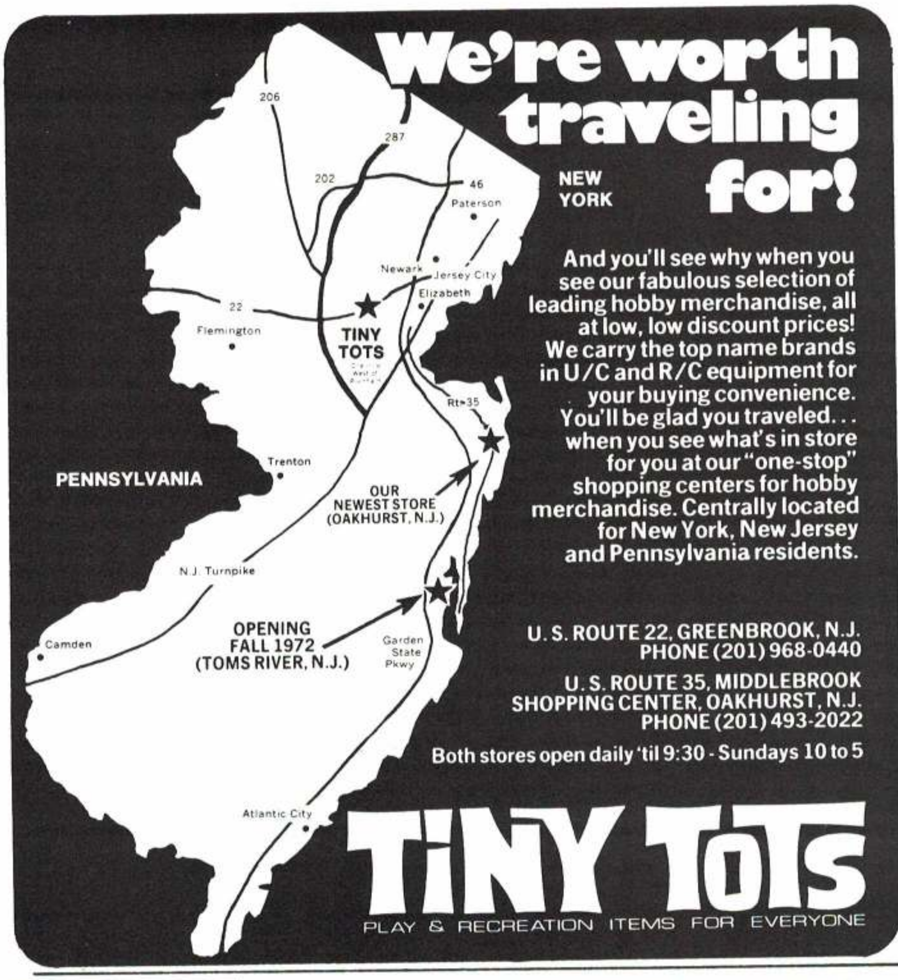
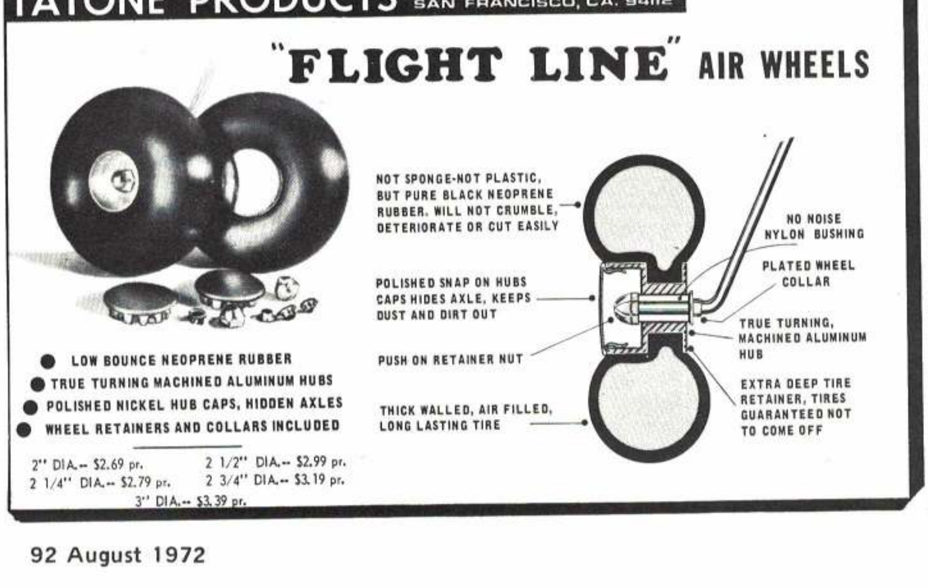
vers, again looking for differences in line tension between inside and outside loops that could indicate a slight warp. Now, keeping downwind, cautiously try full control. By experimenting, find a hole in the control horn that gives enough stab travel to turn the plane tight enough that it slows down somewhat after a few consecutive loops with full up or down control, but not so much that the wing stalls. Adjust push-rod length with the Kwik-Link so that full up and down give the same size loops. Now go cut streamers.

The Nemesis II can give its pilot a big advantage in Combat. The speed and maneuverability will enable you to follow an opponent through anything he tries and will allow you to make a few mistakes and get away before you're caught.

These articles always contain a speed claim. Powered by a Supertigre G21/35 burning 45% nitro and turning a Rev-Up 8-8 prop, my Nemesis IIs have gone 113-plus mph. Nobody will believe that, so I won't even claim it. You can expect 115 mph without a streamer from a Nemesis II with a honkin' engine. An average, stock Supertigre with 40% nitro and a Rev-Up 8-8 will do better than 110, which is very competitive.





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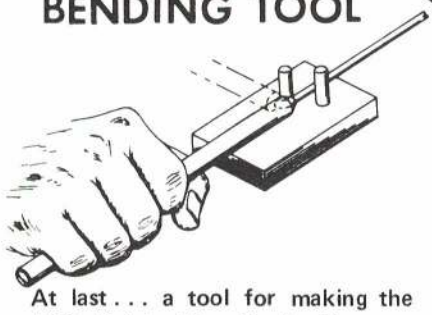

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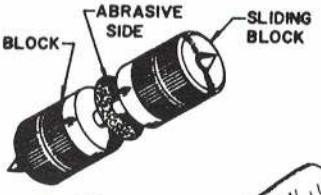

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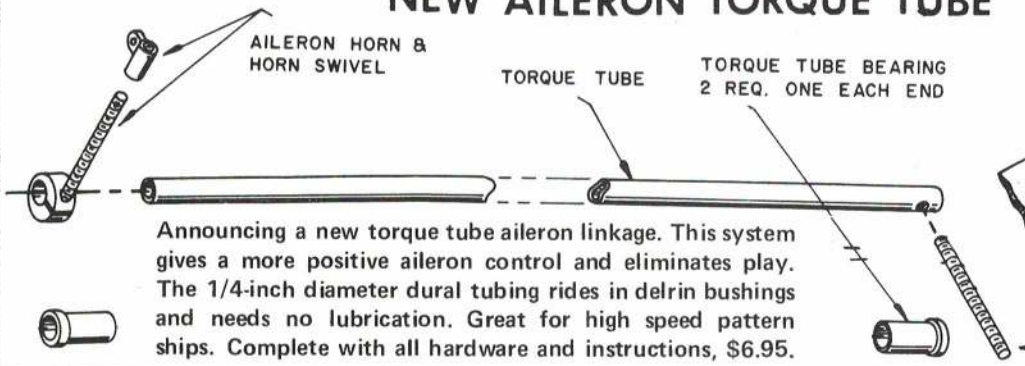

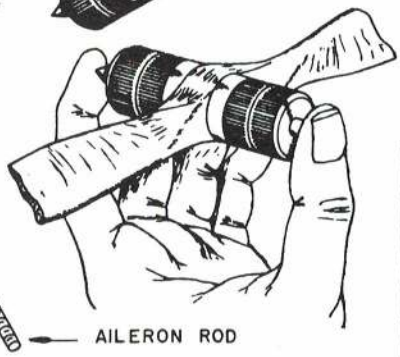

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Getting Into Peanut Scale

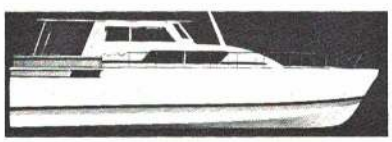
(Continued from page 36)

destructive squadron of fun-wreckers. Build on a flat board, and de-warp your wings by sighting under them from front-to-back and steaming out any twists (twist in opposite direction to remove). A teakettle or just a plain gas flame will work if you don't get too close. (Peanuts *will* burn as well as roast!)

Villain number two next to Captain Warps is Lieutenant Noseplug. You will be winding your rubber motor stretched out from the nose, and the plug hole must be big enough to allow a wound knotted motor to get back inside. In addition, the prop shaft must spin freely inside without too much slop. A small washer cemented front and rear of the plug will work nicely. A bead or washers between the prop and the noseplug will cut friction.

To prevent looping, downthrust is usually needed. Making the front of the model at an angle, even though it does not show it this way on the plan, often pays off. Pointing the prop down only 5° can make a world of a difference in a high-wing model or biplane. (Low-wing models may even need a tiny bit of upthrust instead.) On many models about 3° of rightthrust (pointing prop shaft to the right looking down from the top) is helpful to combat the twisting effect of torque and spiral propwash flow.

Some builders like to make their elevators, rudder, and ailerons separate



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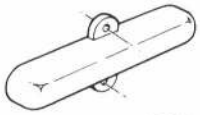
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and attached with thin aluminum or soft wire for easy flying adjustments. This is really a lot of extra work not recommended for beginners. Actually, a model made of 1/32" balsa sheet or with thin balsa sheet stab and rudder can be bent around to flying trim by just breathing a little moisture on the part you want to twist. Going easy on the glue where wings, rudder or stabs attach will help remove them if really major adjustments are needed, and has the added advantage of letting them knock off rather than break in a hard crash.

Flying Peanuts

A high school gymnasium or football field without wind will do very well. Take a couple of different props with you, as I have found that their effect on tiny models can vary tremendously. The ones which come on Skeeters or Sleek Streeks are fast and may get some models in trouble. Kaysun props are higher pitch and steadier, though slower. Hand-carved balsa props are dandy, if you know what you are doing, but are really not that much better than the little plastic ready-mades.

If you are completely a beginner at flying, I heartily recommend a 35 cent booklet available from Bill Hannan entitled "Adjusting Rubber Powered Indoor Flying Scale Models." Otherwise, get an experienced modeler to help you or read the flying instructions that come with most rubber-powered kits or that are found in model magazine articles dealing with models which are about the same as yours.

Success with a Peanut can be very rewarding. I know a modeler who has over sixty trophies all the way from Autogyro to World War I FF Scale who values a mimeographed certificate from the Flying Aces Club earned for a four-minute Peanut flight more than the lot. You, too, can return with us to those thrilling days of yesteryear when the amount of fun you got from modeling had very little to do with how much money you spent on it!

Sources of Hard-To-Find Peanut Material

Bill Hannan Graphics, P.O. Box "A", Escondido, Calif. 92025. Special Peanut Beginners' Plan Kit available for one month only from cover date of this magazine. $1.25. Plan catalog, 25 cents.

Modernistic Models, 4322 Bellingham Ave., Studio City, Calif. 92025. Self-addressed envelope for plan list of Peanut and larger models.

John Pond, 4135 Avati Dr., San Diego, Calif. 92117. Has the largest catalog and stock of real old-timey Peanuts (and other plans) anywhere. 50 cents will bring you an incredible list!

Frank Zaic, Box 135, Northridge, Calif. 91324. The man to write if you can't find 2 mm or 1/8 Pirelli rubber for Peanuts in your neck of the woods. Frank also has Kaysun props. Self-addressed, stamped envelope will bring you a list.

Marlow Engineering, 6850 Vineland Ave., North Hollywood, Calif. 91605. A new source for old-type goodies from 16:1 rubber winders to wee washers and balsa props.

Peck Polymers, Box 2498, La Mesa, Calif. 92041. Puts out a super deluxe Peanut scale kit of the low-wing Miles 18. The price, $1.98 postpaid, is steep, but no other kit comes close to matching it for quality and flyability. The first of a series to come.

Modeler Mail

(Continued from page 69)

new friends I have made during my modeling years are from all walks of life. These same people are always willing to give a helping hand or advice. Over the years I have taught young and old to fly and build radio-controlled planes—the rewards and accomplishments were very gratifying. However, the communication between the younger generation and the old has not even been scratched.

George N. Poirier, Pawtucket, R.I.

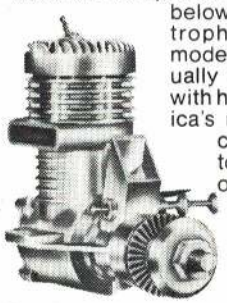
Power to the pedal

At Camp Friendship (U.S. Army Support Thailand), in Korat, Thailand, this is a familiar sight. Here I am on my way to get in some RC flight time via bicycle—awkward, but sure beats walking!

Major Ed. Y. Hall, Fort Knox, Ky.

FOX 36XBB...Spells WINNER For Harold Brown

1971 was a big year for Harold Brown of Westfield, New Jersey. With his Fox 36XBB he captured 1st place in no less than six combat meets against excellent competition. Harold, shown below with his many trophies, is a busy modeler. He continually wins big ones with his 36XBB, America's most successful combat type motor . . . the choice of the pros.



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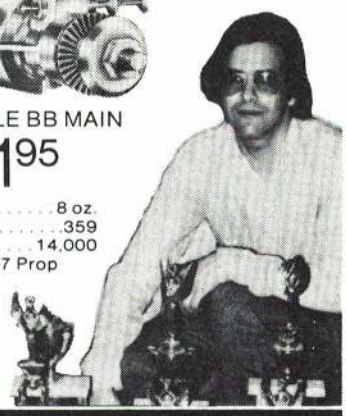

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(Continued on page 106)

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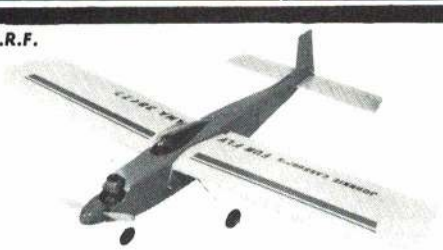

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Index to Advertisers
August AAM

Editor:
Carl Wheeley

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 806 Fifteenth Street N.W., Washington, DC 20005

INTERESTED IN JOINING A.M.A.? Over 39,000 did in 1971. Details may be had by requesting FREE BROCHURE from above address.

AMA Finances Begin New Era

Inflation finally caught up with AMA in 1971—we spent more for the year's operations than we received from basic sources of income. Fortunately, however, we gained enough extra money through interest on savings accounts and donations to offset the deficit. Se we ended the year in the black but much less so than the year before.

In 1970 we had our best financial year ever. We came up with a surplus of over $30,000. This came about due to a good combination of factors which were right for the time but couldn't last. We started the year with a small staff and a small office. Prices of supplies and services were still reasonable. Membership numbers, though increasing steadily, were still within our limited capability.

But early in 1971 the picture began to change rapidly. Membership increased at an even faster rate than previously and threatened to swamp our capacity. But we moved to larger offices and increased the staff to cope with the growth. A new computer processing operation was initiated. We kept up with the growth, but the cost was great.

Inflation made things worse by increasing the cost of everything. Supplies went up and so did salaries (just keeping up with the cost of living caused a big jump in expenses). We also expanded further to improve services—more space and a few more people so that we could do things we were never able to do before.

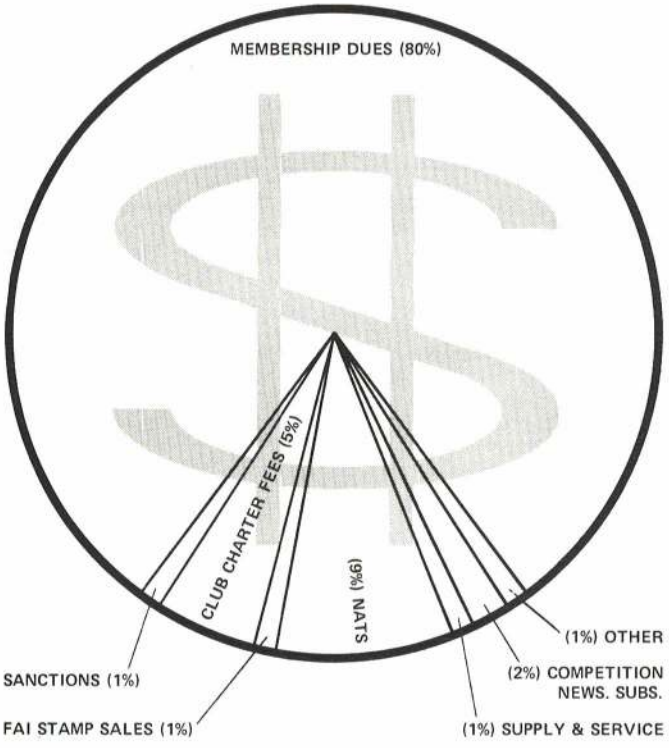
The net result was that in 1971 we used up most of what surplus we might have had by doing things we had put off for years. We finally got out of the bind we had been in during those years, of being too poor and unequipped to do more than the basic minimum in membership services.

The gain was costly, but it was happily received. We finally got AMA to the point of not begging for help and doing a fair job of taking care of membership needs. We even paid off some big bills left over from previous years (such as for '69-'70 film services). And we also ran a very successful World Championships within a few weeks of the biggest-ever National Meet.

But it could be seen in '71 that financial problems were getting worse despite the increased income from membership growth. The AMA secretary-treasurer warned at the

THE 1971 AMA DOLLAR

CAME FROM



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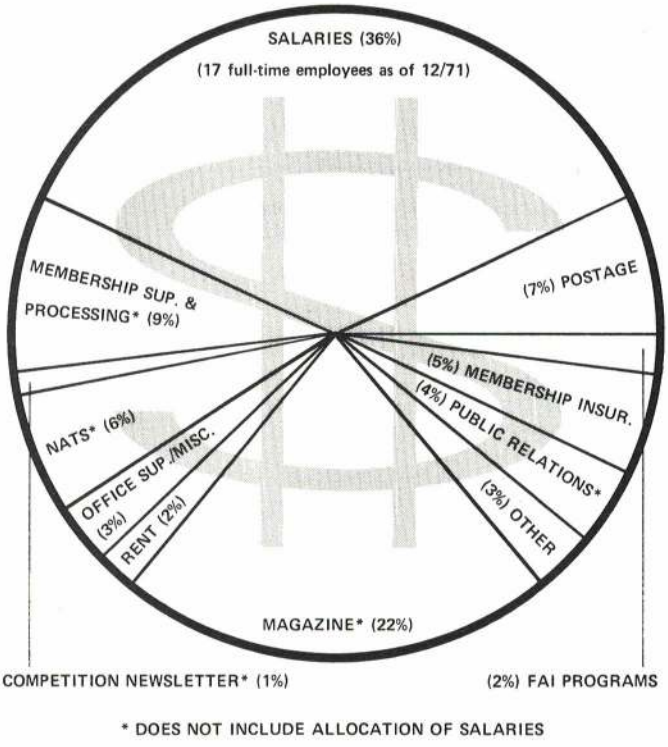

* DOES NOT INCLUDE ALLOCATION OF SALARIES

AMA FINANCIAL STATEMENT — YEAR ENDING DECEMBER 31, 1971

Balance Sheet

Assets

Current Assets:	
Cash/Checking Account	$116,274.88
Petty Cash	50.23
Cash/Savings Accounts	125,497.35
Accounts Receivable (owed us):	
Nats Trophy Sponsorship	890.00
Misc. Accts. Receivable	1,935.65
RC/WC Sponsors & Ads	2,290.00
Advances/Employees	1,146.56
Deferred Exp. (paid in advance):	
Prepaid Insurance	21,154.93
Magazine	16,223.65
1972 FAI Stamps	2,767.43
1972 Membership Exp.	200.00
Other	10,368.42
Supplies Inventory	1,125.00
Fixed Assets:	
Furniture & Equipment	24,857.54
Less: Depreciation Reserve	(11,604.96)
Total Assets	$313,176.68

Liabilities & Net Worth

Current Liabilities (we owe):	
Accounts Payable	$8,323.09
Accrued Taxes	4,939.50
Employees' Escrow	1,900.63
Deferred Income (service due):	
Membership Dues/1972	221,659.75
Other	16,108.05
Program Entry Fees (in trust for team travel within U.S.):	
Free Flight	13,015.28
Radio Control	1,840.73
Indoor	1,663.35
Control Line	1,274.75
Scale, General	403.35
Other Funds (also held in trust):	
FCC Frequency Fund	862.21
Scholarship Fund	728.01
RC/WC Fund	4,663.48
Net Worth:	
Balance—From Dec. 31, 1970	32,496.26
Income for Year 1971	3,298.25
Total Liabilities/Net Worth	$313,176.68

Expense Statement

Operating Expenses—by Department

Nationals	$50,200.31
Membership	134,185.62
Magazine	116,750.49
Supply & Service	6,571.31
FAI Program	28,995.16
Contest Administration	21,333.60
Officer Services	9,892.10
General Administration	37,046.92
Total—All Departments	$404,975.51

Operating Expenses—Detail

Salaries & Payroll Taxes	$146,032.55
Rent	7,715.00
Telephone/Telegraph	3,960.29
Postage, General	22,540.93
Office Supplies	14,761.68
Public Relations, General	11,473.62
Travel/Trade Shows	1,872.57
Meetings	3,621.21
Insurance, General	1,948.93
Depreciation	1,985.41
Legal & Audit	1,468.87
Membership Supplies	32,257.50
Rule Books	4,197.25
Competition Newsletter	4,356.31
Insurance, Membership	21,284.65
Cost of Supplies Sold	2,352.06
Magazine, Purchase	81,422.67
Postage	10,035.57
FAI: Team Expenses	1,461.25
Records (NAA Fees)	138.66
Franchise Fee	2,896.90
Miscellaneous	2,587.64
Uncollectible Accounts	150.55
Nats: Hobby Shop	4,304.95
Trophies	4,528.50
Officials' Fees	4,945.00
Travel/Officials, Staff	595.80
Helmets, Hats, Supplies	5,384.53
Appreciation Activities	654.50
Official Cars	1,570.16
Equipment Rental	2,470.00
Total 1972 Expenses	$404,975.51
1969/1970 Film Services	2,170.75
Total Expenses	$407,146.26

Income Statement

Operating Income—by Department

Nationals	$37,544.26
Membership	127,938.30
Magazine	134,916.00
Supply & Service	6,222.30
FAI Programs	36,245.25
Contest Administration	19,537.00
Officer Services	9,637.00
General Administration	32,125.00
Total—All Departments	$404,165.11

Operating Income—Detail

Membership Dues	$321,246.50
Sanctions (AMA, FAI meets)	3,475.00
Sanctions (FAI Records)	335.00
FAI Stamp Sales	3,785.25
NAR Insurance	2,640.80
Suppy & Serv./Subscriptions	6,222.30
Mailings services & serv. chgs.	1,140.79
Club Charter Fees	18,624.69
Non-Charter Meet Fees	833.00
Junior Programs	(1,178.98)
Competition News Subs.	9,496.50
Nats: Sponsorship	6,690.00
Hobby Shop	5,906.50
Concession, Camping Fees	4,722.87
Entry Fees	20,224.89
Total Operating Income	$404,165.11
Less Operating Expense	404,975.51
Operating (Loss)	**($810.40)**

Other Income:

1969-1970 Film Services	(2,170.75)
Contributions/booster fund	174.00
Interest/savings accounts	6,105.40
Net Gain—12 months, 1971	**$3,298.25**

Respectfully submitted,

John Worth, Executive Director

July '71 Executive Council meeting that a dues increase should be considered for 1972. The council, in general, agreed but decided not to put an increase into effect until conditions worsened sufficiently to match predictions. Even though good business practice argued in favor of a '72 dues increase, a majority of the council felt that it might have a serious dampening effect on current growth and enthusiasm for AMA.

We were lucky, too, in that some anticipated expense increases were able to be postponed for awhile. For example, a big increase in insurance costs was deferred until 1973. Also, a magazine cost increase was delayed until mid-'72. Some desired equipment purchases were also deferred.

But all these savings were temporary. They pointed to 1973 as the year in which a major cost escalation could be expected. Very early in 1972, therefore, the Executive Council agreed that a dues increase for 1973 was inevitable. This was pointed up dramatically by the AMA secretary-treasurer during the February council meeting when he read a list of over a dozen areas of major cost increases expected for 1973 or sooner.

The question remaining for the council to decide is how much of a dues increase to set for '73. This decision will be made during the last week in July of this year when the council meets at Glenview, Illinois. A key factor will be the membership total by the time of the council meeting.

As the budget estimate shows, a membership total of 45,000 for the '72 membership year can result in a loss of about $20,000. This can be so despite the fact that this membership total involves an increase of more than 5,000 members over 1971! This is due to the simple fact that our break-even cost is now higher than it used to be.

For 1972 it looks like the break-even point is about 46,000 members. A radical change happens within a comparatively narrow range. Budget calculations show that we can lose $20,000 at 45,000 members, break even at about 46,000 members, or be about $10,000 ahead at 50,000 members.

In other words it costs AMA a certain amount to operate current programs, with the existing office space, staff, equipment and supplies. This amount requires an income (involving dues and other revenue sources) which can be produced by a membership of about 46,000. Above that figure the increase in expenses is at a lesser rate so that each membership produces a margin of surplus income.

At the beginning of the year we budgeted for an increase to 45,000 members. Since that time the actual membership figures indicate that we can expect a total of 46,000. For example, on May 1 we matched last year's membership total of 40,000—four months ahead of last year's rate. Extending the 1972 monthly rate of membership through the rest of the year predicts a 46,000 total.

If so we can expect to break even for the year. And if simply reaching that figure was

Thanks, Navy!

PRESIDENT'S MEMO

WE WILL REACH A VERY IMPORTANT MILESTONE in the life of the Academy of Model Aeronautics during the week of July 24th through 30th. This will be NAVY APPRECIATION WEEK at our National Model Airplane Championships at Glenview Naval Air Station, Chicago, in celebration and appreciation of the NAVY's twenty-five years of cooperation with AMA through the hosting of the National Championships. Tight budgetary problems dictate that the NAVY bow out of this activity after this year.

The NAVY's strong support of model aviation programs directed by the Academy of Model Aeronautics has meant much to the development of air modeling in the United States.

This marriage of effort and cooperation between the Academy and the NAVY has been a most productive and, at the same time, a most pleasant one. Twenty-five years ago the AMA had developed into a group of far-sighted, technically-minded individuals, organized and dedicated to the furtherance of aviation through the fun-and-fascination vehicle of the building and flying of model or miniature airplanes. The Academy was growing and was developing a technology capable of providing competitions of national scope. However, facilities and locations for such competitions became a very evident problem.

The NAVY had such facilities in the form of the various Naval Air Reserve Stations across the country. At the same time the NAVY was alert for the recruiting of the sharp, technically-minded, above-average young man that air modeling automatically developed. The "hosting" of this above-average young NAVY prospect aboard one of its air stations, by way of the National Model Airplane Championships, was felt to be a progressive move at the NAVY's command level. Exposing him to the handsome image of the naval aviator and the "Navy Way" was indeed an excellent move, both for the NAVY and the young NAVY prospect. At the same time the NAVY was hosting not only the cream-of-the-crop NAVY-age prospect, but since it was an open meet, also the more senior model aviation leaders of the nation and the younger junior "comers".

The very fact that the NAVY saw all this as a wise and opportune move in their own behalf put the NAVY in a very favorable light in the eyes of the community. The NAVY was not only providing for its own future, but was also making a great contribution to the stabilization, education, and entertainment of a large section of the American community, helping to actually improve the very people that the NAVY is dedicated to defend.

Based upon this thinking, the individuals responsible for the guidance of the NAVY's affairs have, each year for the past twenty-five years, given model aviation their full support through the Academy of Model Aeronautics.

AMA President John Clemens

The science and sport of air modeling has profited immeasurably from its NAVY association. The NAVY's endorsement alone provided a tremendous boost for the public image of model aviation, and the use of the huge space of their air stations for the flying of model planes in championship competition was another great aid. This allowed for the promotion of still more activity through providing the championship caliber competition and the publicity that was a natural fallout from it.

Serving the cause of air modeling still further, the NAVY always made sure that their highest ranking officers were in attendance at our closing ceremonies to add dignity to our activities, and to offer prestige and fond memories in the presentation of the championship awards. None of our champions, and especially the younger ones, will ever forget the handclasp of congratulations from these NAVY officers. Nor will the picture of this fade from the memory of those of us who always tried but were destined never to become a champion.

There was always a climactic air show at the end of the National Model Airplane Championships Meet, often with the NAVY's famous Blue Angles flying in salute of model aviation. More often than not, and justly so, these same Blue Angel airplanes were being piloted by young NAVY officers who were, or still are, active model airplane builders.

The NAVY's cooperation went far beyond just our National Championships. Many smaller regional and local modeling groups enjoyed using NAVY facilities for their model flying activities. With the NAVY's cooperation many thousands of youngsters were introduced to air modeling for the first time through our AMA CUB BEGINNER's MODEL building and flying programs. Children of NAVY personnel entered enthusiastically in these programs when they were held under adult guidance at the various stations. This excellent beginner's program, aided by NAVY support, has been the springboard for many a youngster, launching him into an instructive fun-hobby.

Looking back happily at the combined efforts of the Navy and the Academy for the past twenty-five years brings a smile of satisfaction to my face, and at the same time a twinge of regret at the ending of so successful a cooperation. These were two "can-do" organizations whose combined efforts have made a deep contribution to our nation's past, the present, and years into the future. With the NAVY's help, AMA has now grown large enough and strong enough to carry model aviation's banner into the future. The NAVY, with quite an investment in the past of model aviation, will watch with pride as air modeling expands and grows under our guidance from the strong roots that they helped us plant.

AS A CIVILIAN GROUP OF SOME 40,000 MEMBERS, WE OF THE ACADEMY OF MODEL AERONAUTICS STAND IN GRATEFUL SALUTE TO OUR FRIEND, THE UNITED STATES NAVY!

John E. Clemens
AMA President

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our only problem, the outlook for 1973 would be simple–continuance of membership growth might keep up with increasing expenses due to inflation. But it's not that simple. For instance, it's dangerous to rely on membership growth to offset increased expenses. There's no guarantee that growth will continue. The probability seems good, but a rising curve can always level off or dip–some reserve is needed for such a possibility.

Meanwhile, some major cost increases are definitely on the way. Our magazine will cost more in 1973 than in 1972–even if we simply keep it as is instead of improving it. For example, a rate increase of 5 cents per copy goes into effect in July of this year. That increase, times 40,000 members, times six months, comes to $12,000. Over a twelve month span next year the increased cost will be double, so there will be an additional $24,000 expense next year.

Also, our insurance company, which wanted more money in '72 but agreed to wait until 1973, has indicated we will have to pay enough in '73 and beyond to make up for the deferred revenue this year, plus pay the higher rate for next year. Add to this the fact that the National Model Airplane Championships–our big annual PR and membership promotional effort–will not have the benefit of Navy help next year. We will be on our own to run and finance this event. And even though we will increase sponsorship and entry fees, the operation will cost more than ever before.

Members are also expecting AMA to do more in the way of public relations for model aviation and also to help solve flying site and noise problems. These involve increased use of professional rather than volunteer services, particularly in the area of legal help. Such services are not usually cheap–we have about

exhausted all the 'free' or minimum expense services available.

We're also carrying a bigger international program than in the past–Scale was recently added to the World Championships calendar, and RC Pylon is soon expected to be included. These programs involve increased cost for U.S. participation that has never been matched by sufficient contributions to make them self-sustaining.

We'll be printing a completely new rule book next year, resetting all of the type for the first time in many years. Also, a long delayed membership manual will be produced for 1973 distribution. We're also expecting to provide members with new emblems, including bumper stickers, in addition to improved decals.

All of these considerations, including others involving possible further membership benefits (more magazine value, broadened insurance, etc.) will be gone over in detail by AMA officers between now and the Nats council meeting.

Countering the negative discussion about a dues increase is the tremendous achievement and progress made by AMA. Looking back only a few years to 1964-66, when AMA was at a low point financially, we have made tremendous strides. We have gone from a deficit of about $25,000 to a surplus reserve of over that amount, and from a membership of about 17,000 to three times that. So, despite any gloomy talk about inflation and its effects, the fact is that AMA is vigorous, healthy, and in the best shape ever!

1972 AMA Budget Estimates

(Based on a membership total of 45,000)

Income:

Individual Memberships	
34,000 at $10 (0 w/mag)	$340,000
1,000 at $5 (J/S w/mag)	5,000
10,000 at $2 (J/S wo/mag)	20,000
Contest Sanctions	3,500
NAR Insurance	2,500
Mailing & Misc. Services	1,200
FAI Stamp Sales	3,500
Club Charter Fees	18,500
Non-Charter Meet Fees	.800
Competition News Subs.	10,000
Total Income	$405,000

Expenses:

Salaries & Payroll Taxes	156,500
Rent	8,940
Telephone	4,000
Postage	25,000
Office Supplies, etc	15,000
Public Relations Fee	7,600
Other PR	10,000
General Insurance	2,000
Legal & Audit	1,500
Membership Insurance	21,500
Membership Supplies, etc.	35,000
Model Aviation	122,100
NAA Affiliation Fee	3,400
FAI Expenses	10,500
Rule Books	4,000
Total Expenses	$427,040

Excess–Receipts vs Expenses

Loss	$22,040

(Nats planned for breakeven operation.)

What Are We Doing?

By Pete Simonson

The author is president of the AMA chartered Minneapolis Piston Poppers and also editor and principal writer for the club's newsletter, Prop Wash. The interesting and thought provoking description/definition which follows originally appeared in Prop Wash.

I recently came across a definition of what a model is that got me thinking about what it is that I've been doing for a hobby during the past few years. The definition:

A model is a symbolic or somehow simplified representation of an object or concept that features one or more component characteristics of the thing represented in order to make it more easily understood. (Definition by Dr. J. N. Peterman, Doctor of Psychology, University of Minnesota.)

At first glance, the definition seems to tell me that I've been building symbolic representations that feature one or more component characteristics of aircraft in order to make what they are more easily understood.

Is that all? I don't think so. What I build does not just represent an aircraft, it does something more.

To someone who has never seen an aircraft, no verbal description could give such a person a real feeling for what it is. The model of an aircraft could give a person an exact idea of what an aircraft is. It has all the representative components of an aircraft; wings, fuselage, and stabilizers to mention a few. What we build are true representations of what aircraft are with the major component parts showing the basic characteristics of an aircraft. If we just built them and put them on the shelf or hang them from the ceiling, we would fulfill the definition. But we builders who insist on taking our creations to a suitable area and FLYING them, are going a step beyond the definition.

We no longer are content with representations. We are in fact duplicating what man-carrying aircraft do. Our creations (at least the successful ones) are more than models that represent another object. They are objects themselves that are subject to the same laws of physics and aerodynamics which apply to all aircraft, whether it is a Boeing 747, a Piper Cub, or an unmanned military target drone.

No one would say a Navy radio-controlled F8F Crusader fighter is a model plane simply because no human is aboard. The British in World War II didn't call the German V-1 a model. It had wings, a fuselage, stabilizers and an engine. It flew yet it didn't carry a human pilot. By the same token, why call any flying aircraft a model? What we are dealing with are more than models, they are aircraft–they fly. Since they fly, but are designed usually for sport and recreational purposes and are not intended to be man-carrying, and are therefore quite small, they are in fact miniature aircraft.

Model aircraft (by the above definition) help people become more familiar with aircraft. Miniature aircraft go one step further and help people become more familiar with flight.

The further a person progresses in miniature aviation, the more his knowledge approaches that of a true aeronautical engineer. He must become familiar with a number of fields of knowledge. As he designs his own miniature aircraft, he will learn the importance of airfoils, moment arms, aerodynamic stabilization, how they are interrelated and how they can be manipulated. He must become familiar with the materials used in miniature aircraft and their relative strengths and weaknesses. He must learn where to use the materials in the structure to give it the proper shape and strength.

He must also be a craftsman. The materials must be assembled in a careful, precise and orderly manner. He then becomes a painter. He will learn to handle various paints and other materials such as puttys, fillers, glues, fiberglass and epoxies. As he becomes more experienced in the hobby, he becomes familiar with minor metal working while making or modifying fuel tanks and other metal parts.

When this is all finished and a new miniature aircraft is completed, another challenge exists–the first flight. Will it fly? If it does fly, how well? If competition in contests is in the mind of the builder, he must learn to fly his aircraft as best he can. In control line, he is a pilot–of miniature aircraft. As he competes, he also develops some degree of sportsmanship.

When the individual has designed, built and flown miniature aircraft for severall years, he has performed the functions of an aeronautical engineer, a skilled craftsman, and a skilled pilot. He has learned to coordinate the use of his mind and the use of his hands in bringing an idea from the inner reaches of the brain to the object on the far end of the lines.

Knowing the tremendous amount of knowledge, craftsmanship and flying skill that goes into a miniature aircraft, I salute all who share in this sport. As we reach and help others aspiring to share our sport, we are doing more than helping others have fun with the fascination of aviation. We are at the same time getting more people in this world to work with each other and therefore making our world even better to live in. With such highly trained and motivated people, we cannot help but be recognized and acknowledged for what we do.

'72 NATS

Monday morning registration scene from the 1971 Nats shows why advance entry is so important—too many people to handle unless most of the processing is done in advance.

As announced in these pages last month, the U.S. Navy has agreed to be host to the 1972 National Model Airplane Championships at Glenview Naval Air Station (near Chicago) from July 24 through July 30.

Most Nats contestants already will have entered by mail by the advance entry deadline of June 19—all others should take careful note of the fact that late entries can be made only at the Nats, and only on Monday, July 24; the absolute deadline is nine o'clock that night.

A person who doesn't enter in advance and who is in danger of arriving late (after the 9 pm deadline on Monday) may have someone else enter for him. The only requirement, aside from the fees involved, is possession of the entrant's AMA card or payment for same (duplicate membership fees will be refunded by HQ after the Nats).

LATE BASIC ENTRY FEE for Juniors and Seniors is $2 (same as advance fee, and includes entry in two events) and $25 for Open members (no events included). Event fees for late entries, or for events added at the Nats by advance entrants, are $3 per event for all age categories—except RC which are $7 per event. Note: no event additions permitted after 9 pm on Monday, July 24.

MECHANICS FEE, advance or late, is $2; provides identification and field access privileges equivalent to contestants. Available to AMA members only; a Nats-only membership is included in the $2 fee for members of a contestant's family.

NATS HOUSING priority in Navy barracks, limited to approximately 200 bunks, is assigned first to Juniors and Seniors and to Open members who bring Juniors and Seniors—in the order of receipt of entry forms. However, the priority must be claimed by 2 pm Monday, July 24; beyond this time eligibility will be opened to first come, first served basis to Juniors and Seniors and Open members who have brought Juniors and Seniors, and then to other Open members. The cost for barracks housing is $1 per night for Juniors and Seniors and $2 per night for Open members. Users must provide their own sheets, blankets, towels, toilet articles, etc.

CAMPING will be permitted aboard the air station for males and females. Sleeping type trailers or private tents are required. There will be no electricity or water hookup available. Lavatory and shower facilities may be very limited and may not be nearby. The cost is $1 per night for each Junior and Senior camper, $2 per night for each Open age camper; maximum of $5 per night for any tent or trailer site.

MEALS in the Navy mess will be available to a maximum of 1,000 contestants and mechanics, both male and female. The cost is 25 cents for breakfast, 50 cents for supper (no lunch).

LATE ENTRIES ACCEPTED ONLY ON MONDAY, JULY 24—DEADLINE STRICTLY ENFORCED

NATS MEETINGS. The regular membership meeting as provided by the AMA bylaws—which all AMA members are invited to attend—is scheduled for Wednesday evening at 6:30 pm. Also scheduled for Wednesday, but at 8:00 pm, is the meeting of the Nominating Committee—only for AMA vice-presidents or their designated delegates. Location of the meetings will be posted on the Nats bulletin board.

Also check the bulletin board for the time and place for the annual National Free Flight

OFFICIAL SCHEDULE—1972 NATIONAL MODEL AIRPLANE CHAMPIONSHIPS—GLENVIEW NAVAL AIR STATION—JULY 24-30

Except as noted, events are from 8 am to 5 pm

	MON	TUES	WED	THURS	FRI	SAT	SUN
Free Flight **FF**	Indoor 9 am – 9 pm HL Glider Scale	Indoor 9 am – 9 pm Stick Paper Stick Cabin	B Gas Nordic A–1, A–2	1/2A Gas Wakefield Scale Rubber[1] Scale Gas[1]	A Gas Unlim. Rub.	FAI Power HL Glider Coupe D'Hiver	8 am – 1 pm C Gas Rocket
Control Line **CL**			R. Race--Op Stunt--Sr. 1/2A Speed 1/2A Proto 1/2A Profile Proto--Jr. Combat--Jr.	R. Race--Jr. R. Race--Sr. Stunt--Jr. A Speed FAI Speed Combat--Op.	Scale Racing Stunt--Open B Speed B Proto Combat--Sr.	Scale[2] Stunt Open Finals C Speed Jet Speed Carrier--I, II & Prof.	8 am – 1 pm FAI Team Race J. Walker Stunt Finals
Radio Control **RC**	Pylon I & FAI Qualifying 1 pm – 5 pm	Pylon I & FAI Qualifying	C Pattern Qualifying	C Pattern Qualifying	C Pattern Finals[1] Scale[1] Pylon FAI Finals[3]	C Pattern Finals[1] Scale[1] Pylon I Finals[3]	8 am – 1 pm A & B Pattern
Transmitter Processing	8 am – noon[4] 7 pm – 9 pm[5]	7 pm – 9 pm[5]				1 pm – 4 pm A & B Pattern[8]	
Registration[6]	8 am – noon 1 pm – 5 pm 7 pm – 9 pm	8 am – noon 1 pm – 5 pm 7 pm – 9 pm	8 am – noon 1 pm – 5 pm	8 am – noon 1 pm – 5 pm	8 am – noon 1 pm – 5 pm	8 am – noon 1 pm – 5 pm	
Housing, Meals[7]	8 am – 5 pm[7]	[1] 8 am – 1 pm [2] Noon – 5 pm [3] 1 pm – 5 pm [4] Priority for FAI Pylon *Only expection: Indoor late entries accepted at 10 am, earlier if possible	[5] All RC Events--Note cut-off time for registration. No transmitter processing unless entry and registration is completed. [6] For those pre-entered by mail [7] No priority after 2 pm [8] At RC flying site. Entry and registration must first be completed				MODEL AIR SHOW 2 pm – 4 pm
Late Entry* MONDAY ONLY	1 pm – 5 pm 7 pm – 9 pm						
Add Events MONDAY ONLY	1 pm – 5 pm 7 pm – 9 pm						

Society Symposium, Old-Timers' Banquet, RC Awards Banquet, Executive Council and Contest Board meetings.

NATS ENTRY FORMS are available from AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. When requesting an entry form, be sure to enclose a pre-addressed stamped envelope. It is suggested that the Nats entry form be obtained in advance by everyone who expects to enter inasmuch as the form provides much more information about the contest than it is possible to print here.

WANT TO GO BUT NOT COMPETE? Fine—you're welcome to do so. The contest is open to the general and modeling public all week long. And a special Delta Dart program, with free models, is provided for youngsters age 8-13 on Wednesday, Thursday, Friday and Saturday.

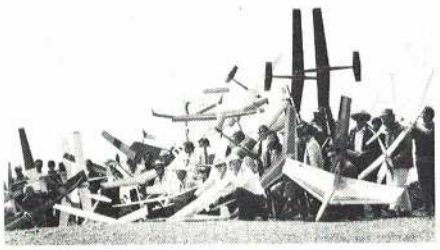
Last Year for the Navy?

It seems likely that this year's Nats will be the last of 25 great Nats hosted aboard Naval Air Stations. Cutbacks in the Navy's budget have made it all but impossible to continue this and other similar programs, and the Navy agreed to be host this year only because of a basic sympathy within the Navy concerning AMA's desire for one more Navy Nats to close out a 25-year relationship.

For 1973, AMA officers are already working on where to go, the goal being to announce the '73 Nats dates and location by the end of 1972.

A portion of the static display provided by the Corpus Christi (Tex.) RC Club in conjunction with the NAS Kingsville Open House in May is shown below. Mike McDougal, left, starts up for Pattern demonstration, assisted by Bob Brown and Dick Roddy (standing). The CC Club was billed along with the Navy Blue Angels and the Leap Frogs.

The Illinois Valley RC Club boasts of eight father-son/daughter members; two such teams shown in photo above by Earl Kruger are Carl and Randy Chapple (holding the FW 190 A-3 and Fokker D-8 planes) and Duane and Merv Wilson, in the middle. Scene is from An IVRCC Fun-Fly last year. Left: Winners of the RC Bees' April Soar-In were (L-R) Rick Walters, 3rd; Jerry Arana, 1st; John Baxter, 2nd. Barely visible are the wireform trophy tops being held aloft. The pylon race was at Sunset Beach State Park in Calif. Many entrants—most shown below. Whitey Pritchard, whose photos are shown, was the CD.



CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

JULY 1-2—ABILENE, TEX (AA) Prop-Twisters 4th Annual CL Championships. Site: Seabee Park. E. Thomas CD, 5349 Harwood, Abilene, Tex. 79605. Sponsor: Key City Prop Twisters.

JULY 1-2—MOBILE, ALA. 8th Annual G.C.R.C. Contest. Site: Plum Forty, Mobile. J. Sabine CD, 10 Maury Dr., Mobile, Ala. 36606. Sponsor: Gulf Coast RC, Inc.

JULY 1-2—CHARLESTON, W. VA. (AA) Mountaineers "Firecracker" RC Contest. Site: Diamond W. Va. RC Field. S. Sturm CD, Box 5234, Vienna, W. Va. 26101.

JULY 1-2—LAKEHURST, N.J. Old Timer RC & FF Fun-Fly. Site: Lakehurst N.A.S. E. Woodman CD, 389 Floral Ln., Saddlebrook, N.J. 07662. Sponsor: North Jersey RC Club.

JULY 1-2—ROANOKE, ILL. (AA) Peoria RC Modelers RC Meet. Site: Roanoke. R. Speerly CD, 209 Wilshire Dr., Washington, Ill. 61571.

JULY 1-2—OSSEO, MINN. (AA) Minneapolis Piston Poppers Annual CL Meet. Site: No. Henn Jr. College. J. Sinton CD, 4941 Wisconsin, New Hope, Minn. 55428. Sponsor: Minneapolis Piston Poppers.

JULY 1-2—SPRINGFIELD, MO. (AA) Springfield RC Club 2nd Annual AMA RC Contest. Site: Springfield RC Airport. G. Langston CD, 616 Tracy, Springfield, Mo. 65804. Sponsor: Springfield RC Club.

JULY 1-2—BEAUMONT, TEX. (AA) Beaumont Open RC Meet. Site: Beaumont. D. Still CD, 306 Orleans, Beaumont, Tex. 77701. Sponsor: Beaumont Radio Control Club.

JULY 1-2—SAULT STE. MARIE, ONTARIO, CANADA. Annual Open RC Contest. Site: Sinclair Model Airport. G. Allen CD, RR No. 2, Fourth Line, Sault Ste. Marie, Ontario, Canada.

JULY 1-2—ALBANY, GA. (AAA) Georgia State FF, CL, RC, Ind. (Cat. II) Championships. Site: Albany Naval Air Station. B. Stevenson CD, 209 Sourwood Dr., Marietta, Ga. 30060. Sponsor: Cobb County Sky Rebels.

JULY 1-2—MONROE, N.C. Monroe RC Fun Classic. Site: Monroe. C. Whilden, Jr. CD, 4735 Emory Ln., Charlotte, N.C. 28211. Sponsor: Monroe Radio Control Club.

JULY 1-3—CADDO MILLS, TEX. FAI Team FF Finals-1972. Site: Caddo Mills. C. Hornbeck CD, 3506 Duchess Tr., Dallas, Tex. 75229.

JULY 2—FREMONT, NEBR. (A) Frontier Fly-In. Site: Fremont. R. Stansbury CD, 9348 Camden Ave., Omaha, Nebr. 68134. Sponsor: Frontier Flyers, Inc.

JULY 2—W. SUFFIELD, CONN. (A) NCRCC/ECSS Soaring RC Contest. Site: NCRCC Field. G. Sawn CD, 6 Audrey Ln., W. Suffield, Conn. 06082. Sponsor: Northern Connecticut RC Club.

JULY 2—SOUTHFIELD, MICH. (A) Cloudbusters FF Thompson Trophy Races. Site: Southfield. R. Kuenz CD, 14645 Stahelin, Detroit, Mich. 48223.

JULY 2—VAN NUYS, CALIF. (A) SCAMPS .020 & Commercial Rubber Meet. Site: Sepulveda Basin. G. Wallock CD, 220 LeRoy Ave., Arcadia, Calif. 91006. Sponsor: SCAMPS.

JULY 2—COUNCIL BLUFFS, IOWA 1st Falcon Event. Site: Cobra Field. H. Hough CD, 924 Avenue I, Council Bluffs, Iowa 51501. Sponsor: Cobras Radio Control Club.

JULY 4—MENTOR, OHIO (AA) MARCS Firecracker Classic RC Meet. Site: Tyler Blvd. R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44094. Sponsor: Mentor Area RC Society.

JULY 8-9—VALLEY FORGE, PENNA. (A) Valley Forge RC Scale Classic. Site: Valley Forge State Park. N. Evans CD, 970

Turn to page 104

DIRECTORY OF AMA OFFICERS

Which officers live in your district? Select correct address when writing officers.

HOW TO USE

Over 150 AMA members serve as volunteers on various committees which determine operating policies of Academy activities—many are listed here. Members are invited to communicate their comments, suggestions, proposals, or complaints by writing to the appropriate committee at any time. Note that the Executive Council and Associate Vice-Presidents represent area interests for general AMA policy matters. Whenever district numbers are shown, write to the nearest address in your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

EXECUTIVE COUNCIL

President: John E. Clemens, Box 64573, Dallas, Texas 74206
Sec.-Tres.: E. Witt, Harvest Ln., N. Guilford Hills, Chambersburg, Pa.
Exec. Dir.: John Worth, AMA HQ, 806 15th St., N.W., Wash., D.C.
Vice-Presidents
I: Cliff Piper, Highland Avenue, Atkinson, New Hampshire 03811
II: William Boss, 77-06 269 St., New Hyde Park, N.Y. 11040
III: Ron Morgan, School for Vet Children, Scotland, Pennsylvania
IV: John Patton, Route No. 5, Frederick, Maryland 21701
V: James Perdue, 111 Christopher Ave., Athens, Alabama 35611
VI: Al Signorino, 11959 Glenvalley Dr., Bridgeton, Missouri 63043
VII: Jack Josaitis, 23663 Lawrence, Dearborn, Michigan 48128
VIII: Murry Frank, 2933 Blankenship, Wichita Falls, Texas 76308
IX: Stan Chilton, 446 Ida, Wichita, Kansas 67221
X: Alex. R. Chisolm, 1589 W. Celeste, Fresno, California 93705
XI: Robert D. Stalick, 1120 Shady Lane, Albany, Oregon 97321
NAA Rep: Gen. B. Allen, NAA, 806 15th St., N.W., Wash., D.C.

GENERAL COUNSEL

J. Courtney, c/o AMA HQ, 806 15th St., N.W., Wash., D.C. 20005

ASSOCIATE VICE-PRESIDENTS

I: John Ross, 19 Sterling Dr., Dover, Massachusetts 02030
II: Josh Titus, 146 Garden Ave., Paramus, N.J. 07652
J. Moynihan, 123 Evergreen Drive, Tonawanda, New York 14150
Joe D'Amico, 9224 Rost Pl., Brooklyn, N.Y. 11236
III: Ralph Pennetti, Wharrey Dr., R.D. No. 1, Sewickley, Pa. 15143
Albert Seidowski, 21460 Sheldon Rd., Brookpark, Ohio 44113
IV: Thomas Baker, 408 Phifer Rd., Kings Mountain, N.C. 28080
William Conkling, 915 Thornbriar Court, Hampton, Va. 23361
Cliff Telford, 8612 Rayburn Road, Bethesda, Maryland 20034
V: Tom McLaughlin, 4140 Fern Ct., Pine Glades, Pensacola, Fla.
James McNeill, 617 South 20 Ave., Birmingham, Alabama 35205
Bob Stevenson, 209 Sourwood Dr., Marietta, Ga. 30060
Jerry Wagner, 274 East 9th Street, Hialeah, Florida 33010
VI: John Blum, 2417 Glen Place, Granite City, Illinois 63040
Glenn Lee, 102 West Mandrake, Batavia, Illinois 60510
Dave Burt, 3048 Central Street, Evanston, Illinois 60201
Mark VanZant, 7512 Arlington St., Raytown, Mo. 64138
VII: Frank Morrissey, 14100 W. Park Ave., New Berlin, Wisc. 53151
VIII: Bud Tenny, Box 545, Richardson, Texas 75080
Calvin Scully, 5271 Memorial Dr., Houston, Tex. 77007
IX: John Kelly, 7020 E. Colfax, Denver, Colorado 80220
Jim Mowrey, R.R. No. 2, Box 56, Kinsley, Kansas 67547
Aubrey Darnielle, 2043 Bartonia Blvd., Billings, Mont. 59102
X: Robert Barnes, 3020 Ala Napuaa Pl., Apt. 304, Honolulu, Hawaii
John Pond, 4135 Avati Drive, San Diego, California 92117
Joe Bridi, 23625 Pineforest Lane, Harbor City, California 90710
Sam Crawford, 65 Maplewood Dr., San Rafael, Calif. 94901
XI: Dick Carson, W. 3029 Hoffman, Spokane, Wash. 99205

Correspondence for the committees, representatives and administrators which follow should be addressed to the proper committee or individual and sent c/o AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. HQ will resend to the proper individual and/or committee.

NATIONALS EXECUTIVE COMMITTEE

John E. Clemens, Dallas, Tex.; Ron Morgan, Scotland, Pa.; Pete Peters, Dallas, Tex.; Pete Sotich, Chicago, Ill.; Earl Witt, chairman, Chambersburg, Pa.; John Worth, Washington, D.C.

JUNIOR COMMITTEE:

Ed Abram, Chmn., Ouaguaga, N.Y.

FAI REPRESENTATIVES

COORDINATOR—Maynard Hill, Silver Spring, Md. **PROGRAM ADMINISTRATORS: Control Line**—Laird Jackson, St. Davids, Pa.; **Free Flight**—Dave Linstrum, Hanover Pk., Ill.; **Indoor**—Bud Tenny, Richardson, Tex.; **Radio Control**—Tom Rankin, Ellicott City, Md.
CIAM REPRESENTATIVES: Maynard Hill, RC; Laird Jackson, CL; Dave Linstrum, FF; Claude McCullough, Scale.

RC FREQUENCY COMMITTEE

Walt Good, Bethesda, Md.; Ed Lorenz, chairman, Poughkeepsie, N.Y.; John Phelps, Liverpool, N.Y.; Paul Runge, Higginsville, Mo.

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I: Paul L. Penny, 8 Charlotte Dr., Andover, Mass. 01810
II: Warren Truppner, 67 Raymond Ave., Staten Island, N.Y. 10314
III: Ken Reber, Mounted Route, Mt. Holly Springs, Pa. **(East)**
M. Weisenbach, 4568 W. 146th St., Cleveland, Oh. 44135 **(West)**
IV: Alice Jaworski, 6408 Marietta Avenue, Baltimore, Md. 21214
V: James Perdue, 111 Christopher Ave., Athens, Alabama 35611
RC: Frank Schwartz, 2400 W. End Ave., Nashville, Tenn. 37203
VI: Merrel Booker, 15711 Dixie Hwy., Harvey, Illinois 60426
RC: Al Signorino, 11959 Glenvalley Drive, Bridgeton, Mo. 63043
VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. **(West)**
Walter Hartung, 14759 Kilbourne, Detroit, Michigan 48213 **(East)**
VIII: S. Frank, 2933 Blankenship, Wichita Falls, Texas 76308
IX: James T. Finley, 6540 E. Central, Wichita, Kansas 67206
RC: Jim Brittian, 2019 Ruskin Road, Salina, Kansas 67401
X: D. Farnsworth, 2600 Country Ln., Visalia, Calif. 93277 **(North)**
Lee Polansky, 865 West Huntington-1, Arcadia, Calif. 91006 **(South)**
XI: Albert Grell, Route 1, Box 165, Tangent, Oregon 97389

CONTEST BOARD COORDINATOR

Don Lindley, 301 East Elizabeth Drive, Crown Point, Indiana 46307

Bold type below indicates Chairman of Contest Board

CONTROL LINE CONTEST BOARD

I: John Scott, Jr., 265 Witches Rock Rd., Bristol, Conn. 06010
II: J. Pailet, 30 Emerson Rd., Brookville, Glen Head, N.Y. 11545
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IV: William Pardue, 1201 Surrey Drive, Greensboro, N.C. 27408
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IX: Michael Tallman, 3014 Exchange, Wichita, Kansas 67217
X: Pete Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif.
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XI: John Lenderman, Route 2, Box 460, St. Helens, Oregon 97051

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V: Lee Webster, 1000 Sycamore Circle, Manchester, Tenn. 37355
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VII: Claude McCullough, Box 40, Montezuma, Iowa 50171
VIII: John Casburn, 6508 Normandy Rd., Fort Worth, Tex. 76112
IX: Don Johnson, 12604 West Virginia Ave., Denver, Colo. 80228
X: Russ Barrera, 1451 LaHabra St., Lake San Marcos, Calif. 92069
XI: Earle Moorhead, 275 South View Place S., Salem, Oregon 97302

Continued from page 102

Steven Ln., Wayne, Penna. 19087. Sponsor: Valley Forge Signal Seekers.

JULY 8-9—WALLOPS ISLAND, VA. (AA) MARKS 7th Annual RC Meet. Site: Wallops Island. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204.

JULY 8-9—DAVENPORT, IOWA (AA) 4th Annual RC Contest. Site: Scott County Park. R. Zimmerman CD, 1212 22nd St., Rock Island, Ill. 61207. Sponsor: Davenport Radio Control Society.

JULY 8-9—TULLAHOMA, TENN. (AA) Annual RC Contest. Site: Airfoiler Field. L. Webster CD, 1000 Sycamore, Manchester, Tenn. 37355. Sponsor: Coffee Airfoilers.

JULY 8-9—OAK CORNER, N.Y. New York State Fly-for-Fun Championships. Site: Oaks Corners. H. Ford CD, 11 Stephens St., Clifton Springs, N.Y. 14432. Sponsor: Sky-Rivers Flying Club, Inc.

JULY 8-9—MADERA, CALIF. (A) 2nd Annual Independence Day RC Races. Site: Madera Airport. M. Chisolm CD, 1589 W. Celeste Ave., Fresno, Calif. 93705. Sponsor: Fresno Radio Modelers, Inc.

JULY 8-9—WICHITA, KANS. (AAA) 12th Annual Midwestern FF, CL & RC Championships. Site: 13th & Webb Rd., M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217.

JULY 9—PERU, IND. (A) Wabash Valley Fun-Fly. Site: Club Field. G. Phebus CD, 2314 Myers Ln., Logansport, Ind. 46947. Sponsor: Wabash Valley RC Club.

JULY 9—YORK, PENNA. ECSS Glider Meet. Site: Faustown. D. Goughnour CD, RD No. 2, Red Lion, Penna. 17356. Sponsor: York Area RC Club.

JULY 9—PULASKI, WISC. (A) R.U.F. Summer RC Pattern Event. Site: Pulaski Airport. R. Cowles CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301. Sponsor: Green Bay R.U.F. Club.

JULY 9—DES MOINES, IOWA (AA) Model Manglers of Iowa CL Meet. Site: Ewing Park. R. Baldes CD, 6719 Colby, Des Moines, Iowa 50311. Sponsor: Model Manglers of Iowa.

JULY 9—E. GRANBY, CONN. (AA) Nor-East RC Air Races-'72. Site: E. Granby. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Connecticut RC Club.

JULY 9—LOCKPORT, N.Y. (AA) United Pylon Racing Circuit RC Meet. Site: Lockport. R. Danilowicz CD, 3245 Creek Rd., Youngstown, N.Y. 14174.

JULY 9—CLEVELAND, OHIO (AAA) Cleveland Aeromodel "Firecracker" Special CL Meet. Site: Cleveland Hopkins CL Model Flying Field. G. Baker CD, 13925 Liberty Ave., Cleveland, Ohio 44135.

JULY 9—BLAINE, MINN. (AA) Minneapolis Model Aero Club Annual Summer FF (Cat. II) Contest. Site: Hentges Sod Farm. W. Anderson CD, 1000 E. River St., Monticello, Minn. 55362.

JULY 9—ST. LOUIS, MO. (AAA) Hot Heads Pre-Nats CL Championships. Site: Buder Park Model Flying Field. G. Frost CD, 22 Glynn Dr., Florissant, Mo. 63031. Sponsor: Hot Heads Model Airplane Club.

JULY 9—WARMINSTER, PENNA. (A) Sky Pirates FF (Cat. II) Meet. Site: Johnsville NADC. T. Kerr CD, 7824 Lexington Ave., Philadelphia, Penna. 19152. Sponsor: Philadelphia Sky Pirates M.A.C.

JULY 15—HILLSBORO, ORE. (A) Nor'Westers Old Timer Meet. Site: Hillsboro. J. Anderson CD, 1495 N.W. 136th Ave., Portland, Ore. 97229. Sponsor: Nor'Westers Model Airplane Club.

JULY 15-16—CHELAN, WASH. (AA) 1st R.A.F. RC Air Fair. Site: County Airport. R. Carson CD, 3029 W. Hoffman, Spokane, Wash. 99205.

JULY 15-16—MENOMONEE FALLS, WISC. (AA) 2nd Annual Pre-Nats RC Warm-Up. Site: Aero Park Airport. F. Morrissey CD, 14100 W. Park Ave., New Berlin, Wisc. 53151. Sponsor: Milwaukee Flying Electrons, Inc.

JULY 15-16—POCATELLO, IDAHO (AA) Pocatello Invitational FF & CL Model Airplane Contest. Site: Pocatello. E. Culver CD, 231 Fairbanks, Pocatello, Idaho 83201. Sponsor: Pocatello Glue Angels.

JULY 15-16—BAY ST. LOUIS, MISS. (AA) Gulf States FF Meet. Site: Bay Side Park. J. Pedreira CD, 4658 Redwood St., New Orleans, La. 70127. Sponsor: Dyna-Soarers Model Aircraft Club.

JULY 16—HOUSTON, TEX. (A) Manned Spacecraft Center RC Soaring Contest. Site: NASA/MSC. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: Manned Spacecraft Center RC Club.

JULY 16—ST. LOUISVILLE, OHIO (AA) Licking County RC Meet. Site: A. Neithers Farm. A. Dupler CD, Box 186, Millersport, Ohio 43042. Sponsor: Licking County RC Club.

JULY 16—AURORA, COLO. (A) MMM Monthly FF Meet (Cat. II). Site: E. Colfax Air Park. G. Baughman CD, Rt. 1, Perry Park Ranch, Larkspur, Colo. 80118. Sponsor: Magnificent Mountain Men.

JULY 16—ODESSA, TEX. (A) Odessa A & B Pattern RC Contest. Site: Odessa RC Field. J. Davis CD, 3633 Adams, Odessa, Tex. 79760. Sponsor: Odessa Prop Busters RC Club.

JULY 16—COLUMBUS, OHIO (AA) 7th Annual Central Ohio CL Championships. Site: Lockbourne A.F.B. J. Everett CD, 4661 Larkhall Ln., Columbus, Ohio 43229. Sponsor: Capital City Controlliners.

JULY 16—SUNNYVALE, CALIF. Annual Kosby Flying Tournament. Site: Pioneer Field. J. Sunday CD, 6667 Rainbow Dr., San Jose, Calif. 94040. Sponsor: Pioneer RC Club.

JULY 16—LAKEHURST, N.J. (A) RC Old Timers Meet. Site: Lakehurst N.A.S. E. Weiss CD, 276 Michael Ave., Elberon Park, N.J. 07740. Sponsor: Monmouth Model Airplane Club.

JULY 16—DENVER, COLO. Old Timers Fun-Fly. Site: E. Colfax Airpark. W. Baldridge CD, 1464 S. Lafayette, Denver, Colo. 80210. Sponsor: Model Museum Flying Club.

JULY 16—TUCSON, ARIZ. (A) Summer Slow Fest for CL. Site: Rodeo Park. C. Dierdorf CD, 2242 Monterey Vista, Tucson, Ariz. 85713. Sponsor: Cholla Choppers M.A.C.

JULY 16—PANA, ILL. (A) Blunderbird's RC Soaring Contest. Site: Tex's Airport, RR No. 1. D. Holtfreter CD, Box 366, Blue Mount, Ill. 62513. Sponsor: Decatur Blunderbirds.

JULY 16—AMARILLO, TEX. (AA) Planesman Annual CL Contest. Site: Thompson Park. M. Denny CD, 2912 S. Seminole, Amarillo, Tex. 79103. Sponsor: Amarillo Planesman Model Airplane Club.

JULY 16—ALLEGENY, N.Y. RC Demonstration. Site: St. Bonaventure University. R. Brown CD, 1255 High, Bradford, Penna. 16701. Sponsor: Olean Model Airplane Club.

JULY 16—HOWELL, MICH. (A) 4th Annual Midwest RC Pylon Jamboree. Site: Howell. J. Josaitis CD, 23663 Lawrence, Dearborn, Mich. 48128. Sponsor: Midwest RC Society, Inc.

JULY 20—FT. WORTH, TEX. RC Pylon Formula I Meet. Site: Thunderbird Field. G. Ware CD, 609 S. Lake St., Ft. Worth, Tex. Sponsor: Fort Worth Thunderbirds.

JULY 22-23—GREAT FALLS, MONT. Big Sky Modelers 4th Annual Fun-Fly. Site: Great Falls. B. Weed CD, 2325-1/2 2nd Ave., N., Great Falls, Mont. 59401. Sponsor: Big Sky RC Modelers.

JULY 22-23—ELMIRA, N.Y. Harris Hill Hobo Meet. Site: Harris Hill. R. Miller CD, 22 Kings Cir., Corning, N.Y. 14830. Sponsor: The Flying Sparks, Inc.

JULY 23—MILPITAS, CALIF. WAFFC 4th Annual FF (Cat. I) Meet. Site: Milpitas Field. R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

JULY 23—OHIO CITY, OHIO. Club Fun-Fly. Site: Club Field. D. Kraner CD, RR No. 1, Ohio City, Ohio 45874. Sponsor: SHOO Flyers M.A.C., Inc.

JULY 23—LAKE ELSINORE, CALIF. (A) Thunderbugs Class A FF (Cat. II) Meet. Site: Lake Elsinore. J. Bonang CD, 11620 Freeman, Hawthorne, Calif. 90250. Sponsor: Thunderbugs M.A.C.

JULY 23—TACOMA, WASH. MRRCS "Funny Farm" Seaplane Fun-Fly. Site: Wargho Lake. B. Gale CD, 811 9th Ave., S.W., Puyallup, Wash. 98371. Sponsor: Mt. Rainier RC Society.

JULY 23—COUNCIL BLUFFS, IOWA 2nd Falcon Event. Site: Cobra Field. D. Hutcheson CD, 317 Spencer, Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

JULY 23-25—CHICAGO, ILL. (A) 3rd Annual RC Soaring Nationals. Site: Miller Meadow. D. Pruss CD, Rt. 2, Box 49D, Plainfield, Ill. 60544. Sponsor: S.O.A.R.

JULY 24-30—CHICAGO, ILL. (A) National Sport Combat Meet. Site: Glenview Naval Air Station. W. Messerly CD,1122 Eight Mile Rd., Cincinnati, Ohio 45230. Sponsor: Queen City U-Control Club.

JULY 24-30—GLENVIEW NAVAL AIR STATION, ILL. (AAAA) National Model Airplane Championships. Traditional Events. For Nats entry blank send pre-addressed and stamped envelope to: Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005.

JULY 29-30—GREENWOOD, S.C. (A) Piedmont RC Fun-Fly. Site: Greenwood. L. Nash CD, 722 Greenville St., Pendleton, S.C. 29670. Sponsor: Greenwood Radio Aircraft Modelers.

JULY 30—ST. CLAIRSVILLE, OHIO. Hill Hoppers RC Fun-Fly. Site: St. Clairsville. A. Grimes CD, 115 Glenwood Rd., Wheeling, W. Va. 26003. Sponsor: Hill Hoppers Model Club.

JULY 30—FRESNO, CALIF. (A) Fresno Monthly FF Meet (Cat. I). Site: Near Kerman. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

JULY 30—FT. WORTH, TEX. (A) Pylon Formula I RC Meet. Site: Thunderbird Field. G. Ware CD, 609 S. Lake St., Ft. Worth, Tex. Sponsor: Fort Worth Thunderbirds.

JULY 30—LOCKPORT, N.Y. (A) Western N.Y. Sport Scale Jamboree. Site: Lockport. R. Danilowicz CD, 3245 Creek Rd., Youngstown, N.Y. 14174.

AUG. 1-3—BRIGHTON, WISC. (AA) National Old Timer FF Championships. Site: Brighton. R. Elman CD, 17707 Burnham Ave., Lansing, Ill. 60438. Sponsor: Pelican Model Airplane Club.

AUG. 5-6—KINSTON, N.C. (AA) RCNC Golden Leaf RC Tournament. Site: Kinston. D. Pearce CD, 1005 Ainsworth Ct., Greensboro, N.C. 27410.

AUG. 5-6—SAYRE, PENNA. Hobo RC Fun-Fly Meet. Site: Sayre. C. Knowles CD, 124 Ridge Road, Horseheads, N.Y. 14845. Sponsor: Valley RC Model Club, Inc.

AUG. 5-6—SALINA, KANS. (AA) MARCS 1st Annual RC Meet. Site: Airport, East. D. Moden CD, 410 Hart St., Salina, Kans. 67401. Sponsor: MARCS.

AUG. 6—LAKEHURST, N.J. (A) NJRCC/ECSS RC Glider Meet. Site: Lakehurst N.A.S. G. Fuller CD, 1043 Lafayette Ave., Hawthorne, N.J. 07506. Sponsor: North Jersey Radio Control Club.

AUG. 6—CLEVELAND, OHIO (AA) Lakewood Flitemasters Annual CL Contest. Site: Cleveland Flying Field. R. Tran CD, 31635 Lorain RD., No. 25, North Olmstead, Ohio 44070. Sponsor: Lakewood Flite Masters.

AUG. 6—CANTON, OHIO (AA) 12th Annual Canton RC Meet. Site: Club Field-Sherr Rd. J. Yarger CD, 1100 Browning Ave., N. Canton, Ohio 44720.

AUG. 6—SYRACUSE, N.Y. (AA) United Pylon RC Racing Circuit. Site: ARCS Field. R. Danilowicz CD, 3245 Creek Rd., Youngstown, N.Y. 14174.

AUG 6—EVERETT, WASH. (AA) Elk Summer CL Invitational Meet. Site: Mariner High School. T. Wilson CD, 9113 Evergreen Way, Everett, Wash. 98204. Sponsor: Everett Line Kinkers.

AUG 6—CLINTONVILLE, WISC. Clintonville Fun Type Contest. Site: East Side Airport. J. Vanderwalker CD, Rt. 3, Clintonville, Wisc. 54929. Sponsor: Clintonville RC Club.

AUG. 6—EASTON, PENNA. (AA) BAM FF & CL Bash (FF-Cat: II). Site: Easton. R. Gutai CD, 334 West St., Bethlehem, Penna. 18018. Sponsor: Bath Area Modelaires.

AUG. 6—PORTVILLE, N.Y. RC Air Show. Site: Portville. R. Brown CD, 1255 High, Bradford, Penna. 16701. Sponsor: Olean Model Airplane Club.

AUG. 6—PENFIELD, N.Y. Fourth Annual RAMS RC & CL Fly-for-Fun. Site: RAMS Field. C. Boyer CD, 541 Laurelton Rd., Rochester, N.Y. 14609. Sponsor: Rochester Aero Modeling Society.

AUG. 12-13—FREELAND, MICH. (AA) Saginaw Valley Annual RC Meet. Site: SVRCC Flying Field. D. Daly CD, 110 Edward, Auburn, Mich. 48611. Sponsor: Saginaw Valley RC Club, Inc.

AUG. 12-13—MINNEAPOLIS, MINN. (AA) T.C.R.C. 16th Annual RC Contest. Site: T.C.R.C. Club Field. A. Haynes CD, 4625 Terracewood Dr., Minneapolis, Minn. 55437. Sponsor: Twin City Radio Controllers, Inc.

AUG. 12-13—TULSA, OKLA. (AAA) Tulsa Glue Dobbers 23rd Annual FF (Cat. II), CL & RC Meet. Site: TGD Field. W. Salnikov CD, Rt. No. 1 Box 130-C, Coweta, Okla. 74429. Sponsor: Tulsa Glue Dobbers.

AUG. 12-13—FARGO, N.D. (AA) Red River Valley CL Championships. Site: F.M. Skylarks Field. M. Olson CD, 305 27th Ave., N., Fargo, N.D. 58102.

AUG. 12-13—CHATTANOOGA, TENN. (AA) TVRC 2nd Annual RC Meet. Site: TVRC Field. J. Wyatt CD, 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: TVRC.

AUG. 13—PIKE, N.Y. (AA) Western New York FF Society FF Meet. Site: Pike. D. Evans CD, 175-1/2 S. First, Bolivar, N.Y. 14715.

AUG. 13—LINCOLN, NEBR. (AA) Aero Design 5th Annual CL Meet. Site: Humane Society. J. Mock CD, 1718 Janssen Dr., Lincoln, Neb. 68520.

AUG. 13—LANCASTER, OHIO (AA) FORKS Annual RC Pattern Contest. Site: FORKS Field. J. Slater CD, 809 Forest Rose Ave., Lancaster, Ohio. Sponsor: FORKS.

AUG. 13—WHEELING, ILL. (AA) Red Barons 2nd Annual CL Meet. Site: Palatine & Wolf Roads. H. Cain CD, 525 Weidner Rd., Buffalo Grove, Ill. 60090. Sponsor: Red Barons Model Airplane Club.

AUG. 13-MADISON, WISC. (AAA) 1st Annual East Towne Mall CL Contest. Site: East Towne Mall. P. Potega CD, 434 Cantwell Ct., Madison, Wisc. 53703.

AUG. 13—PONTIAC, MICH. (AA) Pontiac Open CL Contest. Site: Jaycee Park. H. Hackett CD, 3780 S. Shimmons Cir., Pontiac, Mich. 48057. Sponsor: Pontiac Model Airplane Club.

AUG. 13—BERKELEY HEIGHTS, N.J. (AAA) Flying Bee '72 CL Meet. Site: Columbia School. F. Wolff CD, 68 Berkshire Dr., Berkeley Hgts., N.J. 07922. Sponsor: Berkeley Blade Busters.

AUG. 13—COUNCIL BLUFFS, IOWA 3rd Falcon RC Event. Site: Cobra Field. L. Puls CD, 1020 Ash, Council Bluffs, Iowa 51501. Sponsor: Cobras Radio Control Club.

AUG. 13—E. GRANBY, CONN. (A) Nor' East RC Air Races '72. Site: E. Granby. A. Simmonds CD, 145 Irene Dr., RFD No. 4, Vernon, Conn. 06066. Sponsor: Northern Conn. RC Club.

AUG. 19-20—OMAHA, NEBR. (AA) Omahawks 18th Annual RC Contest. Site: Omaha. R. Stansbury, 9348 Camden Ave., Omaha, Neb. 68134.

AUG. 19-20—KNOXVILLE, TENN. (AA) East Tennessee RC Society RC Meet. Site: Knoxville. R. Rhyne CD, Rt. 4, Clinton Tenn. 37716. Sponsor: East Tennessee RC Society.

AUG. 19-20—SUMMERVILLE, S.C. Charleston RC Society Fun-Fly. Site: Summerville. D. Martin CD, 4361 Helene Dr., Chas Hgts., S.C. 29405. Sponsor: Charleston RC Society.

AUG. 19-20—LAKEHURST, N.J. World War II Scramble. Site: Lakehurst N.A.S. C. Gill CD, 835 Gilbride Rd., Martinsville, N.J. 08836. Sponsor: West Jersey Radio Flyers.

AUG. 19-20—CLEVELAND, OHIO (AAA) & FAI World Record Trials. 37th Annual Cleveland Junior CL Air Races. Site: Cleveland Hopkins CL Model Flying Field. R. Sargent CD, 1694 Wright Ave., Rocky River, Ohio 44116. Sponsor: Skylarks.

AUG. 19-20—CLARKSTON, MICH. (AA) 3rd Annual P.M.A.C. RC Championships. Site: Club Field. J. Frazer CD, 1980 Beverly, Pontiac, Mich. 48053. Sponsor: Pontiac M.A.C.

AUG. 19-20—CORPUS CHRISTI, TEX. (AAA) Corpus Christi International CL & RC Championships. Site: Waldron Field. J. Daubenspeck CD, Box 281, Bishop, Tex. 78343.

AUG. 19-20—RATON, N. MEX. (A) Albuquerque-Denver Annual FAI FF Challenge. Site: Municipal Airport. B. Averill CD, 9117 LaBarranca, N.E., Albuquerque, N. Mex. 87111. Sponsor: South West Aero Team.

AUG. 19-20—MORGAN HILL, CALIF. (A) West Coast RC Scale Championships. Site: Hill Country Air Museum. M. Groves CD, 791 Nisqually Dr., Sunnyvale, Calif. 94087. Sponsor: Pioneer RC Club.

AUG. 20—AURORA, COLO. (A) MMM August FF (Cat. II) Meet. Site: E. Colfax Air Park. W. Baldridge CD, 1464 S. Lafayette St., Denver, Colo. 80210. Sponsor: Magnificent Mountain Men.

AUG. 20—OHIO CITY, OHIO (A) SHOO Flyers RC Club Contest. Site: Club Field. J. Acheson CD, P.O. Box 181, Willshire, Ohio 45898. Sponsor: SHOO Flyers M.A.C., Inc.

AUG. 20—CHARDON, OHIO First C.R.C. RC Glider Event. Site: Chardon. F. Vidmar CD, 26500 Zeman Ave., Euclid, Ohio 44132. Sponsor: Cleveland Radio Controlaires, Inc.

AUG. 20—ST. LOUIS, MO. (AAA) 14th Annual Midwestern CL Championships. Site: Buder Park Flying Field. A. Schaefer CD, 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: St. Louis Yellow Jackets, Inc.

AUG. 20—ALBANY, ORE. (AA) 1972 All Northwest FF (Cat. II) Championships. Site: Parker's Field. B. Stalick CD, 1120 Shady Ln., Albany, Ore. 97321. Sponsor: Willamette Modelers Club, Inc.

AUG. 20—DENVER, COLO. Old Timers Fun-Fly. Site: E. Colfax Airpark. A. White CD, 1373 Bellaire, Denver, Colo. 80220. Sponsor: Model Museum Flying Club.

AUG. 20—MOUNDSVILLE, W. VA. Valley I.F.O.'s Annual RC Contest-Fun Fly. Site: Club Field. S. Sturm CD, Box 5234, Vienna, W. Va. 26101. Sponsor: Valley I.F.O. Model Airplane Club.

AUG. 20—WARSAW, IND. (A) 1st Annual Sailplane Sunday RC Meet. Site: Warsaw. J. Kay CD, 903 E. Canal, Winona Lake, Ind. 46590. Sponsor: Warsaw Aero Modelers.

AUG. 20—PULASKI, WISC. Annual Summer Fun-Fly. Site: Pulaski Airport. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301. Sponsor: Green Bay R.U.F. Club.

AUG. 20—JOHNSVILLE, PENNA. (AAA) 25th Anniversary Eastern States FF, CL & RC Championships. Site: Warminster N.A.F. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057. Sponsor: Levittown Flying Bucks.

AUG. 20—ORWELL, OHIO (AA) 1st Annual Champion FF Rally for Cat. II. Site: Champion Field. J. Grega CD, 355 Grand Blvd. Bedford, Ohio 44146.

AUG. 20—MANSFIELD, OHIO (A) RC Pylon Races. Site: Mt. Zion Road. M. Kalish CD, 235 Cline Ave., Mansfield, Ohio 44907. Sponsor: Electronic Flyers.

AUG. 26-27—FALCONER, N.Y. Flying Rebels Fly-for-Fun. Site: Levant. E. Ecklund CD, 75 Benson St., Jamestown, N.Y. 14701. Sponsor: Flying Rebels.

AUG. 26-27—CEDAR RAPIDS, IOWA (AA) Sig Midwest RC Meet. Site: Seminole Valley Park. J. Finn, Jr. CD, 268 Hampden Dr., N.E., Cedar Rapids, Iowa 52402.

AUG. 26-27—ST. CHARLES, MO. (AA) McDonnell 15th Annual RC Meet. Site: McDonnell Douglas Electronic Co. W. Feldmeier CD, 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: McDonnell RC Model Airplane Club.

AUG. 26-27—MUNCIE, IND. (AA) Mid-States CL Model Plane Championships. Site: Westside Park. J. McDonald CD, Box 384, Daleville, Ind. 47334. Sponsor: Muncie Controliners.

AUG. 26-27—RICHMOND, VA. (AA) R.A.R.C. 12th Annual RC Meet. Site: RARC Field. C. Foreman, Jr. CD, RFD No. 4, Box 683, Mechanicsville, Va. 23111. Sponsor: Richmond Area RC Club, Inc.

AUG. 26-27—COURTLAND, ALA. (AA) Sixth Annual Decatur RC Model Airplane Contest. Site: Courtland Air Base. J. Ray CD, 1304 Fletcher Ave., S.W., Decatur, Ala. 35601. Sponsor: Decatur Model Airplane Club.

AUG. 26-27—ENUMCLAW, WASH. (AA) RAMS Annual RC Pattern Pylon & Scale Meet. Site: RAMS Field. R. Brooke CD, 3431 S. 194th, Seattle, Wash. 98188. Sponsor: Radio Aero Modelers of Seattle.

AUG. 26-27—FOUNTAIN VALLEY, CALIF. (AA) LSF 1972 RC Soaring Tournament. Site: Fountain Valley. L. Gray CD, Box 723, Chatsworth, Calif. 91311. Sponsor: San Fernando Valley Silent Flyers.

AUG. 26-27—ORANGE, MASS. (AA) New England RC Championships. Site: Orange Airport. H. Thomasian CD, 497 Central Ave., Seekonk, Mass. Sponsor: New England RC Modelers.

AUG. 27—FRESNO, CALIF. (A) Fresno Monthly FF (Cat. II) Meet. Site: Near Kerman. F. Ginder, Jr. CD, 5740 E. Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

AUG. 27—DAVENPORT, IOWA (AA) 15th Annual CL Model Airplane Contest. Site: Davenport Airport. J. Kroeger CD, 1218 S. Zenith Ave., Davenport, Iowa 52800. Sponsor: Davenport Model Airplane Club.

AUG. 27—SOUTHFIELD, MICH. (AA) Cloudbusters 12th Annual FF (Cat. II) Meet. Site: 11 Mile and Franklin Road. G. Lewis CD, 29536 Bonnie Dr., Warren, Mich. 48093.

AUG. 27—MILLERSPORT, N.Y. (AA) United RC Pylon Racing Circuit Meet. Site: Millersport. H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

AUG. 27—BLAINE, MINN. (AA) Minneapolis Model Aero Club Annual FF (Cat. II) August Contest. Site: Hentges Sod Farm. H. Langevin CD, 4854 Aldrich Ave. So., Minneapolis, Minn. 55409. Sponsor: Minneapolis Model Aero Club.

AUG. 27—LAKEHURST, N.J. (A) 4th Annual RC Soaring Meet. Site: Lakehurst N.A.S. R. Sarpolus CD, 32 Alameda Ct., Shrewsbury, N.J. 07701. Sponsor: Monmouth Model Airplane Club.

AUG. 27—CINCINNATI, OHIO (A) Junior CL Fun-Fly. Site: Lunken Airport. C. Snyder CD, 7051 Memory Ln., Apt. 1, Cincinnati, Ohio 45239. Sponsor: Queen City U-Control.

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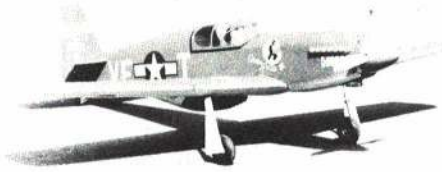

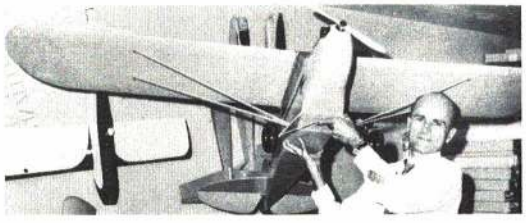

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324—Groupner middle stik, deluxe red & white, very clean. $95.00

325—DeBolt Cobra, hobby poxi finish, very clean. $125.00

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327—8 foot T-craft with Rossi Black twin engine. $350.00

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Low Bounce 3" Sale. $1.65 pr.
Low Bounce 2¾" Sale. $1.50 pr.
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403—Miller 2017 Sprayer, $49.95. $40.00

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509—OS-25RC, $23.50. Sale. $17.50

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511—McCoy 19RC, $14.95. Net to you. $10.00

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516—Black Ross 60 RC, twin, $145.00. Sale. $125.00

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610—ALL LANIER KITS IN STOCK AT LOWEST PRICES.

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618—Royal Products P-38. $69.95 Sale. $49.00

619—Buzzard Bombshell, old time FF, $19.95. Net. $17.00

620—Groupner, Middle Stik, Retail $66.95. Sale. $45.00

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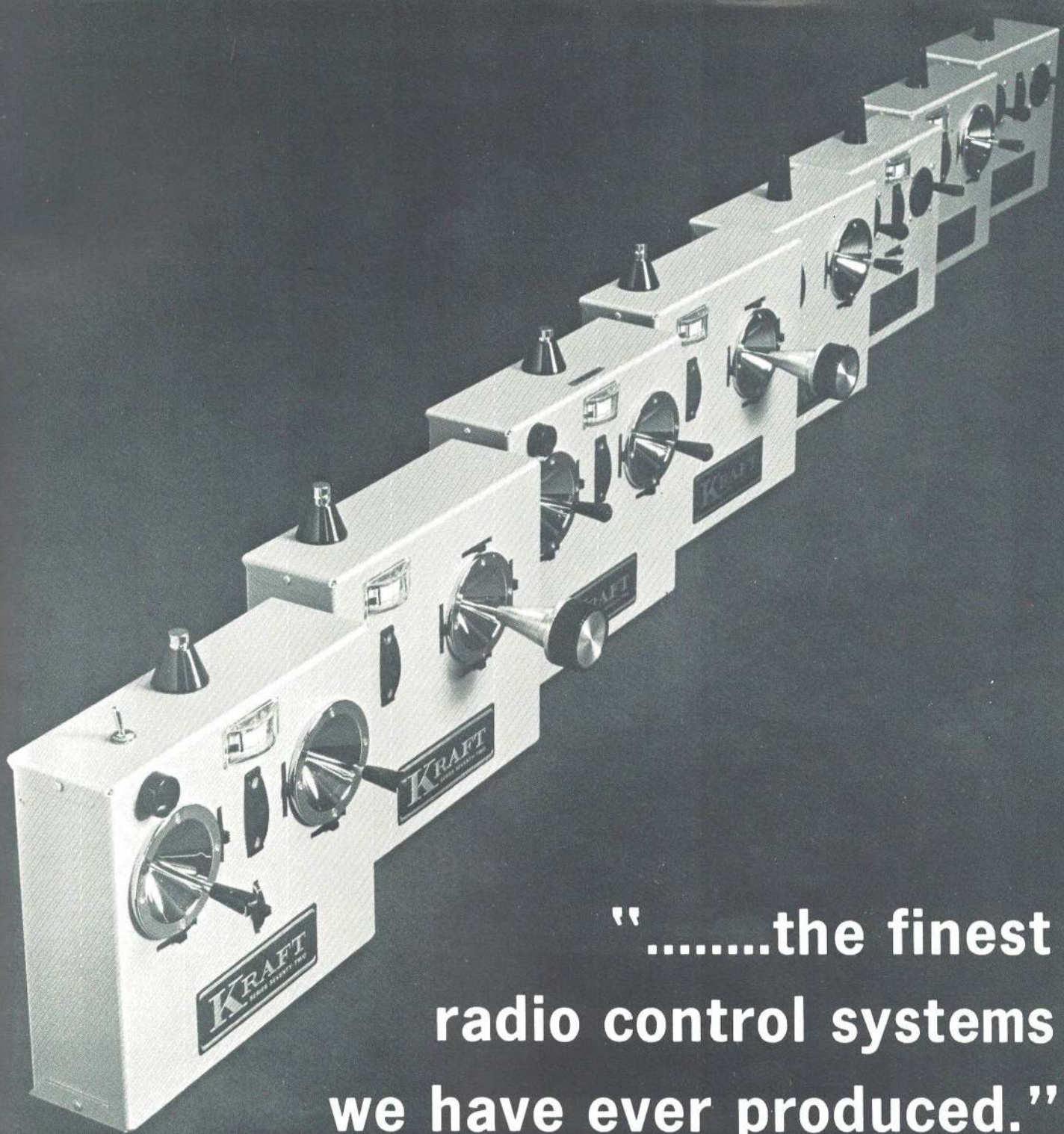

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