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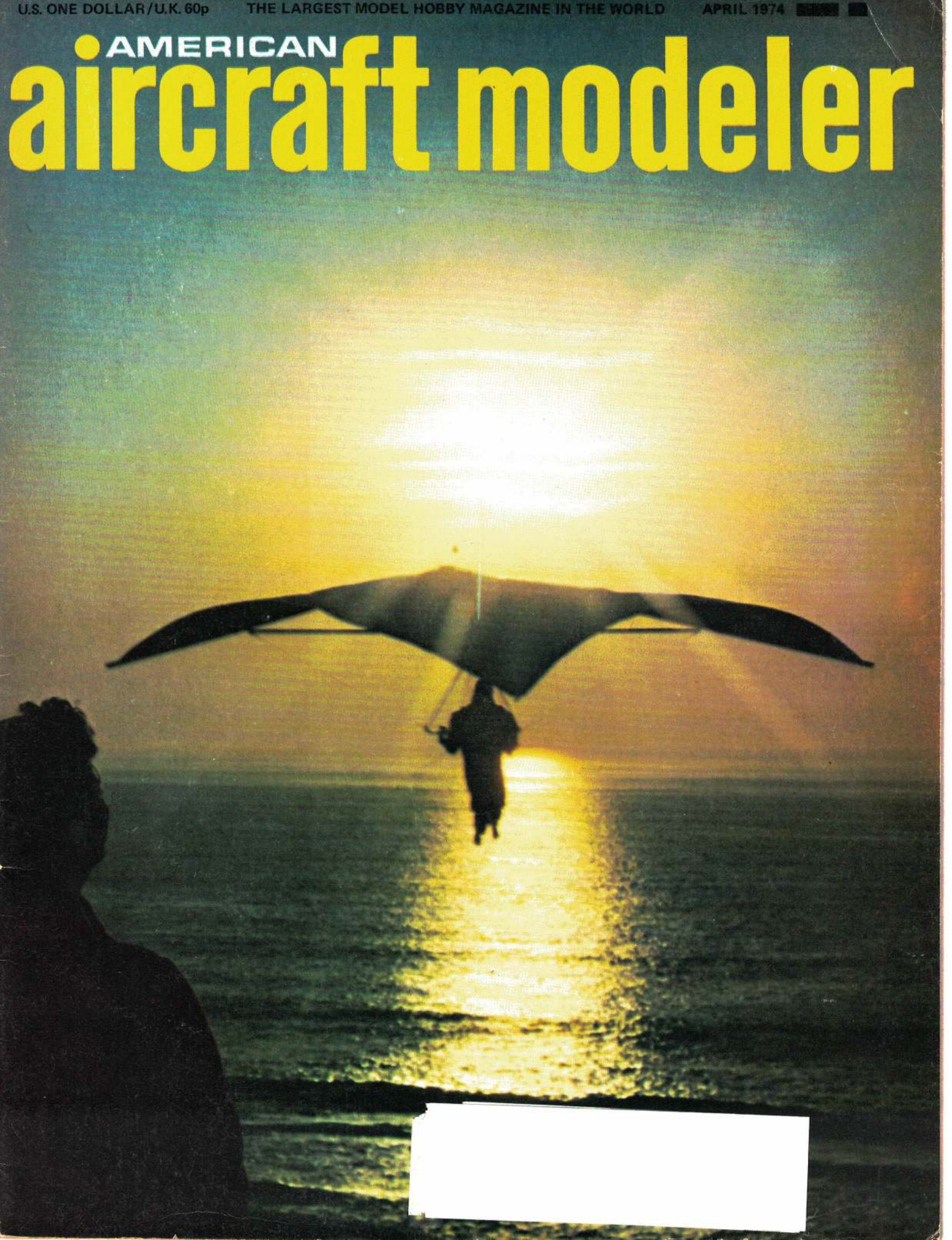
AMERICAN aircraft modeler



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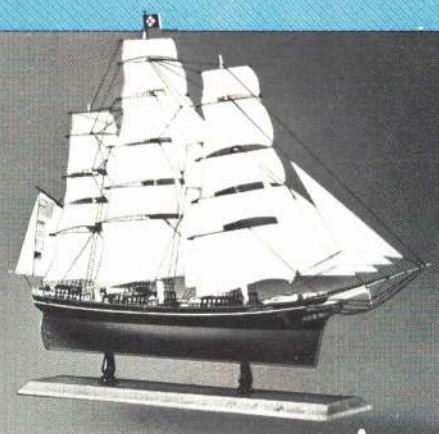

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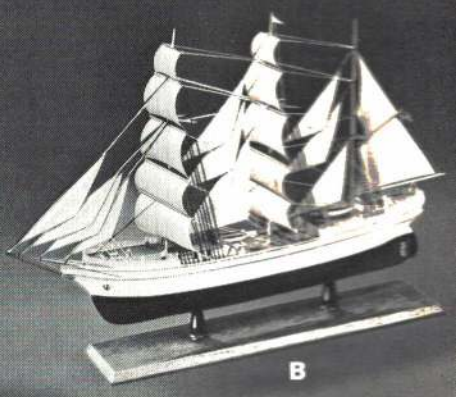

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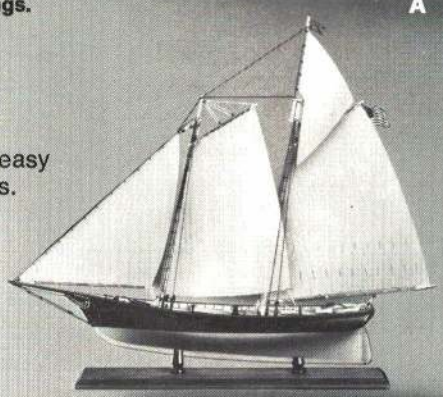

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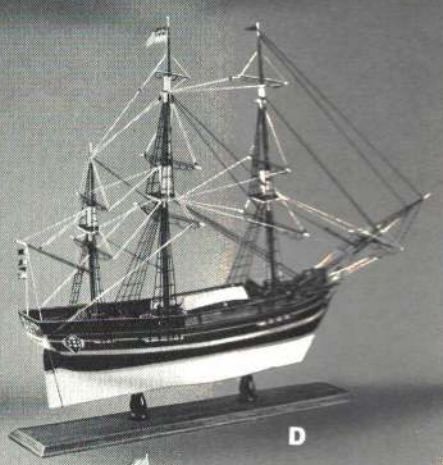

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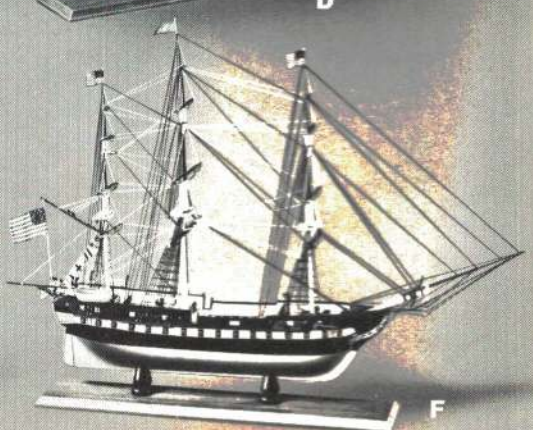

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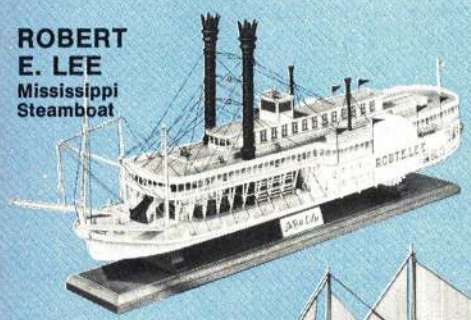

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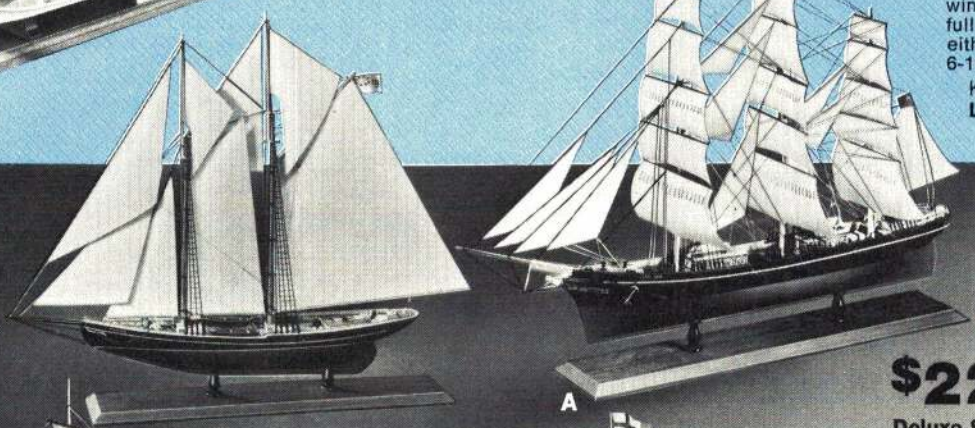

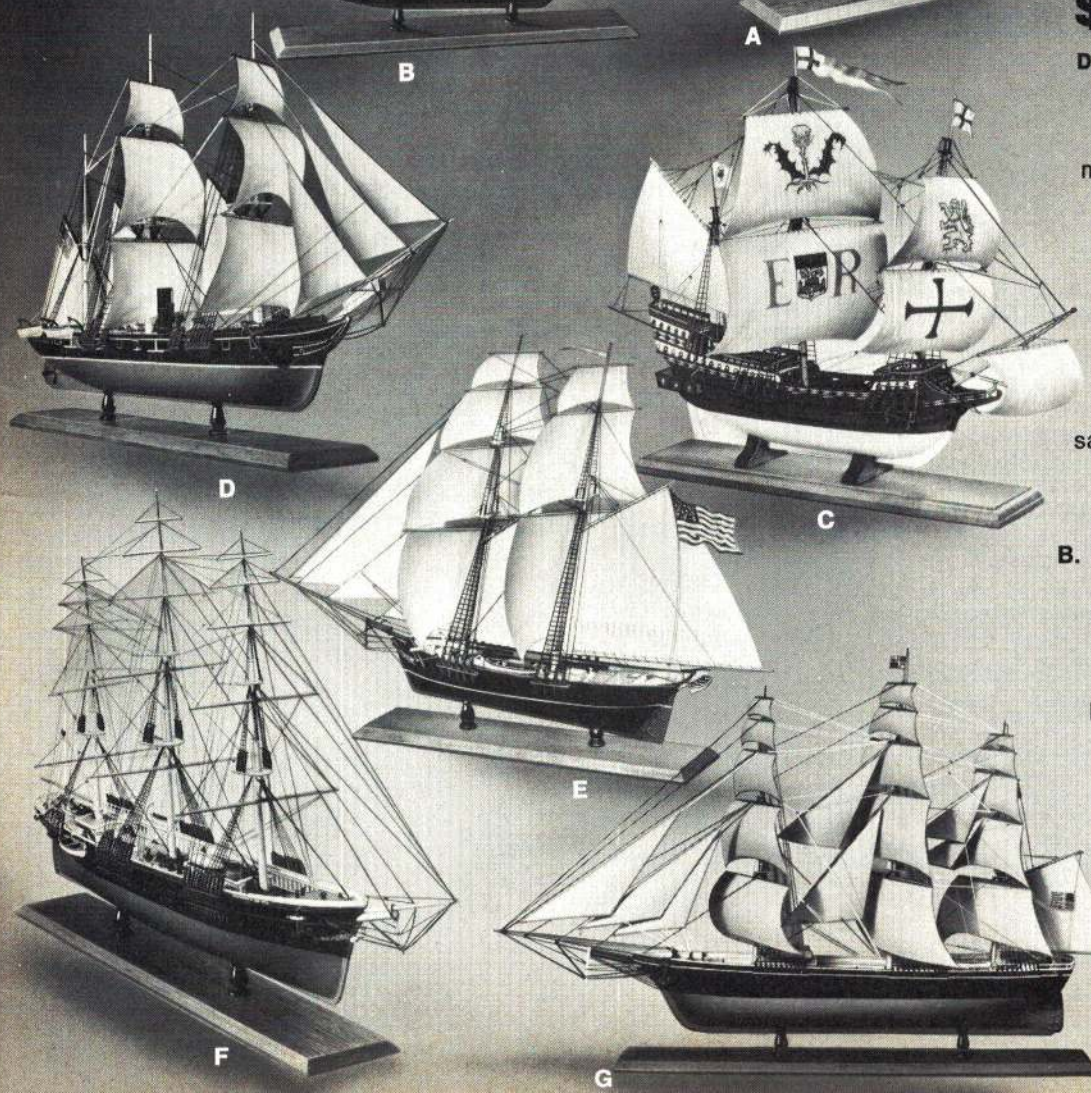

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AMERICAN aircraft modeler

VOLUME 78, NUMBER 4 APRIL 1974

COVER PHOTO

Poised in the splendor of a California sunset, Frank Kelly soars his scale model of Dick Eipper's Flexi-Flier rogallo hang glider. Construction article begins on page 21. Cover photo by Jerry Trager

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Editorial

SOMETHING WILD & WACKY

Patrick H. Potega
Assistant Editor

Sometimes I read magazines backward. Beginning at the back, and thumbing toward the cover, only stopping at items of interest—it somehow seems natural. Maybe it's a reversion to a childhood habit of reading the comics inside the back pages of newspapers first.

If you have similar reading habits, this issue of **AAM** was probably somewhat of a jolt. You might have had some trouble comprehending the crazy quilt of articles. Someone said once that "a variety of nothing is superior to a monotony of something." We broke the monotony with a sprinkle of humor—something wild and wacky. This is not quite an April Fool's issue, but close.

Within this variety of nothing, to juxtapose a model like the Paper Cub with a model like the Missy DARA is more than a bit of editorial freedom. The DARA is all serious business, a real dream of a QM racer. The only humor here is the grin you'll have as you cart off those trophies.

On the other hand, the likes of the Paper Cub—more nightmare than dream—is strictly all for fun. Grab a few old kit boxes and, tossing all stodgy propriety to the winds, have at it with a sense of gusto. Why not build a plane that you hope *will* crash? After all, it's only a hobby.

That old cliche—Smile, it's only a hobby—that's what it's all about. These days, we are often hard-pressed to smile about our hobby, and thus unable to see ourselves objectively. Our image and identity are being assaulted. We are trying to redefine ourselves and to adapt to new terms and ideas, such as "energy crisis," "fuel shortage," etc.

Were gasoline allocations to make flying impractical, then would it be easy to laugh? Humor demands a measure of sureness and a pretty confident stance in life—attitudes which are not widely encountered these days. Modeling will become a leisure time activity of a different sort, and a sense of humor can help establish our "confident stance."

Full-size aviation is apparently in for a rough ride in comparison to aeromodeling—avgas may disappear, or be priced comparable to medicine (don't use car gas in that Lycoming!). The homebuilders of EAA are deep in a telegram and letter writing campaign to their government representatives. Having a two-year basement project go sour because Uncle Sam shut off your fuel spiggot makes for a grim sense of humor, more like irony.

Some of us in modeling won't find the coming changes easy, especially the changes of identity. As these changes occur, a little chuckle at ourselves might make the transition easier. For some, the comic relief of slapping together a Flying Outhouse from this issue might help keep their identity with the hobby intact.

Aeromodeling, as a power-consuming activity, is a comparatively small drop in the ever-evaporating bucket of energy resources. Nevertheless, we will change to fit the tempo of a fuel-starved society. Part of the change might be the pleasant relearning of forgotten things like stick-and-tissue. Probably Scale will come on strong as extra building time is found.

How would we respond, as modelers, to the three-day work week now in effect in England? A surplus of time can touch our sport in profound ways. Clubs only grow as more modelers become involved in these activities. Maybe flying will be a Monday through Friday affair (the weekend is nothing more than a tradition, of course).

There is a refreshing feeling that a renaissance of our hobby is in the offing. A lack of energy will generate a surplus of time, and time will allow the exploration of new modeling vistas. How we use this time will be a measure of how our hobby grows and develops. We will flourish in an arid land. Our images and attitudes will recrystallize, and we must be sure that a sense of humor is retained.

A new look at different modes of flying is in the wind. Electric power is yet in its germinal stages of development. But it is fresh and open for possibilities. As usual, modelers will respond to these possibilities, and progress in electromotive power will come quickly—as quick as the RC pylon racer or the helicopter developed. We fliers have a vitality for exploring and exploiting new horizons. Our energy needs are in this vitality which we bring to our hobby.

So, as you read (either forward or backward) through these pages of **AAM**, remember to smile—it's only a hobby. One thing must endure—we should always have enough of the lighter side of our sport to be able to see something wild and wacky in it.

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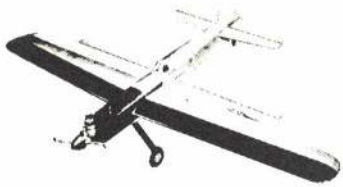

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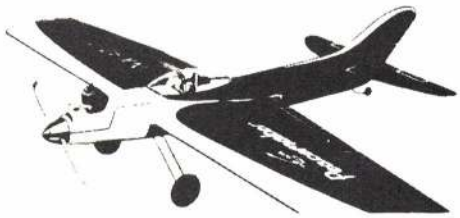

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Paul Harvey Views

OVER SOMEBODY ELSE'S SHOULDER

Man and boy, what we could learn from watching over somebody else's shoulder! Talk about a waste of resources! If only each of us could learn from the experience of others—pick up where they leave off—instead of having painfully to relearn the same old lessons over and over and over again!

That goes for us modelers, too.

As a sophomore in this RC hobby I remember my freshman year with much chagrin. That first ugly duckling trainer which I'd overglued only to have the wing skin "explode" in flight.

That second hybrid bird had a superstrong wing until shortly after the elevator fell off in flight.

It looked so easy and I was in such a hurry.

Fortunately, my second season of modeling I visited the workshop of an old-timer. Harold Parenti was building models and winning medals for his precision flying when he was his son's age.

Every fledgling builder should seek the opportunity to watch over the shoulder of an expert. If it's a day's travel from where you are to where he is, go.

As with no other hobby I know, modelers delight in helping one another, sharing their techniques.

A fisherman may hide his prize lure or his favorite fishing hole, but modelers have no "secrets" which they can't wait to share.

Of course, you can learn a lot from the magazines. The beginner can learn a lot of new things even from old issues.

(Continued on page 87)

Modeler Mail

Off The Scene

In your February '74 issue, page 114, I was honored by making the caption in one of Steve Campbell's cartoons.

One of my crew members (who has built a five-ft. wingspan model of "Miss America") sent me the page, but scribbled all over it. I wanted to get a good clear one for framing and hanging with the other pictures in the "Miss America" gallery. If the original were also available and could be spared, I would naturally like that, too.

Thank you in advance for anything you might be able to do.

Howard M. Keefe
Los Angeles, Calif.

Calkins' Miscalculations

A fate worse than death may be riding in an airplane with Mr. Calkins in charge of the front office. His analysis of the relationship between airplane, airspeed and absolute velocity (groundspeed?) as appeared in your February 1974 issue is quite erroneous.

If Mr. Calkins' airplane has a minimum flying speed of 50 mph, that is the velocity relationship between the airplane and the air, not between the airplane and the ground. If this airplane were to take off into a headwind of 15 mph, the airspeed at liftoff would be 50 mph and the groundspeed would be 35 mph. As the airplane accelerates to 65 mph airspeed, the groundspeed increases to 50 mph. Safe to make a 180° turn? You bet! As the airplane completes the turn, maintaining 65 mph all the way, the groundspeed increases to 80 mph.

Now let's take off downwind with Mr. Calkins. Liftoff will still occur at 50 mph airspeed, but the groundspeed will be 65 mph. It is agreed that more runway will be required, but if one ignores wheel friction, the time required will be identical because the force required to accelerate the airplane is pushing against the air, rather than the ground. Wheel friction will add a minor amount of time required to reach liftoff speed, because the wheels roll a further distance.

Since the requirement for flight is the relationship of the airspeed, it is immaterial how the air is moving with respect to the ground in order to maintain safe flight. Therefore, in order to safely fly downwind, you need an airspeed equal to the minimum flying speed—in this case 50 mph. I think the point Mr. Calkins is missing is the fact that the airplane is only dependent on one medium for flight—the air.

I am an engineer also, but a pilot as well, and was nagged into writing this letter by my 15-year-old son, who reads your magazine thoroughly within four hours of delivery each month.

Ralph A. Kangas, P.E.
(Professional Engineer, not "pilot error.")
Boise, Idaho

I question the validity of the equation mentioned in the last sentence of Mr. Calkins' letter. I clearly recall flying downwind some years ago, in an ancient J-3, when the wind at flight altitude was 60 mph. By the equation, my safe airspeed had to be in excess of 155 mph!

If Mr. Calkins attempts much more flying with his present understanding of aircraft operational procedures, he may not survive to become an "expert pilot" someday.

Will Kane
Rockville, Md.

"Some Practical Advice" given by the naval engineer in the February Modeler Mail, simply does not float! The following is a quote from the *FAA Flight Training Handbook* (1965 ed., page 11):

"There is a prevalent fallacy regarding the reasons for the hazards of downwind turns close to the ground. This results from the belief that the airspeed of the aircraft is affected by the wind. Such is not the case. Once the aircraft is free of the ground, only its speed relative to the air has any bearing on its sustentation in flight. Velocity and direction of the wind does affect the path of the aircraft over the ground, but that is all."

A modeler that flies his 40 mph model away from himself and into a 10 mph headwind, will find the model still flying at a 40 mph airspeed, but going away from him at only a 30 mph groundspeed. When the model is turned around, it will be flying toward the modeler at the same 40 mph airspeed, but now at a 50 mph groundspeed.

I can fly my Ugly Stik into a 25 mph wind, and get it to remain motionless with respect to me on the ground. The model's airspeed is then 25 mph, and its groundspeed is zero. If the plane is then turned downwind, it will still be flying away from me at a 25 mph airspeed, but a 50 mph groundspeed.

John E. Spratt
Member Propbusters RC Club
Rapid City, S.D.

Wait a minute! Any takers for a bet that this guy would make splinters out of his Ugly Stik if he tried the downwind turn? If the plane is trimmed for zero groundspeed into a 25 mph wind (i.e., he's well-flared for a landing), then the downwind

(Continued on page 85)

CARL GOLDBERG

WHAT EXPERTS SAY ABOUT CG RETRACTS

Jack Stafford: Based on reliability, we made CG Retracts our standard installation.

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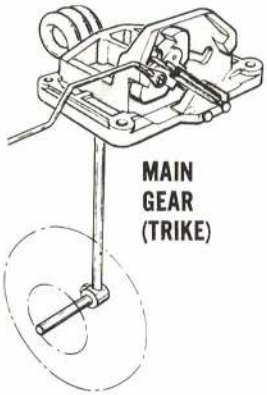
Bud Atkinson: 429 flights with Goldberg Retracts — and they'll easily go another 400.



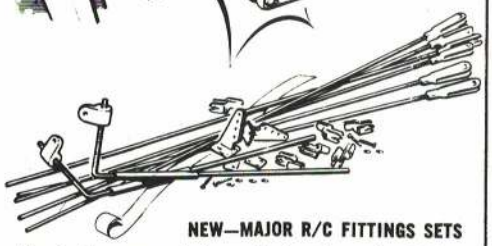
TWIN GEAR Retracts–RG2–$14.95
TRI-GEAR Retracts–RG3–$24.95
NOSE GEAR (Only)–RG1–$10.00

UNIQUE SNAP-LINK! Patent 3711134. Now for the first time—you can buy a truly safe link—the SNAP-Link!

- Tiny 45° shoulder snaps through arm. prevents accidental opening. So unique it's Patented!
- One-piece design—no separate pieces that might come apart.

Snap-Link, Regular, with rod SL1
Mini-Snap-Link, with rod MS1
Snap-Link SL2 or Mini-Snap MS2,
less rod 2 for **40¢**

29¢ ea



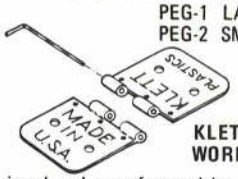
NEW—MAJOR R/C FITTINGS SETS

Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.
R/C Fittings Set No. 1 for ship with standard ailerons. RFS1 **$3.50**
R/C Fittings Set No. 2 for ship with strip ailerons. RFS2 **$3.50**

NEW! KLETT PUSHROD EXIT GUIDES

To protect your fuselage and insure smooth operation of your pushrods. Precision made of tough nylon. Easy installation. Large for 5/64" wire, small for 1/16" wire.

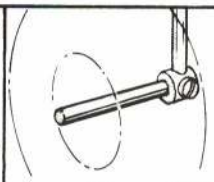
PEG-1 LARGE 4 per pkg. **75¢**
PEG-2 SMALL 4 per pkg. **75¢**



KLETT HINGES – WORLD'S FINEST!

Designed and manufactured by Roy Klett, originator of world-famous RK hinges. An exclusive with Carl Goldberg, these hinges are made with exceptional care and attention to detail. The small RK2 hinges are so thin all you need is a knife slit. The regular size RK3 hinges are the slickest you've ever seen – try holding one leaf and waving the other! And both have **removable music wire** pins. Ask your dealer for the best – Klett hinges.

RK2-7	7 for **$1.10**	RK2-15	15 for **$1.95**
RK3-7	7 for **$1.25**	RK3-15	15 for **$2.35**



5/32" ADJUSTABLE AXLE

Adjustable axle allows you to easily have the strut length you want. Both the axle and screw are hardened steel. Just file a flat on the strut, and tighten axle in place. AA1 **75¢** ea.

STEERABLE NOSE GEAR

Versatile – steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.

Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers G16N **$2.50.**

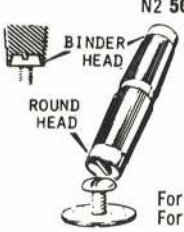
NYLON STEERING ARM
Hardened steel collar and screw SA1 **75¢.**

NYLON BEARING

One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers NB1 **75¢.**

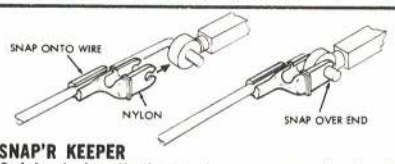
CONTROL HORNS
Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns CH1 or short horns CH2, with screws—**50¢**/2.

NYLON REINFORCING TAPE
This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft.—N2 **50¢.** ¾" wide x 5 ft. N1 **25¢.**



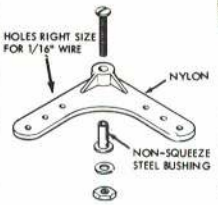
NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD – CAN'T SLIP OFF AND DAMAGE YOUR WING!
Takes Round Head Screws and Binder Head.

KLETT SAFETY DRIVER
For ¼" Nylon Screws SD1
For #10 Nylon Screws SD2
98¢ ea

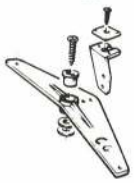


SNAP'R KEEPER
Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter. SK1 **50¢** for 4.

REPLACEMENT FOAM WINGS, ETC.
To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly—**$3.95.** Stab and vertical fin, set **$1.95.** Assembled Ranger 42 fuselage. plus bearers, nosegear, etc., **$9.95.**



AILERON BELLCRANK
Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together—AB1 **50¢** for 2.



½A BELLCRANK and HORN
Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too BCH1 **25¢.**

SHEET METAL SCREWS
Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 5/16 SMS2 **30¢** for 10; #4 x 3/8 SMS4 **30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 50¢ per item ($1 outside U.S.). Minimum order $1.

MANUFACTURERS—All our accessories are available at excellent O.E.M. bulk prices.

Available in Canada

Carl Goldberg Models Inc.
4735 W. Chicago Ave., Chicago, Ill. 60651
I am sending 25¢ for 8 pg. Illustrated Catalog with Basic Explanation of R/C Equipment and Radio Control Definitions.

Name_____
Address_____
City_____
State_____ Zip_____

CARL GOLDBERG MODELS INC.
4735 WEST CHICAGO AVE.• CHICAGO, ILLINOIS 60651

KID'S STUFF & NOSTALGIA DEPARTMENT

Tern Aero's SUPER STARDUSTER $12.95

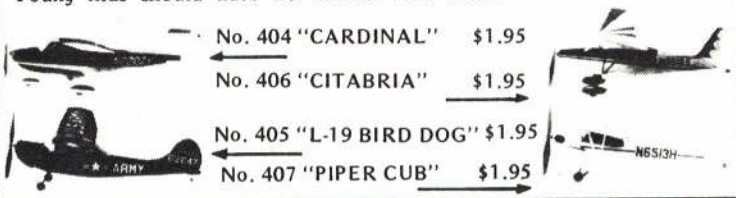
This well-engineered kit is a NATURAL for the installation of Ace R/C's "BABY" rudder only pulse system. A really delightful plane for .020 engine.

34" span, Old fashioned looking, stick model.

Johnny Carr's **INVADER** **$1.49**
17" snap wing rubber band launched glider

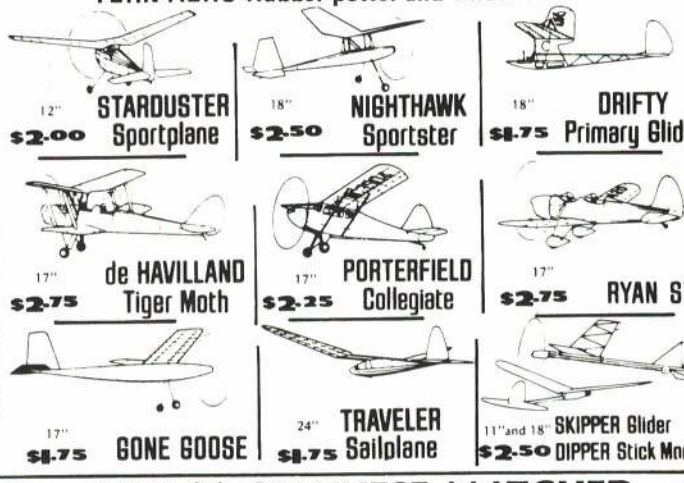
Midwest "QUICK & EASY" RUBBER POWER KITS FOR KIDS

All parts fully die cut -- no knife is needed. Each part's painted and everything but glue is included. Each kit has a 21" span. Young kids should have no trouble with these.



No. 404 "CARDINAL" $1.95
No. 406 "CITABRIA" $1.95
No. 405 "L-19 BIRD DOG" $1.95
No. 407 "PIPER CUB" $1.95

TERN AERO Rubber-power and Glider Kits



12" **STARDUSTER** Sportplane **$2.00**

18" **NIGHTHAWK** Sportster **$2.50**

18" **DRIFTY** Primary Glider **$1.75**

17" **de HAVILLAND** Tiger Moth **$2.75**

17" **PORTERFIELD** Collegiate **$2.25**

17" **RYAN ST** **$2.75**

17" **GONE GOOSE** **$1.75**

24" **TRAVELER** Sailplane **$1.75**

11" and 18" **SKIPPER Glider** **$2.50** **DIPPER Stick Model**

Solarfilm Sale!

LAST CHANCE at these low prices—Solarfilm prices will be going UP!

These prices will be in effect until February 28, 1974 or until we sell out of the lower priced stock.

26" wide rolls, 6 feet long. No limit.

- OPAQUE COLORS—Bright Red, Dark Red, Orange, Yellow, White, Silver, Tropic Blue, Midnight Blue, Black. List Price $6.60 per roll. **SALE PRICE $3.88 per roll.**
- TRANSPARENT COLORS—Transparent Red, Transparent Orange, Transparent Yellow, Transparent Blue. List Price $7.50 per roll. **SALE PRICE $4.88 per roll.**
- METALLIC COLORS—Metallic Red, Metallic Green, Metallic Gold. List Price $9.00 per roll. **SALE PRICE $5.88 per roll.**

Here's Hobby Lobby's New 3 Channel Radio. *Add up what its features are worth,* then see if you believe the price!

★ ULTRA-LIGHT airborne WEIGHT: 6.5 ounces with 2 servos, and 225 mah. batteries; 8.8 ounces with 2 servos, and pencell batteries

★ Excellent SERVO RESOLUTION and CENTERING for CONTEST work

★ I. C. Servo Amplifiers with ONE-CELL-OUT flight capability

★ Smallest SERVOS made

★ A COMPLETE, ready-to-operate outfit: 3 channel Transmitter, 3 channel Receiver, 2 Servos, Airborne battery holder & switch

★ Same FAR-REACHING Transmitter power as the Hobby Lobby 5

★ Precise 2-axis Control Stick

★ Same selective and sensitive Receiver circuitry as the Hobby Lobby 5

★ *PRICE: About HALF of what you'd expect to pay for a top quality 3 Channel radio*

The Hobby Lobby 3 is a ready-to-operate 3 Channel Digital Proportional outfit, consisting of a 3 Channel Transmitter, a 3 Channel Receiver, 2 Servos and airborne battery holder and switch.

The Hobby Lobby 3 is manufactured for Hobby Lobby by the same company that makes the unusually reliable Hobby Lobby 5 proportional system. Many items are common to both systems: the servos...HL 3 uses the same servos as the HL 5 Series III 5th Channel servos; and the optional airborne nickle-cadmium battery packs are interchangeable between both systems.

With its optional 225 mah. nickle cadmium airborne battery pack, the Hobby Lobby 3 is one of the true ultra lightweight systems.

The precision of the control stick-to-servo, the 3½ pound servo thrust, the out-of-sight range, and the proven reliability record of the circuits used in the system combine to make the HOBBY LOBBY 3 the finest 3 channel system available regardless of price.

HOBBY LOBBY 3 3 Channel Digital Proportional

$89.00 (27 mhz, 2 servos)

$99 (72 mhz, 2 servos)

HOBBY LOBBY BRAND X WHEELS

CHEAP!

2" pair	$1.40	2½" pair	$1.65
2¼" pair	$1.55	2¾" pair	$1.75
		3" pair	$1.95

SAVE $$ ON THESE MATCHED COMBINATIONS

Prices in effect til March 30, 1974

Ace ACE HIGH, 70" foam wing and McCoy .049 Engine
Total list value $22.93 **PRICE $17.00**

Southwestern Sailplane's HONKER and McCoy .049 R/C Engine
Total list value $22.93 **PRICE $16.00**

Ace ALL STAR BIPE, 34" foam wing and Fox .15 R/C Engine
Total list value $40.90 **PRICE $29.00**

Goldberg FALCON 56, 56" and Fox .19 R/C Engine
Total list value $46.90 **PRICE $34.00**

Lanier PINTO, 48" and Fox .25 R/C Engine
Total list value $68.90 **PRICE $49.00**

Lanier SPRINT 25, 50" and Fox .25 R/C Engine
Total list value $66.90 **PRICE $47.00**

Ace WARBIRDS, 42" foam wing (builds either P-51 or ME109 or Spitfire) and McCoy .049 Engine
Total list value $24.93 **PRICE $18.00**

Ace UPSTART, 34" foam wing and McCoy .049 Engine
Total list value $20.93 **PRICE $15.00**

Ace 2T Kit, 50" foam wing and McCoy .049 Engine
Total list value $20.73 **PRICE $15.00**

Midwest TRI-SQUIRE, 51" and McCoy .19 R/C Engine
Total list value $42.90 **PRICE $30.00**

Midwest CESSNA CARDINAL, ARF foam and Fox .15 R/C Engine
Total list value $42.90 **PRICE $31.00**

Midwest SUPER CHIPMUNK, ARF foam and McCoy .19 R/C Engine
Total list value $47.90 **PRICE $34.00**

World Engines HAWK 460, 52" and Fox .36 R/C Engine
Total list value $57.90 **PRICE $40.00**

Midwest MACH I, 62" and Fox Eagle .60 R/C Engine
Total list value $119.90 **PRICE $79.00**

V-K BABY CHEROKEE, 53" and Fox .36 R/C Engine
Total list value $56.45 **PRICE $38.00**

Jensen DAS UGLY STICK, 60" and Fox Eagle 60 R/C Engine
Total list value $114.90 **PRICE $79.00**

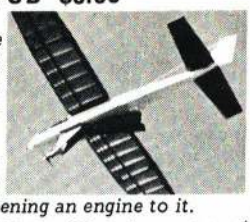
Midwest SWEET STIK, 54" and McCoy 40 R/C Engine
Total list value $61.90 **PRICE $42.00**

Midwest CARDINAL SQUIRE, 74" and McCoy 40 R/C Engine
Total list value $80.90 **PRICE $55.00**

TRY US OUT: J. R. did.

"...thank you for the best service that anyone can find. It sure is nice doing business with people that I really trust and I'm sure that anyone that has ordered any from you will agree 100% with me (that) your service stands head and shoulders above all the rest."
J. R., Perry, Oklahoma

NEW! Craft Air's PARA-POD $6.95



How clever can you get! The problem solved by PARA-POD was how to loft an RC thermal glider without troublesome hi-starts or winches, or worse yet, without ruining the aerodynamics (and the appearance) of a glider by permanently fastening an engine to it.

PARA-POD mounts a Cox .049 to .09 engine and tankmount on a pod which readily slips off the glider when the engine stops. The 'chute opens and lowers the pod and engine to the ground, and the sailplane goes on its unencumbered way.

PARA-POD includes a 22" fully rigged nylon 'chute, kit for pod and release gimmick, and good instructions. The IDEA alone's worth $6.95!

NEW! Sig KWIK-BILT P-51 MUSTANG R/C

List price $42.50 **PRICE $37.97**

64" span, 700 square inch, bee-yoot-i-full scale-looking model using Sig's new formed fuselage technique with its molded-in detailing. The wings use foam cores with a new contour molded and scale-detailed plastic covering that you glue on. The size of the plane and wing airfoil seem to indicate that this ship would be a good RC pattern flyer. Good decals and hardware.

R/C ON A BUDGET — Ace R/C PULSE PROPORTIONAL R/C SYSTEMS

Ace RC's single channel (rudder-only) pulse proportional RC systems give reliable and enjoyable control when installed in small gliders and small, stable RC powered planes such as Ace High glider, Goldberg Jr. Falcon, Competitions Kits' Eindecker, Midwest Li'l "T", Tern Aero's Super Starduster, Sig's RC Sport, Stinson and Relic.

If you've never seen a powered plane fly on rudder-only control you'll probably be surprised when you see it ROG, turn, barrel roll, loop, and glide into a spot landing. And, small gliders with these super lightweight systems in them fly like trained eagles.

Ace R/C System	Airborne Weight	Recommended for:	List Price	Hobby Lobby
"BABY"	2.5 oz.	Pee Wee .020 Up to 48" gliders	$59.95	**$53.97**
"BABY TWIN"	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders	$62.95	**$56.97**
"STANDARD"	3.7 oz.	.049 to .10	$61.95	**$55.97**
"STOMPER"	4.1 oz.	Tee Dee .049-.23	$64.95	**$58.97**

All four above systems are identical except for the actuator used, and the capacity of the airborne batteries -- the two lightest systems use 225 mah. cells, and the two heaviest systems use 500 mah. cells (for longer flying time). You can inexpensively convert your system to one of the others by simply changing the inexpensive actuators and/or batteries (all components PLUG IN). Our recommendation for the most useful all-purposes systems are the "STANDARD" and "BABY".

Series III — HOBBY LOBBY 5 Digital Proportional

We're afraid to change it!

- Unsurpassed reliability
- Extremely Long Range
- Full 90 day Warranty backed by the manufacturer and by Hobby Lobby
- Smallest, Lightest, Servos made
- A Complete system; Transmitter, Receiver, 4 servos, all n-cads, charger, 27 or 72 mhz
- Extra servos cost only $13.00
- I. C. FULL-POWER servo amplifiers
- Only 11 ½ oz. airborne weight
- Reliable Airborne battery pack with ONE-CELL-OUT flight ability

- PRICE: About HALF of what you'd expect to pay for a top quality 5 channel system.

It has become a pretty well-accepted fact among knowledgeable RC'ers that there have been "vintage" years for various radio systems. As digital proportionals have evolved to their present state, a great deal of trial and error was involved. But certain systems from specific years' production of various manufacturers have been ahead of their time in terms of reliability and accurate performance.

During the summer of 1973 we began to realize that we had a "vintage" model in our SERIES III Hobby Lobby 5. The reliability was tops -- the best we'd ever seen in any brand of radio -- and the performance began to be discovered by the more sophisticated RC flyers to whom the SERIES III's tight control stick-to-servo resolution, and its ability to preserve their complex contest planes through a long flying season are the criteria for judging a radio system.

Series III
HOBBY LOBBY 5 Digital Proportional $209

We will continue the SERIES III Hobby Lobby 5 absolutely unchanged for 1974 simply because we can not think of any change that would improve either its accurate performance or its superb dependability.

HOBBY LOBBY'S COMPLETELY *Ready-to-Fly* 3 CHANNEL AIRPLANE

Ready Bird 23 $19900

The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system FULLY INSTALLED, a Fox 25RC engine INSTALLED, and pushrods, wheels, fuel tank, . . . EVERY THING except batteries... FULLY INSTALLED AND ACTUALLY READY FOR YOU TO FLY!!!

Since we couldn't fit the fully assembled plane into a box you must glue the two wing halves together, and glue the tail to the fuselage. But, this only adds up to about 23 MINUTES WORK, and then you put batteries into it, gas 'er up, and GO FLY IT!!!

Volume II HOBBY LOBBY ILLUSTRATED CATALOG $2.00

Our Volume 2 catalog has more items, more pictures and better pictures and descriptions of R/C and control-line stuff than we've seen in any other catalog.

HOBBY LOBBY INTERNATIONAL

Route 3, Franklin Pike Circle, Brentwood, Tennessee 37027 - 615/834-2323

DROP YOUR ORDER IN THE MAIL BOX. THEN JUMP BACK BECAUSE WE SHIP FAST!
WE PAY POSTAGE (in U.S.) on all orders accompanied by check or money order.
Satisfaction guaranteed or money refunded.
Phone 615/834-2323 Store Hours: 9 a.m. - 5 p.m. except Sundays.

LSF

The Fourth Annual International Glider-Guider's Bash, better known as the League of Silent Flight's RC Soaring Tournament, took place at Oxnard Air Force Base, Camarillo, California.

The festivities started with a meeting in one of Camarillo's community recreation centers. This briefing was held at an outside place to keep the bunch from cluttering up Le Gray's motel room. Last year they kept Le up till 2:00 a.m. and, let's face it, he is getting old and needs his beauty sleep. (As you can see by the photos, the sleep didn't help! Ed.)

Loosely, it was ascertained (by reading the club jackets) that at least 18 clubs were represented, the majority from California. Neil Liptak and Dan Pruss, from the Chicago area, won the distance award. New Mexico was well represented by a half dozen members of the Albuquerque Radio Soaring Enthusiasts. Arizona sent fliers from the Arizona Soaring Club.

One of the purposes of the League of Silent Flight is to foster and support all phases of sporting and *competitive* activity for RC model sailplanes. This was not a contest for the Sunday Flier; as you proceed up the ladder from Level I to Level V in LSF, you become an accomplished flier. If you want to take home the title of LSF Overall Champion, you have to be the best.

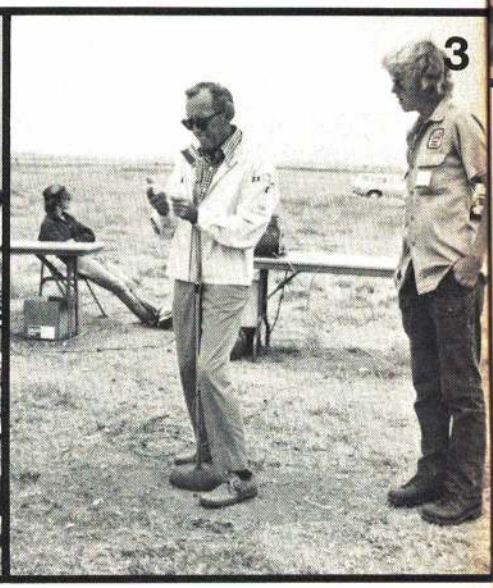
Saturday

At the pilot's meeting, any problems concerning the field and flight procedure were reviewed. It wasn't necessary to review the Flight Tasks in detail, because LSF mailed to each entrant, weeks before, a detailed sheet of information. For your interest, however, this is how it went.

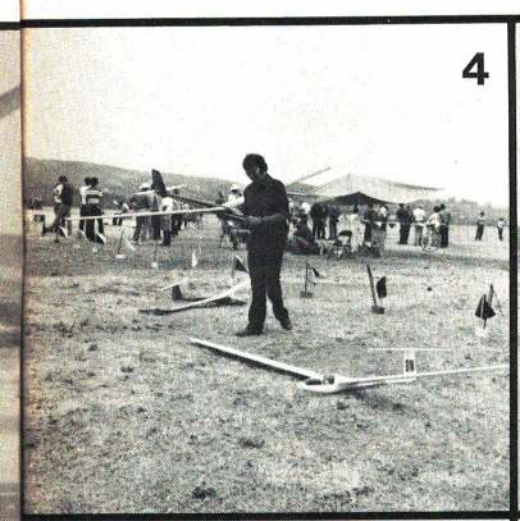
Precision Time / Spot Landing, two min. Target (AMA Task III). Objective: To fly for exactly two min. and bring the sailplane to rest at a predetermined target position on the runway. Flight time scoring in accordance with AMA Task III Precision Flight Score Table. Landing points, to a maximum of 100, are added to flight score. Landings will be on a modified AMA Scale Runway, which offers 25 to 50 points for landings in appropriate outer blocks.

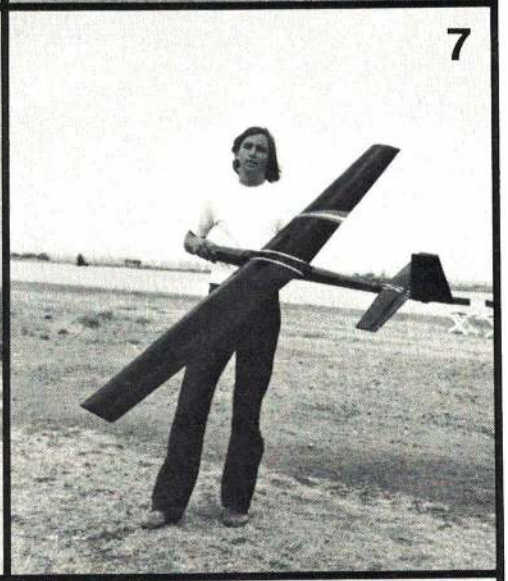
Goal Distance (AMA Task V, Modified Course). Objective: To Fly a one-mile closed course in minimum time, and land within a designated area. Flight time is scored in accordance with AMA Speed Task V, with the fastest time for completion of the course earning 1000 points.

A guider of gliders called "Buck"
Flew his sailplane with so much pluck
That he beat all the best
At this West Coast contest
To prove that it's more than dumb luck.



PAUL DENSON





(1) Paul Christian's Kestrel 19 overflies the runway prior to a turn onto final and a chance at the elusive spot. (2) The loneliness of the soaring competitor. Ken Willard looks out over the runway (perhaps to spot a thermal). (3) CD Le Gray, after a good night's beauty rest, examines a contestant's score card. (4) Champ Andre "Buck" Faure strolls through the ready area with his Presbyterian. (5) John Baxter is all smiles after flying a shattering 1:32 mi. with his combo model (KA6-E wings on a Kestrel). (6) Bob Boucher makes a last minute adjustment to brother Roland's Monterey. They kit this fine model under the Astro Flight name. (7) Fast-Trash, Rick Walter's new modification to White Trash, cleaned up in the Mile Speed event. (8) Gloria Mills of the Albuquerque Radio Soaring Enthusiasts (she's an ARSE!) holds Paul Denson's Avian, a new Pierce Arrow kit.

Another innovation prevailed this year—Open Flight Order: pilots may fly at any time, subject to frequency, winch availability and Flightmaster clearance. Furthermore, the pilot declares his task before 60 sec. have elapsed, from time of towline release.

LSF did not furnish stop watches or timers. Each contestant furnished both. However, the contestant had to utilize the services of six different timers, each a registered contestant. The pilots had to complete three official flights Saturday in order to be eligible for competition on Sunday.

All right, you are ready to fly. You know there is a thermal just waiting for you at the end of the runway. You have put your plane in the ready-box area, and have moved up, until you are now the proud possessor of the frequency flag. You pick up your plane, take your score card and the frequency flag to the Flightmaster (usually Le Gray), and he initials your card. You give it to your timer who, with the frequency flag, retrieves your transmitter. Next you go to the flight line, find the Winchmaster, and he initials your card, then points you to an appropriate winch. The next part is up to you. If you get a beautiful launch, go for the mile—it is all downhill. If the launch was a bust, go for the two-min. precision. Astoundingly, it worked that smoothly at the contest.

On Saturday, the morning wind was fairly quiet, and most of the fellows used their flights to zero-in on Precision Time. Not long after noon, the prevailing westerlies sprang up, and the boys brought out the "mooses"—Kestrel 19s, ASW 17s, ASW 15s and KA6Es (big monsters, some weighing as much as 10½ lb.). The heavies were checked and weighed in accordance with the FAI and AMA limit of 11+ lb. It was predicted, before the match, that any plane that couldn't handle from 8-10 lb. on a winch had better stay home. When these planes came off the 12 volt winch, they zoomed through the upwind gate, turned and came across the launch area with a mean whistle. Then down the field 2000 ft. more to the downwind gate, another quick turn and back to the finish line.

John Baxter's Kestrel, with KA6E wings, completed the course in 1:34. A few minutes later, Rick Walters burned up the air with a 1:37, flying his modified White-Trash. As things settled down, a 2:00 for the measured mile became a generally accepted thing. By the 5:00 p.m. winch shutdown, all of the

(Continued on page 99)

Tournament

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A LOOK AT THE COCKPITS FOR THE SPORT FLYER WHO EXPECTS QUALITY AND DEPENDABILITY IN 1974

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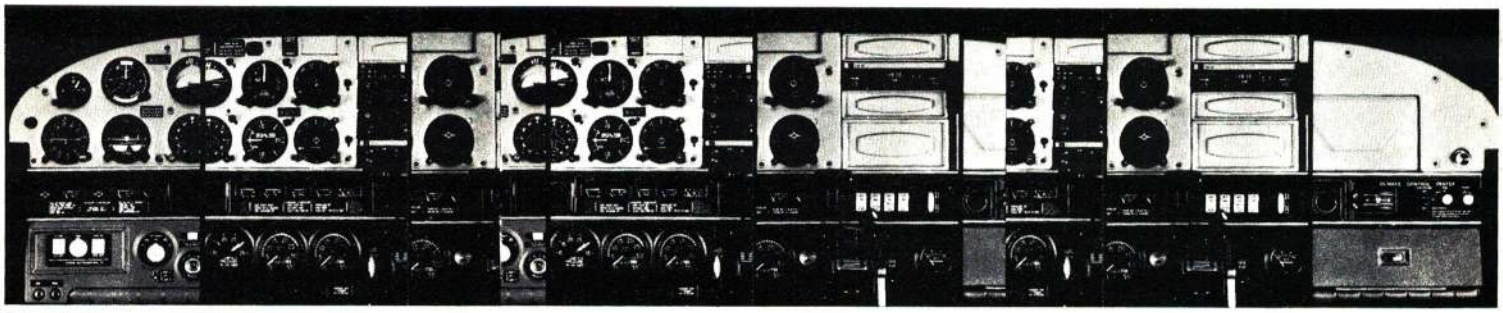

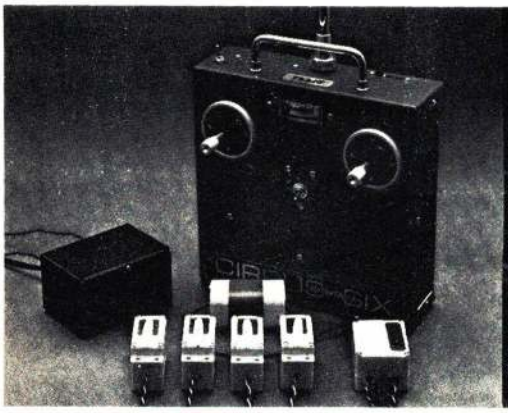

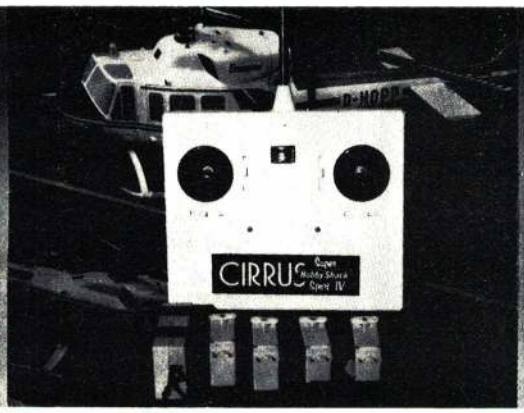

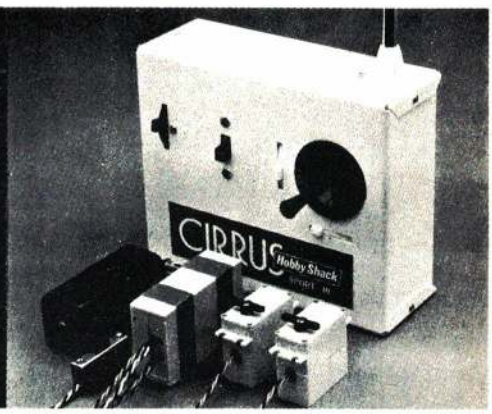

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.15 Radio control	$29.95	$23.88
.15 Standard	$18.88	$18.88
.15 TBR CompetitionDiesel	$34.95	$25.99
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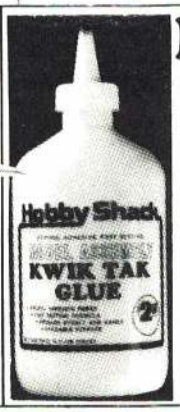

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Quality die-cut balsa and ply.

46" wing span
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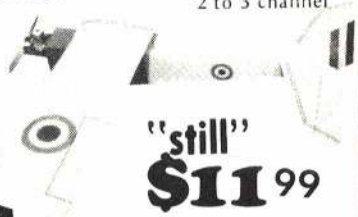
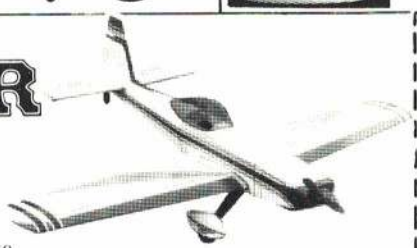
.049 to .10
2 to 3 channel



"still" **$11.99**

SPINKS ACROMASTER



8% means a lot to us !

When we decided to kit the Spinks, we felt that we had the best .40 size model kits on the American market. The subject was excellent (if we say so ourselves), the kit design is excellent, in the way it was built and the performance in the air, a real delight. After shipping one heck of a lot of the Spinks kits, I would estimate that we have had about an 8% feedback that was not, shall we say complimentary. Now to put this in the proper light, we got a whole lot more letters telling us that they loved the kit and the way it flew than those letters telling us what they expected.

Well, all I can state to you is that 8% means a lot to us. So we listened to those who had suggestions and we have revised the kit to make a good one even better. Many felt that we should have had more hardware. So we added motor mounts, a tail bracket, aileron strip horns, hinges, and horns. Of course the beautifully molded scale type canopy and aluminum landing gear is still in the kit. Many thought that perhaps we should have had a better description as to how to build foam wings. We lacked a bit here, for we didn't realize that so many novices were going to build this kits as we advertised it as a truly outstanding first low winger, as a transition from the high wing trainers, so we now have a seperate instruction sheet on foam wing 'skinning'. Next WE didn't care for the plans although I can't recall anyone saying anything about them. We took the initive here and had them completely redone, and improved them greatly in our opinion.

Okay, you 8% out there, because of you letting us know how to make this kit better, we did just that! Now everyone benefits. After doing all this at, of course, a much higher price for us to kit than before not even counting that balsa prices have gone up, we will lower the price for awhile: RETAIL $45.00 / Normally sold at $32.88, . . . SAVE AN X-TRA 10% !

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ON THE SCENE

HEY MISTER, YOU'VE GOT THE WING ON CROOKED!!

ASYMMETRIC MODEL AIRPLANE CONTEST.

by Bob Meuser

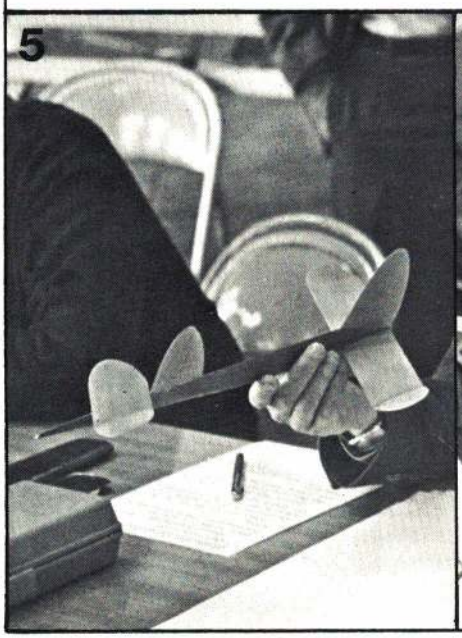
Last year, NASA announced a proposal for a new kind of swing-wing configuration for an SST. Instead of each wing panel swinging about a hinge situated near the fuselage, the entire wing pivots about a single hinge at the center. The new concept, invented by NASA aerodynamicist Dr. Robert T. Jones, assures low wave drag at supersonic speeds when the wing is angled, high lift for low landing speed, efficient subsonic flight when the wing is straight, and a minimum of structural difficulties.

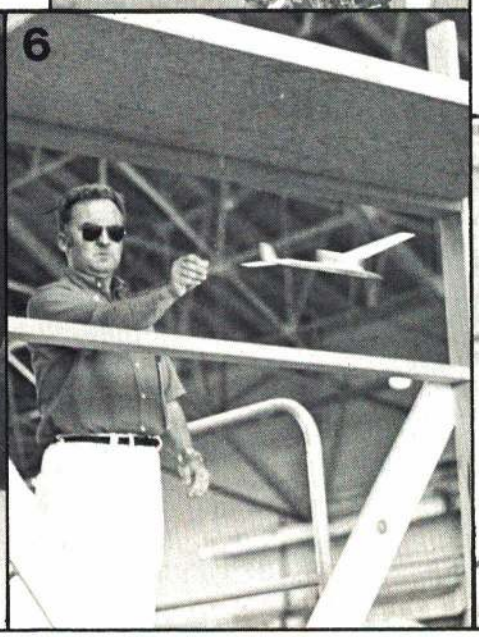
To draw attention to the NASA proposal, the San Francisco section of the American Institute of Aeronautics and Astronautics, in cooperation with the NASA Ames Research Center, sponsored what must have been the craziest hand-launch glider contest ever. Models had to be asymmetrical and were limited to a wing area of 30 sq. in.

Scoring was divided into three categories: Distance, Design and Duration. The Design category models were judged for practicality in terms of an SST, originality and craftsmanship. Distance and Duration scores were multiplied by a factor ranging from 50 to 100 percent based on degree of asymmetry. For the Distance contest, models were thrown through a "window" 10 ft. a-

(Continued on page 83)

(1) Sliding their slip-sticks are Judges Hank Cole and George Xenakis determining an entrant's "degree-of-asymmetry" score. (2) Steve Geraghty's model was pronounced the most asymmetrical model, but not much of an SST. (3) Author Bob Meuser simply cut out the wing center section to gain an asymmetrical configuration, but flight trim was super critical because of small amount of dihedral. (4) A skewed wing model was flown by the youngest contestant, Tommy Snellentrop. (5) High fins make up for lack of dihedral. Although a good performer, judges didn't see it as an SST possibility. (6) Steve Geraghty tosses his ultra-asymmetric glider through the "window" for a Distance category flight. Board above prevents upward launches. (7) Bill Vanderbeek's high-aspect-ratio model easily won the Distance category event. The wing and tail units are skewed on the fuselage; in flight, it must look like it's going sideways.





LEFT = RIGHT

UP = DOWN

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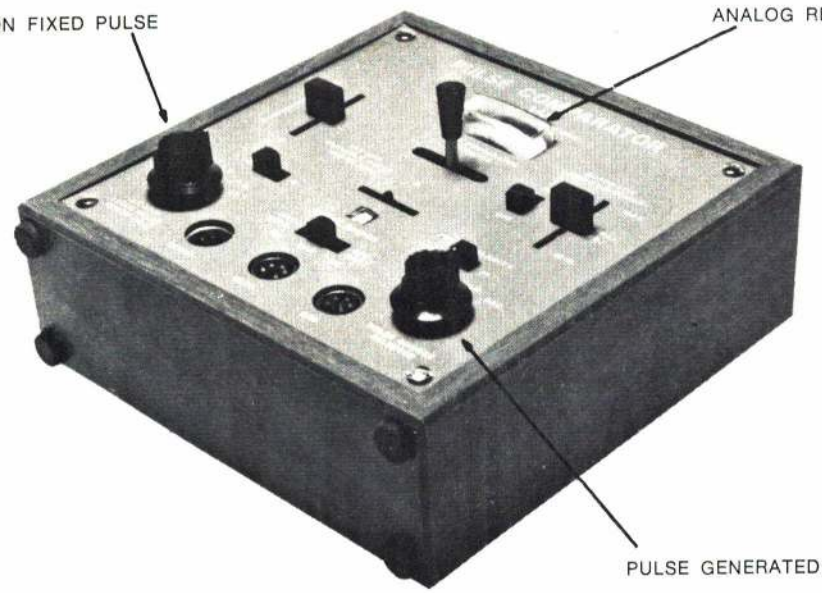
FOR PRECISION TESTING OF YOUR COMPLETE RC SYSTEM



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Uplift

SHOWDOWN: Using a show to gain public support.

Fred Hagan, Jr., RC Club of Jacksonville

Sunday, April 1, 1973, was a sad day for the Jacksonville modeling community—it marked the closing of the abandoned Imeson Airport, previously used by modelers as a flying field. Expansion of the Imeson Industrial Park put too tight a squeeze on the remaining airport space to insure adequate safety, so now only one flying field remains available to the four clubs in the area. This city-owned site is adequate for those presently using the facility; it cannot, however, handle the influx of modelers formally using Imeson. Another flying field was urgently needed or local modeling would be in trouble. All efforts to acquire a new site, however, were hindered by the general public's lack of knowledge concerning model aviation. Consequently, The Radio Control Club of Jacksonville decided that promoting our hobby would be the best way to promote our club and ultimately help in acquiring a flying site.

Toward this end, we made arrangements to set up a static display on Saturday, March 31, at a local shopping center and to televise the last day of flying at Imeson Airport on Sunday, April 1.

Several weeks before the display, commitments were made for display tables, airplanes, workers, signs and literature. A past display analysis revealed several areas that were misjudged, but also showed the overwhelming success of the day. Being new at the publicity game, we overestimated the number of planes needed for interest and underestimated the number of workers required to handle the crowd. Twenty planes of all kinds were shown: Pattern, Fun-Fly, Scale, Seaplanes, Gliders, Quarter Midgets, and a Helicopter. We now believe 10 to 12 planes would have been adequate, as long as they spanned a wide range of interest. In addition to the static display, club members gave Mono-Kote demonstrations which were an instant success. We wish we had pursued more in this direction; we might have demonstrated the use of five-min. epoxy and other up-to-date techniques of model construction. This, we decided, would not only have attracted the crowds, but retained their interest longer.

Our signs were made by a professional sign painter. One was made to show the club name and one was painted for each plane, showing that plane's name. A sign which was missing but which is a must for future displays, is one stating, "Please Do Not Touch."

Business cards stating our club's name and the time and place of our meetings were printed and distributed, specifically for people who may want additional information at a later date. We also distributed the AMA publication, "Greater than Golf."

Crowd control was somewhat of a problem. Rope and stanchions were used to cordon off an area of the mall; the planes were set well behind the rope so that the public could not handle them. Even so, the crowd, in an effort to examine the planes, would press so close that the rope barrier would eventually wind up next to the models. Several times we had to reposition the rope and stanchions because of the crowd's enthusiasm.

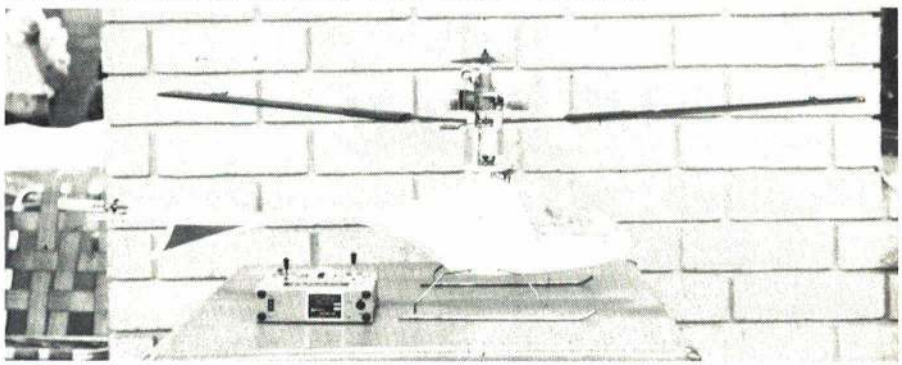
The question asked most often was, "How much do they cost?" Other questions ranged from, "How large is the largest you build?" to "Do all of them fly?" We also overheard several statements that began, "When I was a boy. . ." The scale military planes were of interest to the ex-military pilots. One

(Continued on page 82)

Always be prepared to answer any questions about modeling.

The use of such things as tripod stands increases visibility.

Dr. John Lane's helicopter. Specialty models always draw attention.



A good clean display means quite a lot in a shopping center.

Club member Roy Cosselman discusses RC with shoppers.

Great looking P-51 drew many glances.

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2 ND PRIZE MULTIPLEX-ROYAL!! The complete package with 6 CHANNEL TRANSMITTER, 6 servos, micro receiver and Multiplex-combilader. This unit has the new balljoint movable antenna which is removable for easy storage. I/C's are used throughout the encoder. All potentiometers are cermet types, resistors are metal film and special mention should be given to the transmitters 1000 mah nickel cadium batteries, which enable an operation of 8 hours without recharging. The MICRO RECEIVER is extremely small dimensioned (2 x 1.45 x 1.1 inches and a weight of 1.6 oz.) This compact design can be installed in the smallest model. Your MULTIPLEX ROYAL will give you years of trouble-free R/C enjoyment.

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3 RD PRIZE MULTIPLEX 4!! This is the complete package! A 4 channel transmitter with 4 servos has the same capabilities as the MULTIPLEX-ROYAL. This system can be expanded to use with cars & boats as well as AIRPLANES.

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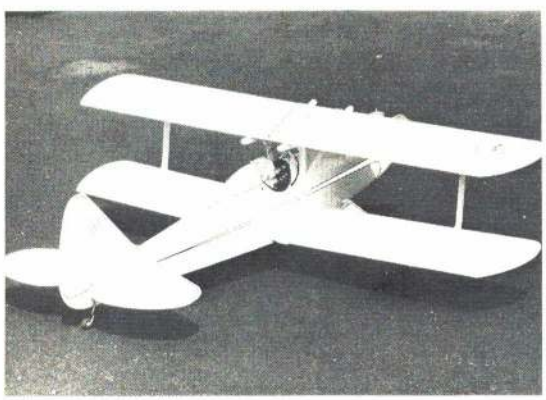
4 TH PRIZE The next 10 WINNERS will receive a WAYFARER KIT. These kits include all accessories that help make model building FUN!

CONTEST RULES:

1. Modeler must have BUILT-UP verified by DEALER from whom purchased.
2. Modeler must cut out and include 'MODE DE CONSTRUCTION' box on fuselage plans.
3. Modeler must include BLACK & WHITE and COLOR photos taken at all angles. Be sure to include as many photos as possible.
4. All entries must be addressed to TENCO INTERNATIONAL, P.O. BOX 1987, PALM SPRINGS, CA 92262, no later than May 31, 1974.

Judges will include staff members of R/C MODELER and ART GRISA (U.S. MANAGER, SVENSON SALES, TENCO INTERNATIONAL).

The winners will be announced at the MODELS & CRAFTS SHOW held in Anaheim, California the end of June 1974.



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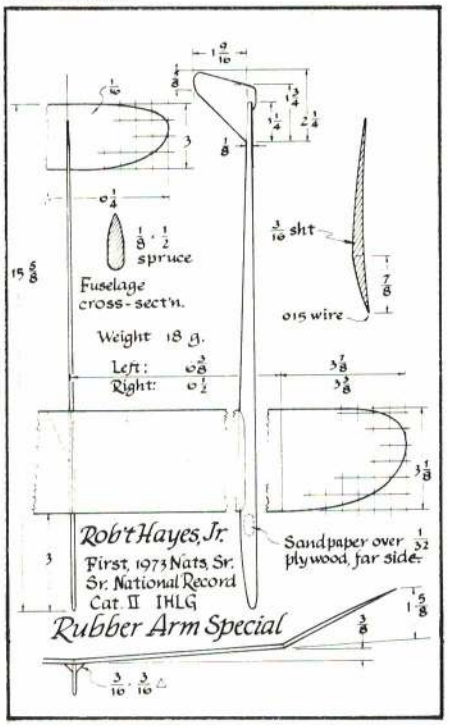
BOB MEUSER ON FF SPORT

Bob Hayes Sets IHLG Record: In the NATS story (November 1973 **AAM**) I told how 17-year-old Robert Hayes, Jr., won the Indoor Hand-Launch Glider event, Senior division, with a model of his own design: The Rubber-Arm Special. His winning two-flight total was 3.5 sec. short of Marty Thompson's National Record score of 127.2 sec. set at the 1971 NATS at the same place. Bob has built five new gliders since the NATS, and managed to disintegrate two of them in outdoor test flights.

New AMA IHLG Record by Bob Hayes, Jr. He flung his Rubber Arm into the rafters in the Washington Park Armory, and it landed 65.6 sec. later.

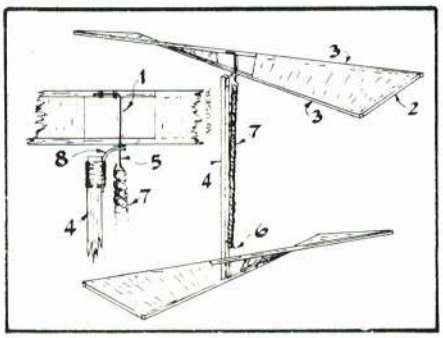


The Chicago Aeronuts meet on November 4, 1973, provided his first opportunity since the NATS to fly indoors. The first model he tried looked good in test flights, but the rudder was badly cracked by the time Bob finished adjusting it. Bob took the first four of his allowed nine flights with a second glider, the best of which was only 48 sec. By then Chuck Markos had already posted flights of 64.5 and 63.0 with a new Supersweep 22, setting a fast pace for Bob, although Chuck and Bob were competing in different age classes.

At this point, it was clear that Model No. 2 wasn't going to make the grade. Bob patched up the first one, and made flights of 62.1 and 64.3, which put him within 0.8 sec. of the record. His next flight—his seventh official one—made 63.4 sec., giving him the National Record by a scant 0.5 sec. Flight eight was the best of the day, 65.6 sec., giving him the record by 2.2 sec., a healthy margin by IHLG standards, where tenths of seconds come dearly.

The three-view was drawn from measurements I made on Bob's NATS winner one evening at the NATS while listening to Bob Senior's Oscar Peterson albums. The record-setting model has an even higher aspect ratio, as the span is two in. greater. Tail moment arm is 1/4" greater, the rudder is 1/4" taller and 1/8" wider, and the weight is up to 21.5 gm.

Mini-Copter: The little helicopter shown takes only an hour or two to build and requires only 11 pieces of wood. It will fly for a minute or two, depending on the weight of wood used. Bill Bigge showed John Thornhill how to build one in 1951, and John has built one every year or two ever since. If the model is to be flown in the living room, insert a pin in the center of the upper rotor to prevent the blade tips from striking the ceiling. Ultra-light helicopters of similar design have flown for over ten min.

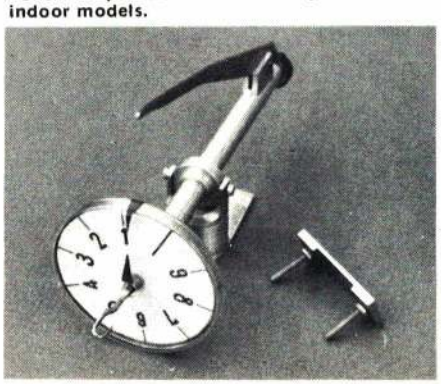


Bill Bigge, former record holder, has some interesting comments on designing and flying 'copters in the 1959-61 *Model Aeronautic Year Book* ($5 postpaid, Box 135, Northridge, Calif. 91324).

Torque Meter: While many still depend on counting turns and the "feel" of the rubber as it is wound, an increasing number of modelers use torque meters. The one shown in the photo, sent to Bud Romak from Poland, is specifically for indoor models. However, it has features that could be applied to higher torque loads as well. A clip is permanently mounted on the model box or some other convenient surface, and the foot of the meter slides under the clip. The torque meter proper is mounted in a gimbal, so that it is not necessary to keep aligned with the meter while winding. The vertical spindle of the gimbal is mounted in a pair of precision ball bearings—an unnecessary frill. The scale revolves under a fixed pointer—a great convenience.

Protection of the scale from an exploding rubber motor is provided by a vacuum-formed plastic cover. The far end of the torsion wire is anchored in a notched disc which appears to be ball-bearing mounted, and the release lever seats in the notch. Neat, eh? Now, why doesn't some American manufacturer make something like that? (Bob Wilder, are you paying attention?)

Polish torque meter is extremely efficient for indoor models.



CARL MARONEY ON RC

Major Changes Ahead: In November 1973, the East Coast Soaring Society's Board of Director's held an 11-hour meeting. Serious minded soaring leaders discussed the organization's growth, since its inception three years ago, and how it might tend to serve national soaring interests. The organization will undergo a name change this year, in order to delete the local connotations. Membership spans 43 States and 11 foreign countries.

Now, with the AMA rules official, ECSS will not use ECSS rules during the 1974 contest season.

Additionally, all RC clubs or soaring groups may now sponsor their soaring meets under the ECSS program, regardless of location. The sponsoring club selects from the official AMA rules what task or tasks it will run. Contestants have three classes of competition from which to select. Open Class is completely unlimited, allowing everything the mind can dream of for a glider in the way of control, size and gadgetry. Standard Class is for those designs of 100 in. or less, and is limited to rudder and elevator control only, (ruddervators included). Scale will be in accordance with the current RC Scale Sailplanes Provisional Rules, as published in the 1973 AMA Rule Book. The ECSS has adopted, and will foster, the LSF achievement program, since it provides recogniition of each individual's level of soaring skills.

We have new blood on board this year, serving as Directors: Paul Kelly, Dover, DE; Leo Weiss, Woodside, NY; Otto Heithecker, Royal Oak, MI (who, by the way would be named the Master Sailplane Pilot, if we had one, for 1973); Don Clark, Kensington, MD, and Ray Smith, Silver Spring, MD. Officers for 1974 are George Durney, President, Dover, DE; Leo Weiss, Vice President, Woodside, NY; Clive Sadler, Secretary, Dover, DE; and Jack Alderson, Treasure, Newark, DE. Serving for another year as Editor for the organization's monthly journal *SAILPLANE* is yours truly. It appears that 1974 will be remembered as the year of national soaring unity through the development of a nationally recognized body.

'74 INTERNATS: The AMA will sponsor an International Soaring Meet at Lakehurst Naval Air Station, New Jersey, on August 5, 6 and 7. The meet will be organized and run by the ECSS. Rules for the contest will be the '74 FAI rules, Series A. The U.S. will be represented by a 10-man team as follows:

Three From
1973 LSF Tournament
Andre Faure
Kelly Pike
Frank Finney

Three From 1973
Soaring NATS
Jeff Mrlik
Mark Smith
Otto Heithecker

Four From 1973 ECSS
Grand Championships
Otto Heithecker
Keith Finkenbiner
Jerry Mrlik
Don Goughnour

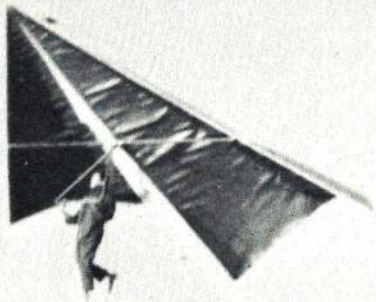
Alternates
1st Rick Walters (LSF)
2nd Rick Lederman (NATS)
3rd Richard Tanis (ECSS)
4th Ken Willard (LSF)
5th Tom Kelly (NATS)
6th George Durney (ECSS)

Note: Since Heithecker's ranking placed him twice in the team selection, the first alternate moves up to complete the U.S. team.

'74 SOARING NATS: The 1974 Soaring NATS will be hosted by the Silent Order of Aeromodeling by Radio (SOAR). The meet site will be at Lewis College, Lockport, Illinois, and the contest dates will be July 22,

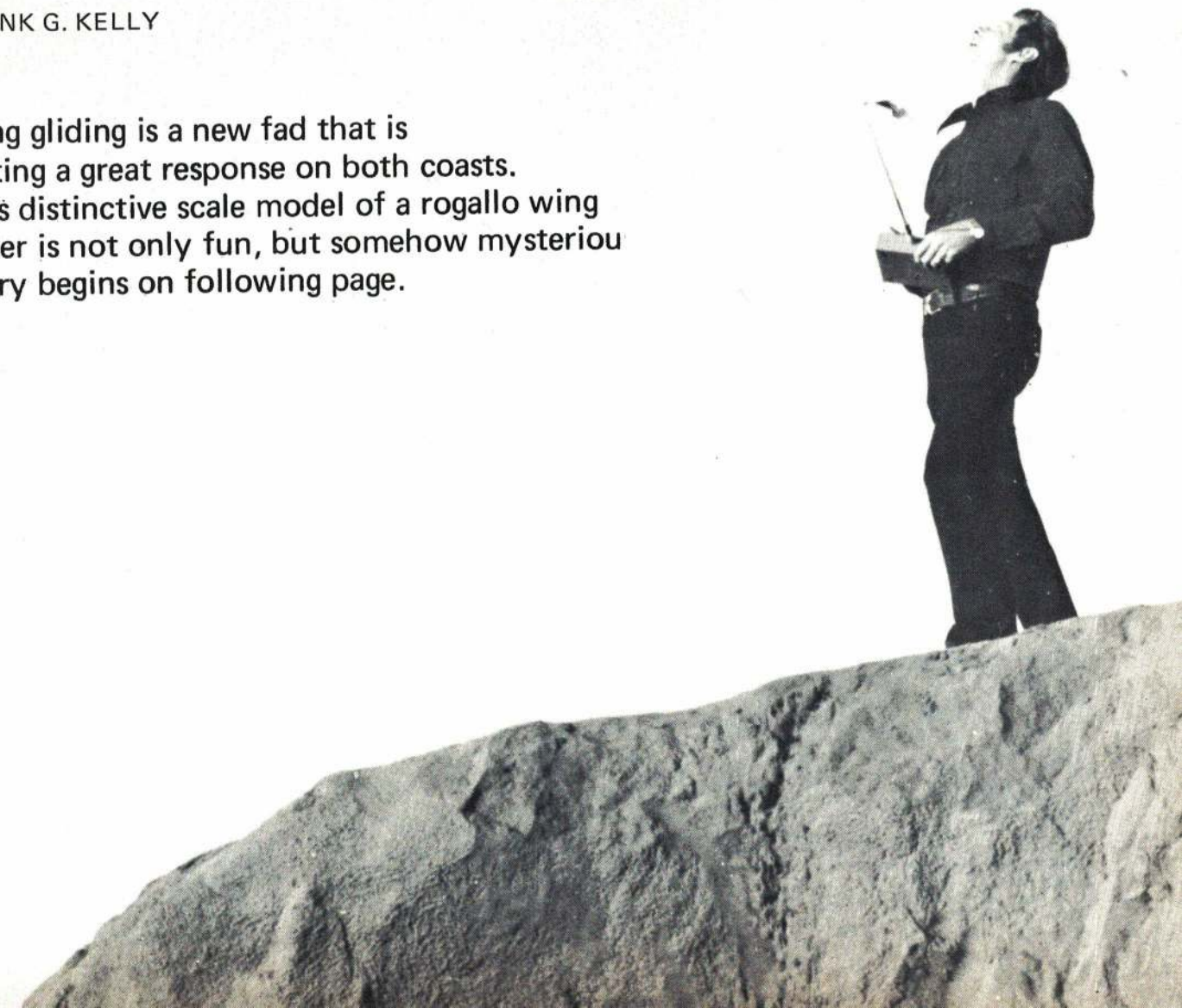
(Continued on page 97)

FLEXI-FLIER

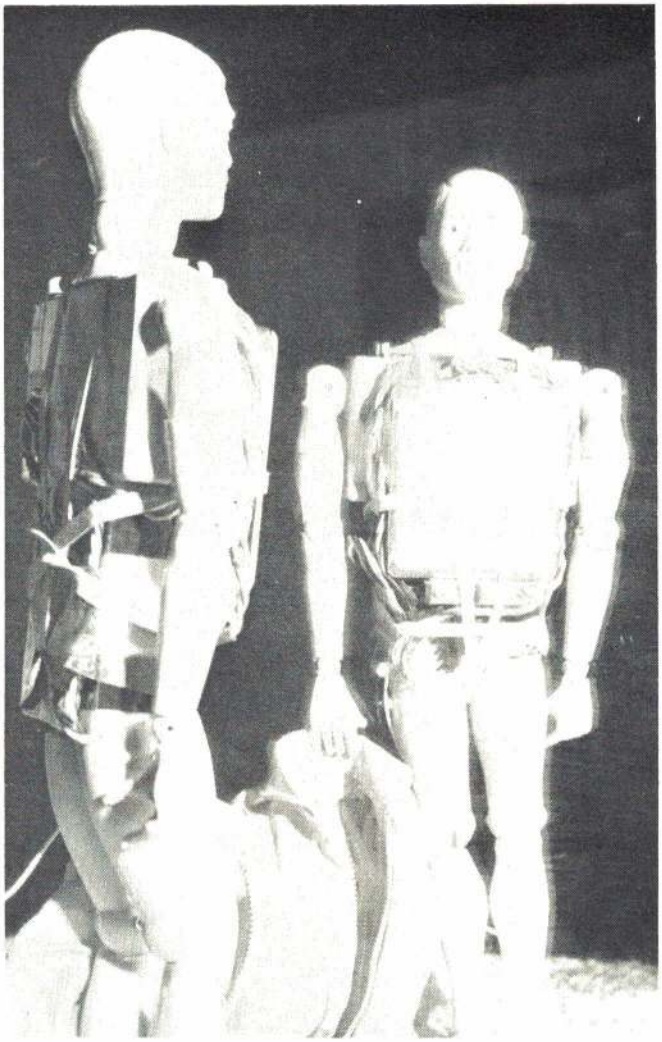


FRANK G. KELLY

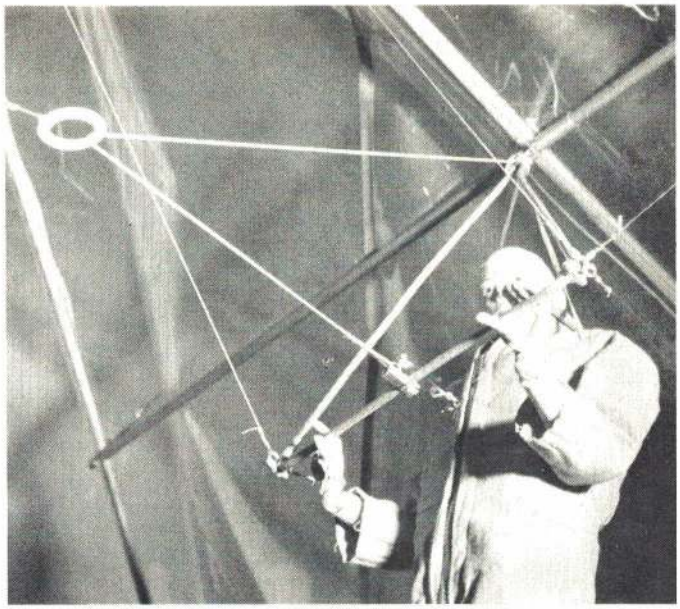
Hang gliding is a new fad that is
getting a great response on both coasts.
This distinctive scale model of a rogallo wing
glider is not only fun, but somehow mysteriou
Story begins on following page.



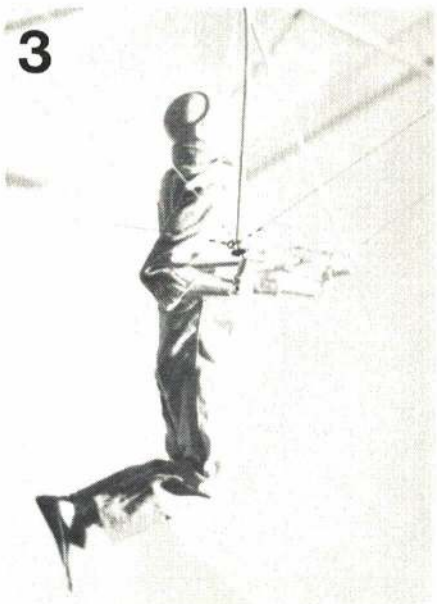
Flexi-Flier



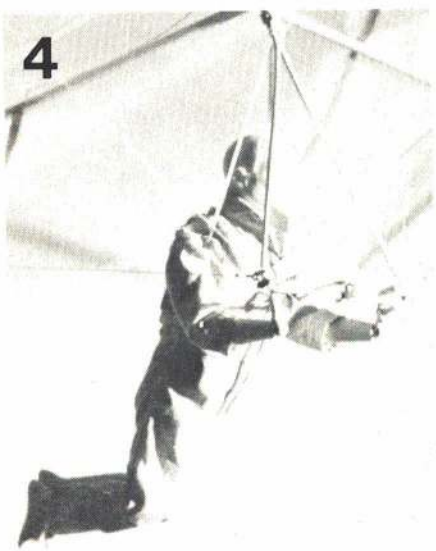
The mannequin doll looks like a robot from science fiction as he admires his electronic innards in a mirror. Even with KPS-10 size servos, there is adequate room inside the chest for a complete flight package.



ABOVE: The doll in position on his hang bar, amid a maze of rigging. Tow hook release bridle is shown here. GI Joe is also available with a beard. BELOW: GI Joe takes a hop aboard his Flexi-Flier. Note that the author holds the transmitter at a 45° angle, a clever way to get elevon control. Watch that you don't detune the signal by accidentally grounding the antenna with your hand. (Photo by Jerry Trager)



The mini-man does his thing. Control inputs should find the doll in each of the positions shown: photo No. 1, neutral; 2, left turn; 3, right turn; 4, up elevator; 5, down elevator. It's a real marvel just to watch the mechanical man do tricks.



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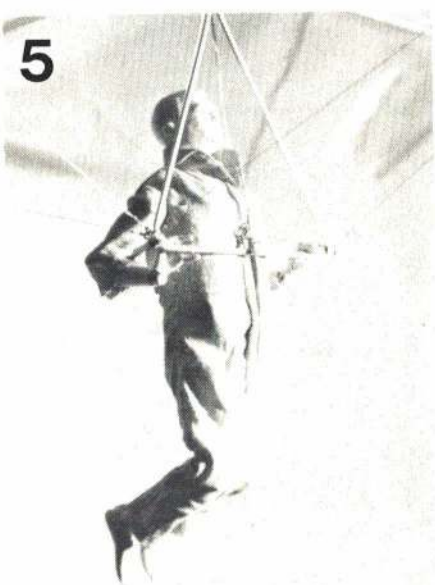


5

I first became aware of hang gliders in their present form when I met Bill Moyes. While experimenting with a rogallo wing as a potential sidelight to his Australian water ski exhibitions, Bill discovered that he had broken the altitude records for such things. Perhaps more significant, he found that the rogallo wing ski-kite was a stable aircraft with the line slack or disconnected. The conventional water ski-kite is in no way stable with a slack line. When Bill showed the movie of himself jumping off the south rim of the Grand Canyon for a nine-min. flight to the river, I knew I was hooked! On another occasion, he was towed to 10,000 ft. by an airplane, then he released himself to glide back.

During the past year or so, hundreds of young people in the Los Angeles area have assembled hang gliders, mostly the products of available hardware. Some are frightening creations of bamboo, clothesline and garbage bags; others are very professional, made of the proper kind of aluminum tubing, stainless steel cable, and rip-stop dacron.

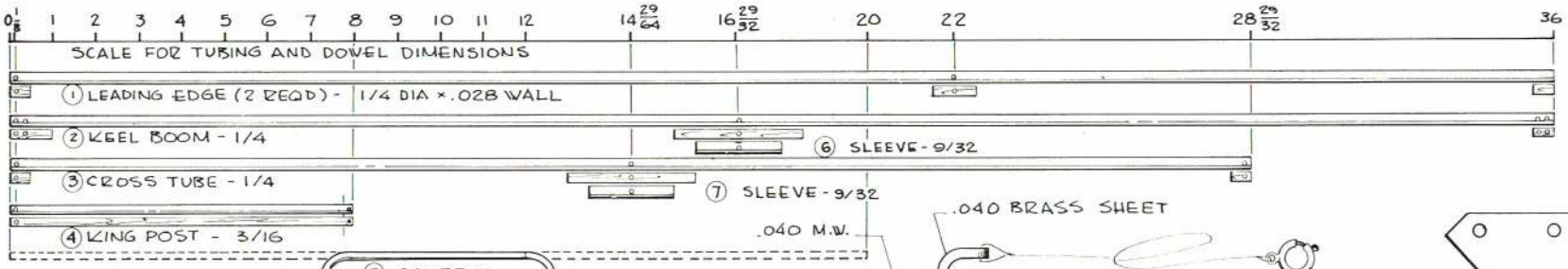
The one modeled here is a nearly exact 1/6 scale "Flexi-Flier," a popular contemporary design by Dick Eipper. (If you want to build a full-size glider, get a set of plans from him. DO NOT scale the model plans up. Parts and materials must be carefully selected to avoid disaster!) Dave Cosgrove recently flew one (full-size) continuously for over *two hours* in unusually favorable conditions near Palmdale!

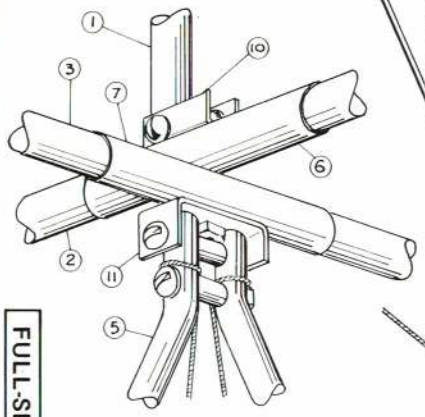
The model, like the prototype, has a primitive but interesting and effective control system. Pitching and turning is done by shifting the center of gravity by means of body english. The pilot is suspended from a harness or swing seat, and the control bar provides something to push against. The model is equipped with only two muscles, so the body is suspended from a string leading under the arms and around the back. This worked out much better than any of the more scale versions, and does not detract from the appearance. It is interesting to note, if only for academic interest, that this control system is effective at zero velocity. Ponder that during your next hammerhead stall.

Now ponder this: Two rotary servos operate the two arms. BOTH must move for each direction. To pitch up, move BOTH arms forward to cause the body to move back. To pitch down, move BOTH arms the other way. To turn right, move RIGHT arm back and LEFT arm forward (try this while holding onto an imaginary towel bar).

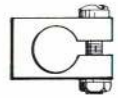
To effect this complex set of motions, simply rotate the transmitter 45°. This way the aileron/elevator stick operates in a normal manner: "forward" moves both servos in such a way that the model responds appropriately. Right stick turns right, etc., and after just a few min., the controls feel quite natural. The same system could be used for a V-tail airplane with NO extra linkage! The completed glider weighs just eight oz., after his extensive transplant. GI Joe weighs one lb.

(Continued on page 78)

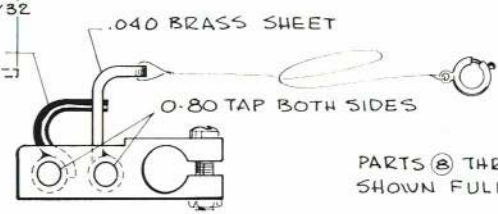




DETAIL A



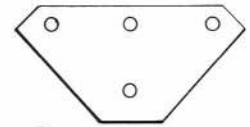
⑫ CONTROL BAR CORNER FITTING 2 REQD - 5/32 SQ. BRASS TUBING (2x SIZE)



⑬ TOW HOOK RELEASE (OPTIONAL) - 5/32 SQ. BR. TUBING - 2x SIZE
• FIT BOTH PARTS TO MOVE FREELY

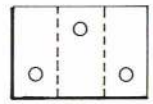
PARTS ⑧ THRU ⑪ SHOWN FULL SIZE.

PARTS ⑨ THRU ⑪ .020 STAINLESS SHT.

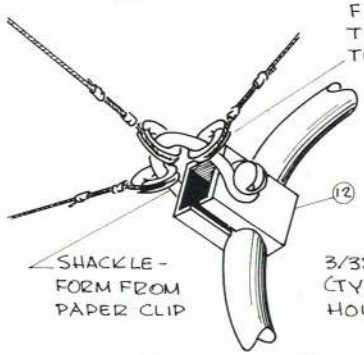


⑨ HINGE PLATES 2 REQD

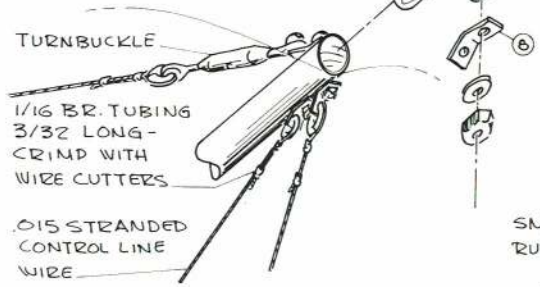
⑩ KING POST FITTING



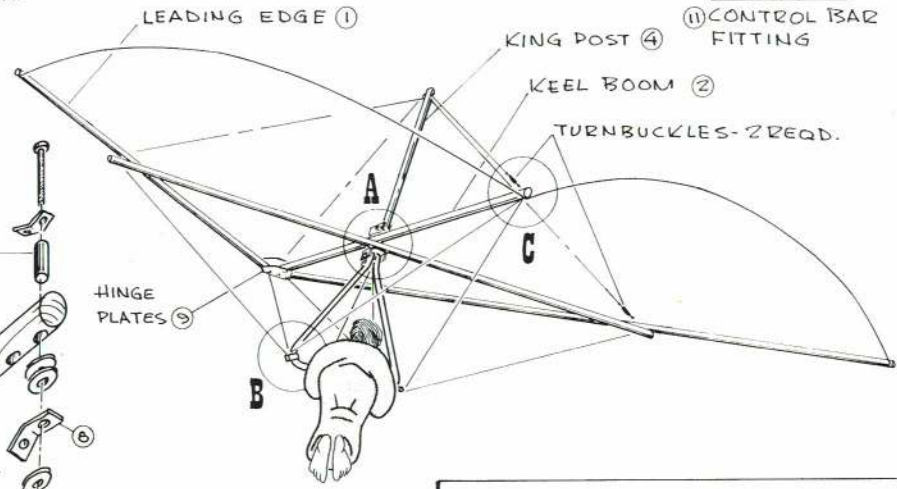
⑪ CONTROL BAR FITTING

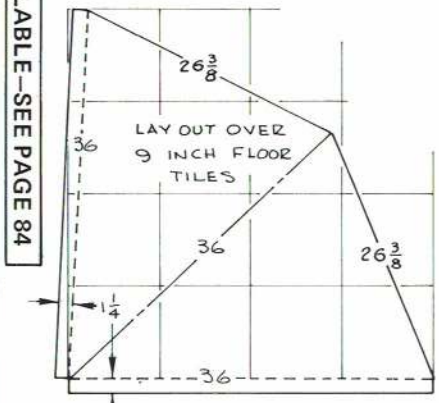


DETAIL B



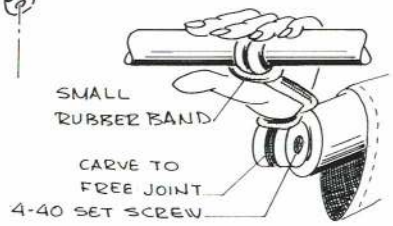
DETAIL C





SAIL PLAN

MOUNT WITH DOUBLE BACK TAPE:



HAND DETAIL

FULL-SIZE PLANS AVAILABLE—SEE PAGE 84

DICK EIPPER'S

FLEXI FLIER

R/C SCALE ROGALLO HANG GLIDER

DESIGNED AND DRAWN BY

Frank Kelly 26 DECEMBER 1972

Du-Bro "HUGHES 300" semi-scale, R/C HELICOPTER

RADIO CONTROLLED MODEL HELICOPTER KIT

COMPLETE O & R 1.34 CU. IN. GLO FUEL ENGINE, GEAR BOX, AND INERTIA CLUTCH . . . ENTIRE UNIT READY TO BOLT ON

SPECIFICATIONS H-300

OVER ALL DIMENSIONS
LENGTH 59½" . . . WIDTH OF MACHINE AT SKIDS 16" . . . WIDTH OF PASSENGER COMPARTMENT 8" . . . HEIGHT 22½".

PREFORMED PARTS
PASSENGER SEATS . . . INSTRUMENT CONSOLE . . . MANY STEEL, ALUMINUM AND BRASS COMPONENTS ALL CAREFULLY MACHINED OR PRE-FORMED, READY TO BOLT TOGETHER . . . CLEAR PLASTIC CANOPY . . . ONE PIECE AIRCRAFT PLYWOOD SIDE FRAMES FOR THE FUSELAGE UNIT.

ENGINE
O & R 134 CUBIC INCH DISPLACEMENT . . . CUSTOMIZED FOR GLO FUEL BY DU-BRO PRODUCTS . . . SPECIAL R/C CARBURETOR DESIGNED AND MANUFACTURED BY DU-BRO PRODUCTS . . . USES REGULAR R/C GLO PLUGS . . . PULL STARTER BUILT IN . . . GEAR BOX AND CLUTCH ARE ALL ONE UNIT, READY TO BOLT IN PLACE . . . FUEL TANK SUSPENSION BRACKETS ARE DESIGNED TO CARRY A SULLIVAN 12 OZ. SS12 PLASTIC TANK (INSTALLATION OF LARGER TANKS EASY TO DO BY THE INDIVIDUAL OWNER.)

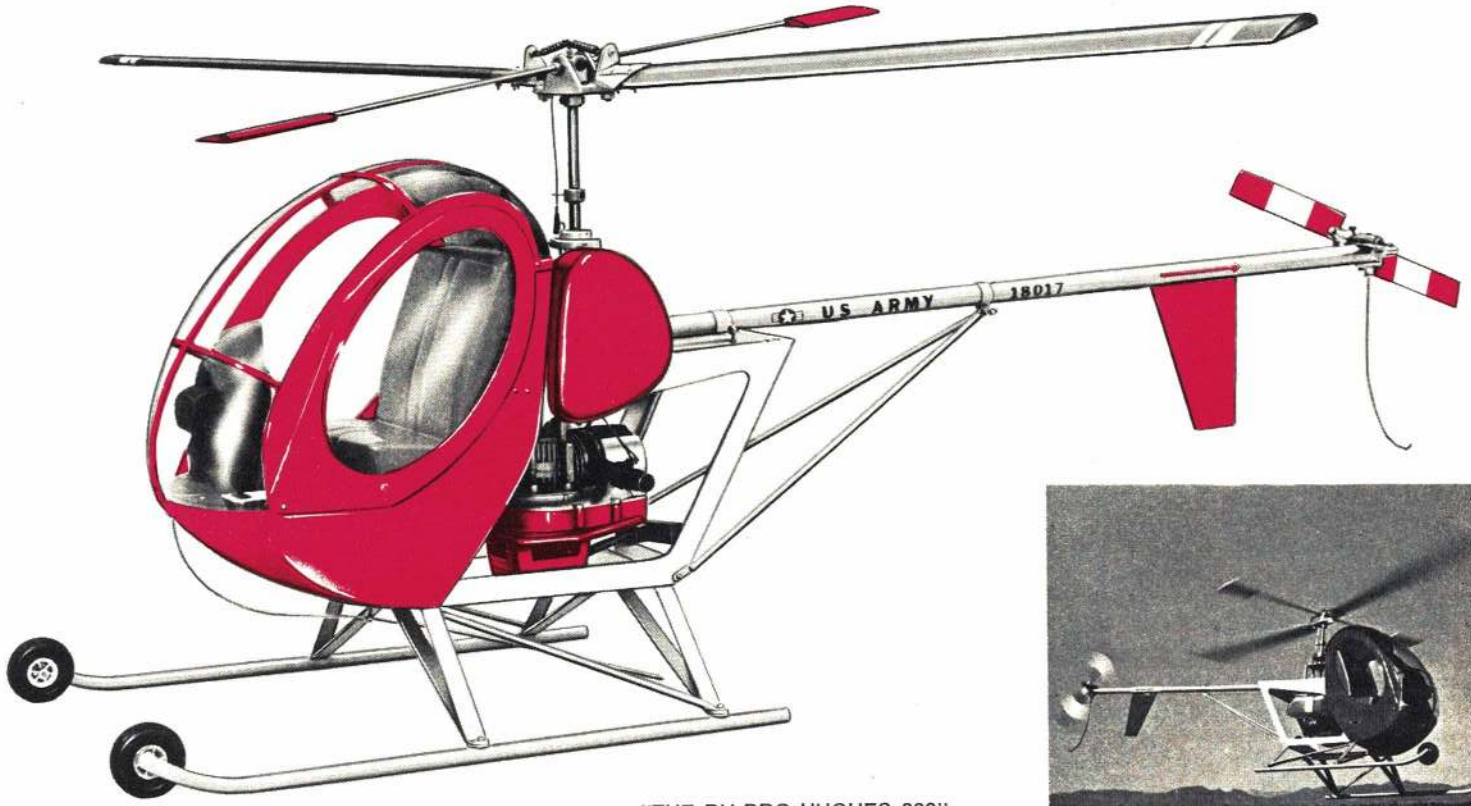
MAIN ROTOR (SHAPED)
BASS WOOD . . . SPAN 57¼" . . . CHORD 2" . . . AIRFOIL, HIGH LIFT SECTION . . . HILLER TYPE SEMI-RIGID ROTOR.

TAIL ROTOR (SHAPED)
BASS WOOD . . . DIAMETER 12½" . . . CHORD 1 3/16"

FLY BAR
STEEL ROD . . . SPAN 28½" FLY BAR WEIGHTS, EXTRUDED ALUMINUM, AIR FOIL SECTION.

WEIGHT
FLYING WEIGHT WITH FULL TANK APPROX. 14 POUNDS.

PERFORMANCE DATA
TOP SPEED FORWARD ESTIMATED AT 70 MPH . . . PROPERLY TRIMMED, WILL FLY HANDS OFF . . . ALTITUDE, OUT OF SIGHT . . . CLIMBING STALLED TURNS . . . STEADY HOVERING . . . EXCELLENT CONTROL ON VERTICAL RISE OR DESCENT 360° TURNS HOVERING OVER ONE SPOT . . . FLIES FORWARD, BACKWARD OR SIDEWAYS . . . HAS BEEN FLOWN WELL IN 40 MPH WIND GUSTS.



"THE DU-BRO HUGHES 300"

CAN YOU PICTURE A RADIO CONTROLLED FOURTEEN POUND FLYING HELICOPTER MODEL THAT DIVES, ZOOMS, DOES STALL TURNS, VERTICAL BANKS, SNAP TAIL TURNS, FLIES FORWARDS OR BACKWARDS, OR SIDE TO SIDE, CAN RISE AND HOVER OVER ONE SPOT? AN AIRCRAFT POSSESSING SO MANY REFINED DESIGN FEATURES IT'S A PLEASURE JUST TO LOOK AT IT.

ADVANCED R/C MODELERS AND FLYERS CAN NOW OWN SUCH AN OUTSTANDING AIRCRAFT . . . "THE DU-BRO HUGHES 300" HAS ALL OF THESE FINE PERFORMANCE FEATURES PLUS DESIGN AND MANUFACTURING QUALITIES THAT ARE THE ULTIMATE IN THE ART AS IT STANDS TODAY . . . THIS BEAUTIFUL MACHINE IS A "BOLT TOGETHER" ASSEMBLY WHICH, OF COURSE, MEANS MAINTENANCE, REPAIRS OR PARTS REPLACEMENT CAN BE ACCOMPLISHED WITH EASE . . . AN OVERSIZED UNDER CARRIAGE AND "LANDING SKID ASSEMBLY KIT" IS ALSO AVAILABLE FOR TRAINING R/C PILOTS JUST GETTING INTO THE CHALLENGING AND FASCINATING SPORT OF R/C MODEL HELICOPTER FLYING $350

designed and manufactured by **DU-BRO PRODUCTS INCORPORATED** wauconda, illinois 60084 u.s.a.

*RADIO EQUIPMENT . . . EPOXY . . . FUEL TANK . . . GLO PLUG . . . 225T WHEELS AND DECORATING MATERIALS NOT INCLUDED WITH KIT

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

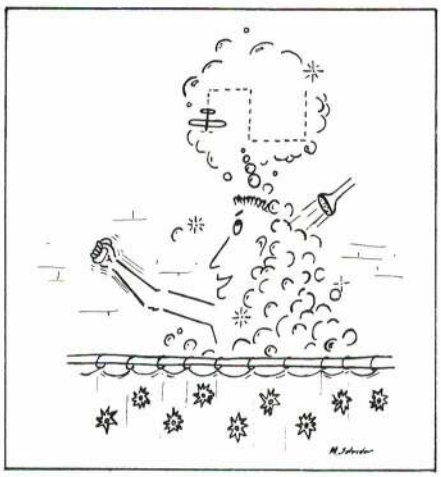
MAIL ORDERS F.O.B. FACTORY

A Beginner's Guide To Contest Flying

Secrets revealed! You too can step into the winners' circle. / by Mike Agnanoff

After learning to fly, many novices get the urge to try their hand at contest flying. However, since they are, after all beginners, what they see as contest spectators is sketchy and incomplete. They probably grasp only the overt and apparent in each event, and cannot perceive the factors that separate the winners from the also-rans. The purpose of this article is to reveal some of the inner secrets that only the true devotees of the events at model contests know. If the beginner follows these tips, he too can be a winner.

Illustrations by Miguel Salvador



STUNT: Practice the pattern continually—even when you're not out flying. . .

STUNT: Be neat. Be immaculate. Never allow castor oil to touch you or your clothes or your airplane. Be a fanatic. Practice the pattern continually—even when you're not out flying. Do Square Eights with your dinner fork on the way to your mouth. Get a divorce. Practice ballet. Develop detents in your shoulder muscles at 0°, 45° and 90° elevation. Be able to recognize the sound of a Fox 35 at 200 yards. Like mufflers, instant lettering, and rubbing compound. Dislike Combat fliers, Carrier fliers, Rat Race fliers, Speed fliers, Sport fliers, RC fliers, Free Flight fliers, Indoor fliers, dogs and kids. When asked, be able to recite the names, weights and moment arms of the winning planes (and their pilots) of Open Stunt at the NATS for the last ten years.

SPEED: Walk around with a tach in your pocket at all times. Also have the cord of your stopwatch grafted to your neck. Be able to play "Yankee Doodle" in at least three different keys on a tuned pipe by manipulating the needle valve. Add nitromethane in large quantities to your fuel, your beer and your household detergent. Use technical sounding words like "revs" and "pan," as often as possible. Call your engine a "mill." Be unfamiliar with such terms as "bellcrank," "canopy," "landing gear" and "maneuver." Worship Wisniewski as a minor deity. Practice the following exercises at least an hour a day:

(1) Lean backwards at 45° and spin madly at 50 rpm, with feet never moving more than eight in. from one spot, while rapidly pumping a monoline handle up and down.

(2) Wind an inertia starter to 10,000 rpm in four sec. If you fly FAI speed, be able to speak fluent Polish, Russian, Italian, Rumanian and Latvian, and be able to convert from mph to kilometers per hour instantly. Obtain your PhD in chemistry and complete 10 years as an experimental machinist before you enter your first contest.

CARRIER: Make sure your engine has at least six adjustments for a proper idle. Be certain it won't idle after you make them. Be able to wipe at least four oz. of castor oil off your plane after each flight. Be able to wring at least four qt. of castor oil out of your clothes after each day's flying. Quote your plane's performance in sec., not mph. Either wear custom tailored ear muffs or be deaf. Become familiar with the life and works of Rube Goldberg. Make your landing gear extend at least 18 in. in front of your propellor. Be able to explain convincingly to Navy judges how a vertical downward approach at 65 mph terminating in a horrendous splat wherein the hook, wheels, prop and rudder are all inextricably entangled in six arresting lines is a "normal" three-point arrested landing." Learn how to make hand signals while holding a Roberts handle in two hands.

COMBAT: Be able to score a match under any circumstances.

COMBAT: Be at least 6' 3" and speak with a drawl. Be a sadist. Be a trained killer. Former membership in the SS or a Kamakazie squadron is definitely an asset. Obtain an AMA number that begins with "00." Become adept at removing pieces of crepe paper, balsa wood and macadam from the intake of your engine. When your local druggist, who knows you to be unmarried, asks why you want a dozen baby pacifiers, have at least three plausible answers ready to use. Turn your workshop into a fully automated assembly line. Carve notches in your control handle to count your victories; carve notches in your opponent to count your losses. Click your heels a lot. Be able to figure out how to score a match wherein both you and your opponent crash simultaneously. . .in a line entanglement. . .after a mid-air collision. . .which was preceded immediately by double kill. . .after the five-minute flight period was over. . .because neither of you were airborne before the end of the five-minute flight period. . .and it turns out that you weren't even supposed to fly each other. Permissible comments: "Death before dishonor!" "Gotcha!" "@&!!?[+†%*!!" Impermissible comment: "Well, I guess the judge knows what he's talking about."

FAI TEAM RACE: Go to Oxford. Wear striped morning pants and spats to the field. Learn how to play "Rule Brittania" on a tuned pipe by manipulating the needle valve. Say things like "Rawthah!" and "Ripping good show!" and "My word, a. . .(sneer). . .glow plug!" Never consider an engine a true engine unless it has a contra-piston. Call your pit man "Weatherby" and say he is a fine product of European engineering. Learn how to start a diesel. Learn how to adjust a diesel. Learn how to splint and bandage a broken right index finger.

AMA TEAM RACE: Nobody flies AMA team race.

BALLOON BUST (or DIVE BOMBING & STRAFING or DEMOLITION DERBY or whatever you want to call it): Build a plane out of solid titanium. Never fly anything in a Balloon Bust event that is under eight years old and has had less than four partial recovering jobs (all in different colors). Become familiar with at least 14 different sets of rules for the event. Try to find a contest that flies according to AMA rules. (This is not manditory, considering the scarcity of such contests; however, it is a definite plus if you do.) If you fly Balloon Bust strictly as a second event, use an old plane from your primary event, particularly if your main event is Scale or Speed. (????!) If you don't have a primary event, get one. Learn six colorful, uncomplimentary things to say to your line-up man when he lines the balloons dead even with your line connectors. Al-

(Continued on page 106)

GREAT THINGS ARE COMING FROM AHM

ACADEMY LINE

Kwik-Cote: The new plastic material covering for all types of model airplanes. It's stronger, more durable, and best of all; Kwik-Cote has a high degree of flexibility . . . which means it is not brittle and therefore Kwik-Cote is highly resistant to shattering. In addition Kwik-Cote requires relatively low temperature for adhering to balsa or foam models. Kwik-Cote can be taken around complex curves without wrinkles appearing, it has a 40% shrink factor.

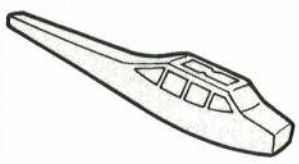
SAVE $1.00

SAVE $1.00

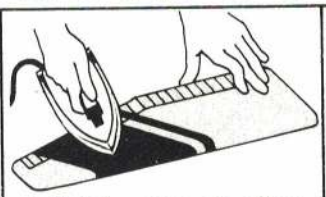
As a special introductory offer, this coupon is worth $1.00 off the $7.98 list price of Kwik-Cote at all cooperating hobby shops. This coupon is good only until May 1,1974. Only one coupon good per sheet of material purchased. This coupon has no redeemable value by the retailer.

AHM

KWIK-COTE COVERS BETTER...



Kwik-Cote colors are opaque . . . covers balsa grain and foam completely.

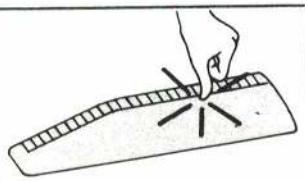


Kwik-Cote stays in place easily when applying one coat over another.

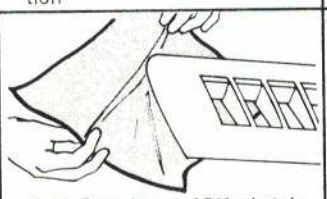
Kwik-Cote can be sprayed or painted with standard fuel-proof paints, after prepara tion

Kwik-Cote colors are opaque —light colors can be used over darker colors, without colors showing through.

Kwik-Cote is stronger than any normal balsa construction. In fact, construction will break before Kwik-Cote will.



Kwik-Cote's strength is such that on direct pressure, you will smash any normal balsa wood structure, before you break the covering.



Kwik-Cote has a 40% shrink factor. Now, for the first time, wing tip . . . top and bottom . . . . can be covered with a single piece of material.

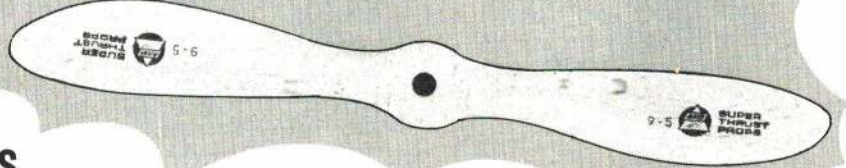
AVAILABLE NOW

Each roll is 26" by 78"

9301	DARK RED	$7.98
9302	ORANGE	7.98
9303	YELLOW	7.98
9304	WHITE	7.98
9306	SKY BLUE	7.98
9307	SILVER	7.98
9308	BLACK	7.98
9315	PURPLE	7.98
9316	LIGHT RED	7.98

More exciting new colors to come!

A GREAT NEW LINE OF PROPELLERS



Start your flying day off with a propeller designed specifically for performance plus. These propellers are made in England exclusively for AHM. Machined from top quality beech, provide the maximum RPM and thrust potential of your engine. Available in sizes up to 18 inches in diameter.

SUPER-THRUST MACHINED BEECH PROPELLERS

9x5	.80	12x4	1.10	14x4	1.50	16x6	2.50
9x6	.80	12x5	1.10	14x5	1.50	16x6	2.50
10x5	.85	12x6	1.10	14x6	1.50	17x4	3.00
10x6	.85	13x4	1.30	15x4	2.00	17x6	3.00
11x7	.90	13x5	1.30	15x6	2.00	18x4	3.50
11x7½	.90	13x6	1.30	16x4	2.50	18x6	3.50

We are just starting our national distribution on this great new line of propellers. If they are not yet available in your area, and you want to try them by mail, you can on the following guaranteed basis. . . . If you don't agree these are the best looking, best performing, most carefully finished propellers you ever bought, you can return them within 30 days of your purchase, for a 100% money back refund.

- For more details on our full airplane line, send a self addressed stamped envelope.
- Trade Inquiries Invited. • Catalog #CA-35 airplane literature send 25¢
- Mail Orders: Try your favorite Hobby Shop first, if our products are not available in your area, forward retailer's name and address with your mail order, direct, for prompt service. For prompt attention to mail orders, address to:
- Orders under $3.00 retail, add 50¢ handling charge.
- If service is not completed promptly write Mr. "Boss", 1240 Gilbert Road, Meadowbrook, Pa. 19046.
- Full Catalog #CA-11D (Primarily Model Railroads) $1.50 ea.
- All prices subject to change without notice.

"Foreign mail order should be in American currency only."

CS 7083

AHM

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The Finest HOBBIES from AROUND THE WORLD

TOWER

P.O. BOX 543 CHAMPAIGN,

RC POWER KITS . . . .

	RETAIL	TOWER
AERO PRECISION:		
Focke-Wulf	$39.95	$27.50
AT-6 Texan	38.50	27.00
Piper Vagabond	32.50	24.00
Touchdown: 42" Wing	21.95	15.50
48" Wind	21.95	15.50
Sundancer	39.95	27.50
AIRTRONICS:		
Acro Star	$74.95	$59.75
ANDREWS:		
Aeromaster	$49.95	$36.95
Sportmaster	49.95	36.95
Trainermaster	39.95	29.25
Minimaster	30.95	22.25
H-Ray	26.95	20.25
S-Ray	23.95	17.95
A-Ray	32.95	24.75
AIRBORNE ASSOCIATES:		
Tiger Tail	$84.95	$72.00
Tiger Tail Deluxe	115.00	97.50
Nutcracker	64.50	54.75
Banshee	64.50	54.75
Hi-Lo	99.50	84.50
Cosmic Wind	64.50	54.75
Troublemaker	64.50	54.75
BRIDI:		
RCM Sportster	$34.95	$26.75
RCM Basic Trainer	29.95	21.95
RCM Trainer	49.95	38.25
RCM Trainer 40	42.95	32.25
Super Kaos	57.95	42.50
Kaos	49.95	38.00
Super Kaos 40	44.95	33.75
(All wing and fuse kits in stock)		
BUD NOSEN:		
Aeornca Champ	$99.95	$87.50
GOLDBERG:		
Senior Falcon	$42.95	$29.50
Skylane 62	42.95	29.50
Skylark 56	25.95	18.25
Falcon 56	22.95	15.95
Shoestring 54	34.95	24.50
Ranger 42	19.95	13.95
Junior Skylark	9.95	7.95
Junior Falcon	8.95	7.15
(all wing kits in stock)		
DAVE PLATT:		
Spitfire	$54.95	$42.50
GEE BEE:		
Islander	$39.95	$31.95
Mallard	39.95	31.95
HOT LINE:		
Sierra Trainer	46.95	29.75
Mini-Comanche	29.95	19.50
Cricket	16.95	11.75
Cassutt Racer	29.95	19.50
JENSEN:		
Das Ugly Stick	$49.95	$39.00
J & J:		
Troublemaker	$59.95	$42.00
Eyeball	54.95	38.00
Banshee	54.95	38.00
J-Craft	45.95	32.00
1/4 Midget Mustang	34.95	25.00
KRAFT:		
Wing Master	$29.95	$23.95
LANIER:		
Sprint 25	$45.95	$34.50
P-51 Mustang	52.95	39.75
Caprice	59.95	44.95
Apache	52.95	39.75
Hawk	32.95	24.75
Cessna	42.95	32.25
Transit	39.95	29.95
Jester	59.95	44.95
Comet II	51.95	38.95
Slo Comet	51.95	38.95
Pinto	44.95	33.75
Midget	52.95	39.75
Invader	62.95	47.25
Dart	52.95	39.75
(All Lanier are almost ready to fly)		

BRAND NEW FROM BRIDI
.40 SIZE VERSIONS OF THE SUPER KAOS & RCM TRAINER

SUPER KAOS 40

.40 SIZE VERSION OF SUPER KAOS

RETAIL $44.95 TOWER $33.75

RCM TRAINER 40

.40 SIZE VERSION OF RCM TRAINER

RETAIL $42.95 TOWER $32.25

SULLIVAN
HI-TORK STARTER

HI-TORK, HI-RPM, 12 VOLT STARTER

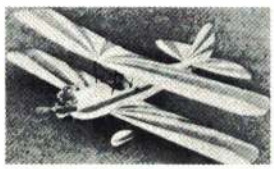
RETAIL $27.95 TOWER $19.50

BADGER
AIR BRUSH KIT

INTERNAL MIX, SINGLE ACTION AIR BRUSH COMPLETE WITH 2 CANS OF PROPEL AND FULL ACCESSORIES.

RETAIL $34.00 TOWER $27.75

AERO PRECISION
SUNDANCER



Span 48" Engine .29 to .40

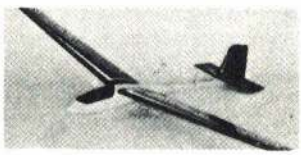
RETAIL $39.95 TOWER $27.50

ROYAL PRODUCTS
TWIN ENGINE B-25

Span 71" Engine: Twin .40 to .60

RETAIL $74.95 TOWER $63.75

ASTRO–FLITE
all new ASW-15



Span 100" Area 630 sq. in.

RETAIL $44.95 TOWER $33.75

DAVE PLATT
SPITFIRE

Engine .40 to .60 Span 65"

RETAIL $54.95 TOWER $42.50

MACO:		
Jet Star	$54.95	$35.00
Vaga	52.95	34.00
MODEL DYNAMICS:		
Gryphon	$34.95	$28.50
Shriek	55.00	44.75
Power Pod	6.50	5.75
MIDWEST:		
Cardinal Squire	$54.95	$37.95
Mach I	54.95	37.95
Chipmunk	24.95	17.00
Cardinal	23.95	16.50
Little Stick	24.95	17.00
Sweet Stick	35.95	24.75
Tri Squire	19.95	13.95
Lil Tri Squire	13.95	9.75
Lil "T" Glider	18.95	13.50
RC KITS:		
Hawker Hunter	$49.95	$42.50
ROYAL PRODUCTS:		
Cessna 206	$54.95	$46.75
Focke-Wulf 190	69.95	59.50
Corsair	69.95	59.50
Phantom F4J	54.95	46.75
Cessna 182	54.95	46.75
Cessna 182 Junior	34.95	29.75
B - 25 (Twin)	74.95	63.75
P - 38 (Twin)	74.95	63.75
Spirit of St. Louis	49.95	42.50
Pitts Special	64.95	55.25
Hein Senior (Tony)	54.95	46.75
Hein Junior (Tony)	34.95	29.75
Hayabusa (Oscar)	64.95	55.25
Cessna 310 G (Twin)	74.95	63.75
Zero	69.95	59.50
Spitfire	69.95	59.50
Aquarius	59.95	50.95
Super Cherry II	84.95	72.25
SOUTHERN RC:		
Tigertail Standard	$64.95	$55.00
Tigertail Deluxe	94.50	80.00
Sweetater Standard	64.95	55.00
Sweetater Deluxe	94.50	80.00
Bobcat	48.50	41.00
TIDEWATER:		
Pronto	$18.95	$16.00
Super Pronto	24.95	21.25
TOP FLITE:		
P-51 Mustang	$49.95	$33.50
P-40 Warhawk	52.50	35.50
P-39 Airacobra	52.50	35.50
Kwik Fli III	52.50	35.50
Contender	39.95	27.00
R/C Nobler	32.95	22.75
SE 5a	52.50	35.50
Headmaster	19.95	13.95
VK:		
Cherokee	$41.95	$28.35
Navajo	41.95	28.35
Cherokee Babe	28.50	19.95
Super Corben	34.95	24.00
Fokker Triplane	49.95	33.75
Nieuport 17	47.95	32.40

THE $200 PRICE BARRIER IS NOW BROKEN!!

The Tower/Control 5 is a high quality 5 channel digital proportional radio that has all of the features of a $400 system except the high price.

The Tower/Control 5 comes standard with transmitter, receiver, four servos (the worlds smallest!), Ni-Cad batteries, and charger. Add to that features like proportional fifth channel, adjustable stick tension, and a full 90 day warranty. The Tower/Control 5 is the finest radio value in R/C-a fact that is backed up by Tower Hobbies reputation of total customer satisfaction.

COMPLETE SYSTEM ONLY $199.00

SUPER MONOKOTE

6 FOOT ROLLS

		ONLY
OPAQUES: Red, White, Orange, Yellow, Clear, Aluminum, Gray, Blue, Dark Blue, Black, Chrome, Olive Drab	Retail $8.10	$5.00
TRANSPARENTS: Yellow, Red Orange, Blue (NEW!)	Retail $9.00	$5.60
ALL NEW FLAT FINISH: Olive Drab, Dove Gray, Aircraft Aluminum	Retail $9.00	$5.60
METALLICS: Plumb crazy, Green, Blue	Retail $10.50	$6.50

HOBBIES

ILLINOIS 61820 PHONE 217–356-4294

RC GLIDERS . . . .

	RETAIL	TOWER
AFI (ASTROFLITE):		
ASW-15	$44.95	$33.75
ASW-17	69.95	53.00
Monterey	34.95	24.75
Fournier RF4	29.95	21.50
Malibu	25.95	19.25
AIRTRONICS:		
Olympic	$44.95	$35.95
Grand Esprit	124.95	97.50
Mini Olympic	21.95	18.50
Questor	29.95	23.75
GRAUPNER:		
Cirrus	Tower Price $51.00	
Cumulus	Tower Price $120.00	
JP MODELS:		
Dart	$55.00	$47.00
Dart II	64.50	55.00
Javelin	49.50	42.00
MARK'S MODELS		
Windward	$25.95	$19.50
Windfree	34.95	24.50
Windfree R.T.C.	88.95	77.50

OTHER R/C PRODUCTS . . . .

In addition to all of the items listed and shown in this ad, TOWER HOBBIES carries all of the following lines: Austin Craft, DuBro, Goldberg, Robart, Rocket City, Sonic-Tronics, Su-Pr-Line, and Tatone ACCESSORIES; Ambroid, Devcon, Hobby Poxy, Southern RC, and Titebond ADHESIVES; Tower Hobbies BALSA WOOD; Eveready and Tatone BATTERIES; A-Justo-Jig, Dremel, and X-Acto BUILDING EQUIPMENT; Perry CARBURETORS; Coverite, Royal Silk, and Southern RC COVERING MATERIALS; Kavan and Sonic-Tronics ELECTRIC STARTERS; K&B FUEL; Sullivan FUEL TANKS; Fox and K&B GLOW PLUGS; DuBro, Hegi, Kalt, Kavan, RC Helicopters Inc, and Graupner HELICOPTERS; Complete selection of MUFFLERS; Aero Gloss, Hobby Poxy, and K&B SuperPoxy PAINTS; Badger PAINT SPRAYERS; Top Flite and Tornado PROPELLORS; EK, Kraft, MRC, and Tower Hobbies RADIOS, Goldberg, Rom Air, and Sonic Systems RETRACT SYSTEMS; Tower Hobbies RUBBER BANDS; JP SCALE INSTRUMENTS; Williams Bros. SCALE PILOTS; Midwest, Tatone, Tower Hobbies, and Williams Bros. SPINNERS; DuBro, Goldberg, and Universal WHEELS.

All are in our new FALL '73 fully illustrated catalog - at the lowest prices, of course!

IT'S NEW . . . AND IT'S THE BEST!

KWIK–COTE

Available in these colors:
Dark Red, Light Red, Orange, Yellow, White, Aluminum, Sky Blue, Silver, Black, Chrome, Olive Drab, Light Grey, Purple, Trans. Red, Trans. Orange, Trans. Yellow, and Trans. Blue.

Compare KWIK-COTE'S Features
1) Trans. colors same price as opaques
2) Comes in rolls 6½ feet long
3) Complete coverage of balsa grain
4) Unbelievable 40% shrink factor
5) Can be sprayed or painted over
6) Light, strong, and not brittle
7) Tested & recommended by Tower Hobbies

RETAIL $8.00 TOWER $4.75

AHM HEAT GUN

Designed for use with Kwik-Cote & other shrink films. Features a 2 speed heat control, 900 watts, long life motor, special nose control director, 3 way switch, and a low price.

RETAIL $24.95 TOWER $17.50

SUPER BONUS:
With purchase of an AHM Heat Gun you may order up to 5 rolls of Kwik-Cote at only $4.00 per roll!

IT'S NEW

HIGHEST QUALITY!

AHM GUSHER 1
ELECTRIC FUEL PUMP

Features: Metal casing, 18" clear fuel lines, shielded alligator clips in 2 colors, reversable flow switch, easy to insert nozzel, automatic wire-lock to prevent unnecessary spreading of wires.

RETAIL $12.98 TOWER $9.50

AHM SUPER THRUST PROPELLORS
The Finest Hardwood Props Available Anywhere At Any Price

Size:	Each	Box of 6		Each	Box of 3
9x5, 9x6	$ .80	$4.10	14x4, 14x5, 14x6	$1.50	$3.85
10x5, 10x6	.85	4.35	15x4, 15x6	2.00	5.10
11x7, 11x7½, 11x8	.90	4.60	16x4, 16x6	2.50	6.40
12x4, 12x5, 12x6	1.10	5.60	17x4, 17x6	3.00	7.65
13x4, 13x5, 13x6	1.30	6.60	18x4, 18x6	3.50	8.95

RC ENGINES. . . .

	RETAIL	TOWER
COX:		
Tee Dee .010	$14.00	$10.50
Tee Dee .049	14.00	10.50
Tee Dee .09	16.25	12.25
Medallion .15	17.25	12.95
Medallion .09	14.00	10.50
Medallion .049	11.50	8.65
Golden Bee .049	8.15	6.15
Babe Bee .049	6.50	4.95
ENYA:		
.09 III TV	$18.98	$14.25
.15 III TV	21.50	16.25
.19 V TV	24.50	18.50
.19 BB TV	37.98	27.75
.29 IV TV	27.98	21.00
.29 BB TV	35.98	26.00
.35 III TV	29.50	22.25
.35 BB TV	36.98	26.75
.45 BB TV	51.50	37.00
.60 III BB TV	76.98	50.50
FOX:		
.15 RC	$18.95	$13.50
.19 RC	23.95	17.00
.25 RC	23.95	17.00
.29 RC	27.95	19.25
.36 RC	27.95	19.25
.40 RC		Discontinued
.60 RC Eagle	64.95	43.00
.78 RC	84.95	56.50
H.B.:		
.61 RC w/muffler	$100.00	$64.00
K&B:		
.15 RC Schneurle	$40.00	$27.75
.35 RC Stallion	19.95	14.95
.40 RC w/Perry	40.00	27.75
.40 RC Schneurle	70.00	49.00
O.S. MAX:		
Pet .099 RC	$12.98	$11.00
.10 RC	17.98	14.25
.15 RC	22.98	18.50
.20 RC	24.98	20.50
.25 RC	26.98	21.75
.30 RC	29.98	23.95
.30 RC Wankel	87.50	75.00
.35 RC	29.98	23.95
.40 RC	44.98	33.95
.50 RC	52.98	36.95
.60 RC Goldhead	69.98	55.95
.80 RC	95.98	77.50
ROSS POWER:		
In Line Twin Cylinder .60 Black Anodized	$145.00	$125.00
Opposed Twin Cylinder .60 Aluminum Finish	125.00	107.00
Opposed Twin Cylinder .60 Black Anodized	145.00	125.00
SUPERTIGRE:		
G 20/23 RC	$28.98	$23.50
G 21/46 RC	34.98	27.95
ST .60 RC	54.98	43.95
G .60 RC Bluehead	69.98	55.95
G .71 FI RC	69.98	55.95
VECO:		
.19 RC	$33.00	$23.75
.61 RC w/muffler	74.95	52.50
WEBRA:		
.40 RC Blackhead	$99.95	$63.75
.61 RC Blackhead	130.00	83.00
.61 RC Schneurle	147.50	95.00
YS:		
YS .60 RC	$146.00	$94.00

NOTE: ENYA AND WEBRA PARTS IN STOCK!

SOLARFILM

6 FOOT ROLLS

OPAQUES: Dark Red, Bright Red, Dark Blue, Light Blue, Orange, Yellow, White, Black, Silver — Retail $6.60 — ONLY **$4.00**

TRANSPARENTS: Yellow, Orange, Blue, Red — Retail $7.50 — **$5.00**

METALLICS: Green, Gold, Red — Retail $9.00 — **$6.00**

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SATISFACTION ALWAYS GUARANTEED AT TOWER HOBBIES!

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for IMMEDIATE
COD SHIPMENT.

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Add $1.00 to each order for Full Insurance, Postage, and Handling. Money Order or Check only. Foreign Orders add $10.00. Excess refunded.

JUST RELEASED FALL '73 CATALOG

FULLY ILLUSTRATED!

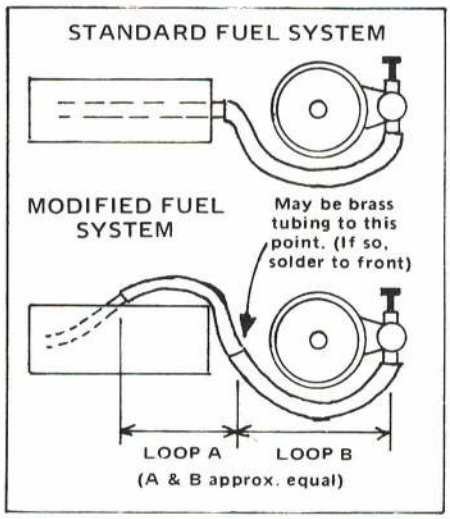
The Fall '73 catalog is twice as big as the Spring '73. Over 75 manufacturers of kits, radios, engines, and accessories at the lowest prices anywhere! Send 50¢ (mailed 3rd Class). For first class mailing, send 75¢. FREE WITH ANY SIZE ORDER

LEW McFARLAND ON CL

Stop And Think: That is what information from correspondents and other sources, such as the AMA Newsletter, PAMPA Newsletter and **AAM**, has caused me to do. Here is hoping this pensive mood can be transferred to our readers. Let's approach with renewed thought and interest every phase of modeling: building, flying, developing flying fields and contests, even relations with our fellow modelers. If we do, perhaps the result of such thought will be our expression of ". . .thanks to be a citizen of a country which affords the opportunity and freedom to take part in such a sport and hobby as ours."

The Well Should Not Run Dry: Thanks to those who are, and have been, sending in information and photos. Presently, the greatest problem is to put it "all together" in a sensible format that will give you what you seem to want. For example, a great deal of interest in stunt bipes has been expressed. It seems most practical, however, to render this mass of information in one concise presentation. HELP! You bipe lovers!

Tank System For Profiles: Joe Sullivan of Richardson, Texas, has a solution for erratic fuel flow and occasional engine shutoff so commonly associated with profile stunters as a result of sharp turns. He accomplishes this



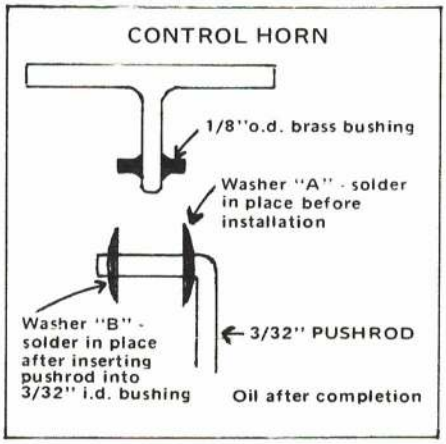
by bringing the pickup tube outside the tank so that it causes the fuel to flow through a loop that is equal in length, but with a curvature opposite to that formed by the portion of the tube that circumvents that engine cylinder and connects with the spray bar. The theory here is that centrifugal force (as a result of the plane turning) which may cause fuel starvation is self-compensating in the two loops.

Drill And Tap "Your" Head: Well, not exactly, but Harold Bartlett of Corte Madera, California, reports success in threading Cox 15 glow heads so they will take standard glow plugs. This is accomplished by pulling out the center pin, saw off the top fin, drill and tap with appropriate sizes. End result some monetary saving, can use variety of plugs and one type battery clip.

Control System: A potentially superior stunt plane need only have one "defect" to result in inferior performance. This "defect" can range from engine, tank, wing loading, to control system. The control system can be considered the "heart" of any good stunt ship and *must be correct* to get the desired excellence. What is Correct? That which gives max performance for a given design. To list a few basic requirements: (1) very little flexing of pushrods; (2) smooth action without binding; (3) minimum lost motion (slop) in controls. (Some contend a 3/32" slop in elevator movement improves grooving in flight which may be particularly true if a slight misalignment of the flight surfaces exists.)

Some other basic requirements include: (4) control sensivity to complement the plane and pilot. (Generally this will fall within a range: for each 3/4" to 1" leadout movement a resulting 20-40° flap as compared to 30-40° elevator movement.) The sensitivity and ratio of movement can not be given as a fixed value because of variations in moments, weights, i.e., wing loading, and control surface areas. The flight speed is a factor but, more realistically, the wing loading and control surface area dictate the speed at which you must fly to get optimum results.

(5) A durable control system is essential, and most commonly exists as a result of using a nylon bellcrank and brass tubing bushings (see drawing) of approximately 3/8" on the flap horn, and 1/4" on the elevator horn.



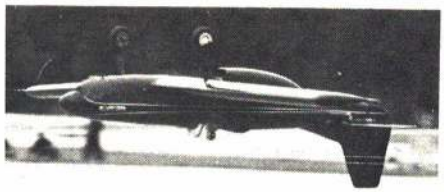
The preceding should point out that there is an interplay of many variables in a stunt design; thus the more variables you can build into a plane, the greater your chances of "trimming" it into a truly functional machine. A few are becoming common: variable leadouts, adjustable tip weight, removable wing to give access to flap adjustment. (Vary spacing of lines on handle for overall sensitivity.)

Bipe lovers! What about this '59er by Wilbur Hinton? Interesting, not only because of its racy looks, but also because the stagger in the wings occurs only at the LE. The wings are so close together that the net lift effect might be more akin to a monoplane. (Photo by Wilbur Hinton)

Dick Pacini flew his Free Spirit to a strong fourth place at the King Orange. (Photo by Lew McFarland)

Maneuver A Month: Next issue will start a study and explanation of the AMA Stunt pattern, we will study one maneuver each month. Fliers, send in observations and remarks pertaining to your efforts to learn and perfect each maneuver.

PAMPA: Al Rabe, the current holder of the Walker Trophy (Perpetual Trophy presented to the Annual National Champion), has arranged to restore the trophy to its original state. This is being done in the name of PAMPA, and we will again have a trophy which represents, to a better degree, the prestige of this honor. Donations may be sent to Al Rabe, Chairman, Walker Trophy Restoration, 1904 Valley Oaks, Irving, Texas 75060. Who knows? You may some day get to take this beautiful trophy home for a year.



In the groove during the inverted flight part of the pattern, Dave McClellen exhibited the true form required to win first place at the Cowtown Circle Burners Contest, Fort Worth, Texas. (Photo by Al Rabe)

Walker Trophy in its present decimated state. Originally twice the height, Al Rabe (the current holder) has arranged to have it restored to pristine condition for future preservation.

Our Very Own Hobby Park And Museum: Our AMA President Johnny Clemens, gallantly recovering from a serious illness and surgery, thinks we (AMA) can have property of our own for the Nationals, FAI Selection, etc., as well as a museum. Let's make it more than a dream and back him with action when he fully presents the program and proposal.

DON LOWE ON RC

Joe Flier, Boy Expert: Several months back, I started a series of discussions on flying the Class C Pattern. This sprang from comments by a number of competitors along the contest trail who wanted something aimed at helping the beginner and intermediate flier improve their competition performance. Since the series was started, I have been gratified by the comments of some who have read the article and indicated a positive response. These days, with dynamic changes in pattern flying of all kinds in the wind, unless we accelerate the pace of discussions of the Class C Pattern, it will be obsolete before we finish!

So, this month we will devote the available space to half of the remaining maneuvers, complete the rest next month. Actually, although maneuvers may change, most of the basic techniques and skills that you learn in flying this pattern will be directly applicable to other maneuvers. Needless to say, reading

Photo by James S. Miura

Kay Sodefani of Honolulu, Hawaii, cuddles up to Rev. Leonard Onaga's Veco-powered Lanier Invader. Who says ARF's aren't good-looking?

these lines will not make you a winning Class C flier. It is hoped, however, that some of the ideas and techniques will help and, coupled with much practice, improve your pattern performance whether you fly competition or not.

In our last episode, we had completed the Double Immelman (whew!), now we are headed upwind for a beautiful turnaround, to come back downwind and perform the outside loops. Please recall the procedural requirements, i.e., set up on the maneuver heading, call the maneuver, fly maneuver entry (50 ft. or more), fly the maneuver, exit 50 ft. or more and call maneuver complete. Never enter the maneuver immediately after calling; always allow for straight flight. Never call maneuver complete until 50 ft. of straight exit is flown. These days, maneuver placement, balance and procedure seem to count as much as the maneuver itself. We are fast approaching the time when the pattern will be flown as a continuous combination, in which all flying will count, including turnarounds. So, discipline your flying to improve turnarounds, setup, entry and exit. Even though continuous flying between maneuvers does not count, it certainly generates an impression, and judges are impressionable—they are human, right? Avoid the temptation to wave

Pattern competition in Popard,Czechoslovakia, is a casual dress affair to say the least. Pictured are first-place winner Havel (in left background), fifth-place winner Rohla and Michzalovic who came in fourth.

off a maneuver and go around for a new setup—think ahead. Even if you are going to simply fly-by for proper maneuver positioning, act like you know what you are doing. Some fliers give the judges a running commentary—this is okay, as long as it is informative.

Okay, we are headed downwind at moderate altitude for the Three Outside Loops. Start the maneuver directly in front of the judges by pushing over from straight and level flight. (Be certain that you are level.) Many fliers will be in a slight climb or dive at the beginning of this maneuver—sometimes I do the same thing; I have an aversion to outside maneuvers, since it doesn't seem natural, or is dangerous, I guess. Anyhow, a lot of fliers will throttle back a bit in the pushover and add throttle a little before hitting the bottom of the loop. Don't wait until hitting bottom or after, since you must allow time for the engine to pick back up, especially if it goes richer at low throttle settings. Practice the throttle technique to check its influence on maneuver roundness and speed. Throttling will help maintain a somewhat constant speed, rather than an acceleration on descent and the opposite on ascent.

Concentrate on keeping the loops round, with the tops and bottoms at constant altitude for all three loops. If you are crosswind, you will have to use the rudder and aileron technique previously discussed to keep a straight track. Exit the maneuver at entry altitude with wings straight and level.

One additional note: new fliers usually have great difficulty correcting the track in the outside loops. That is because corrections with the aileron must be made in a direction opposite to that which would seem natural. Envision that, in outside loops, the bottom of the wing is doing the lifting and the wing lift vector must be rotated to the direction in which you wish to move the track. To accomplish this, move your hand in the direction opposite to that in which you wish the airplane to move.

For example, if the track is drifting to the right, move the aileron stick to the right to get it back on track, thus rotating the lift vector to the left and forcing the aircraft back to the left. To check this easily, use a small hand-held model and move it through the maneuver; always remember that the composite wing lift vector is perpendicular to the bottom of the wing in outside loops. Inside loops are much more natural, since the aileron control is simply moved in the direction in which you wish to move the airplane track. There is one thing going for you on outside loops, however, since most craft seem to loop straighter outside than inside. I think that this is due to the vertical fin being more influential, since it is outside of the wing wash on the outside loops.

Okay, let's turnaround and try the sneaky Reverse Cuban Eight. This is a pretty, but difficult maneuver, since it is hard to get the

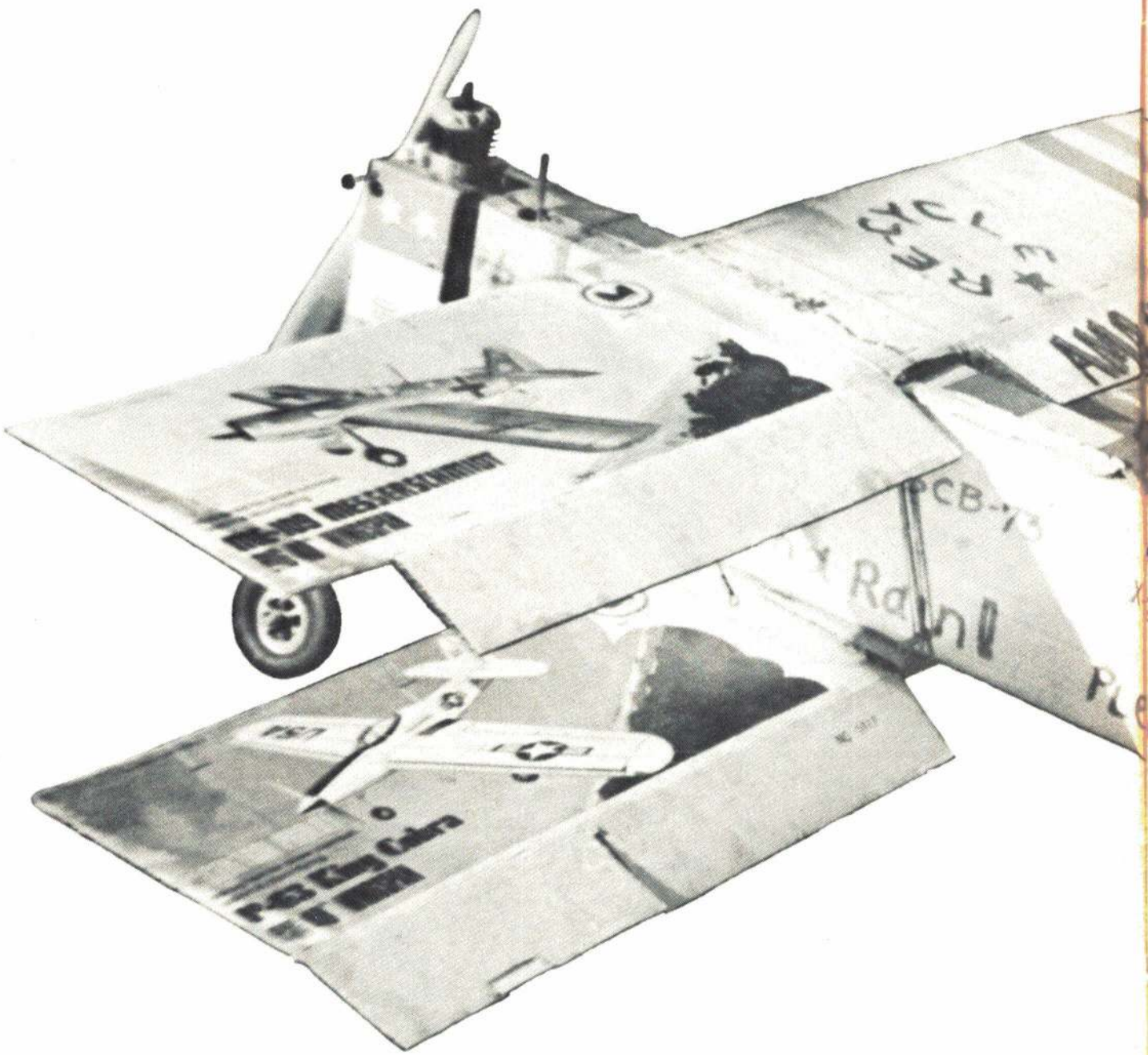
(Continued on page 102)

One of the great "behind the scenes" guys at contests. CD Will Feldmeier is a real spark plug in the St. Louis area.

FLY THE CRATE IT CAME IN!

PAPER CUB

Last month our readers saw the Toadstar and said that it was ridiculous. Undaunted, we now present the Paper Cub. / by Hal Redner



Difficult times produce inspired aircraft designs. Witness the Spitfire in WWII and the North American Sabre with its 10:1 kill ratio in Korea. So, during these trying days of materials shortages and recycling, the Paper Cub has been born! Modeling has taken a giant step! More and more, our hobby will hear of the desire, nay, NEED, for recycled aircraft such as the majestic Paper Cub J-1 and J-2. (J does not stand for junk!)

Born of necessity during the recent soft job market for engineers, steeped in the tradition of fine workmanship with any material handy, it was in the pioneering spirit that the Paper Cub came to life. Some critics detect a slight Frankenstein influence.

A few stodgy flying circles have not received the Paper Cub with appropriate respect. Let this be a friendly warning to those who seek to hold back progress—just remember how recently skeptics leered at the BD-5; and don't forget how they viewed the Learjet.

Our design philosophy is simply this: low cost, low upkeep, low performance along with the idea that, at any moment, the plane can be easily repaired or thrown away. This striking series of craft is not just a dream on the drawing board. It is actually in existence and flying (perhaps our SST program could learn from this). Paper-powered models will soar onward through our hobby. Antiquated building materials such as plastic, foam, epoxy and balsa will fall by the wayside. Paper airplanes fly better! The switch is to paper. The catchword winging upward is "Power to the Paper."

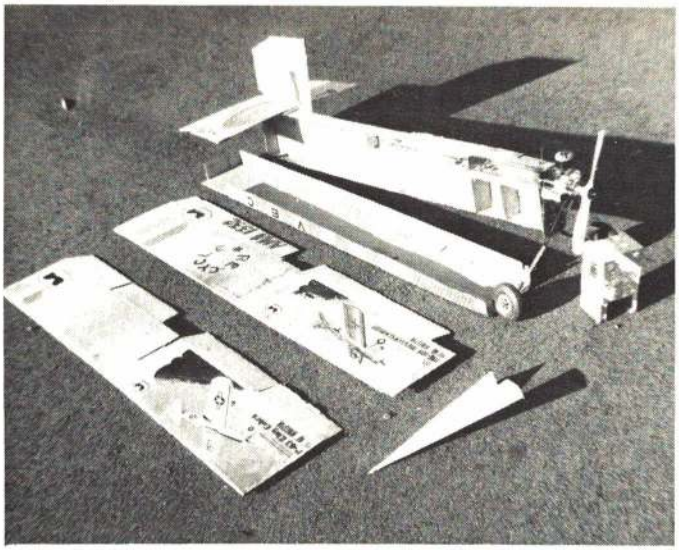
Lest we forget, it all started with man first leaving the ground in a lacquered paper balloon full of hot air. (See Montgolfier brothers, page 35, *Saga of Flight*, Avon Books, Paperback Edition.) And now, with the Paper Cub, we enter the second era of aviation—powered flight via a paper airplane. History has a way of repeating itself.

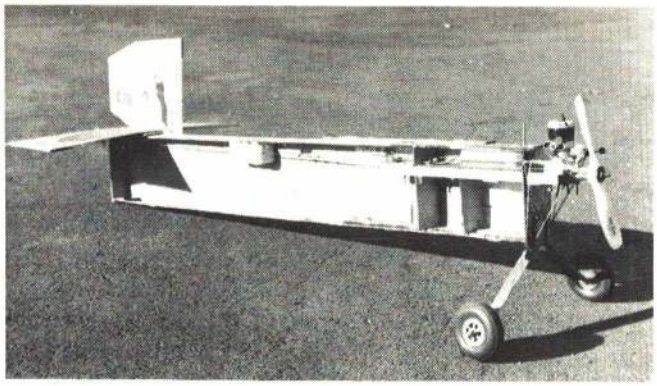
Much research lies behind the J-1 (J does not stand for Jury-rig). Credit should be given to the futile efforts of the Butler and Edwards Delta Dart of 1867. That's right, 1867. (See *Airplanes of the World* by Douglas Rolfe, Simon and Schuster.) Our engineers are familiar with the Bristol XLQ-1, an assault glider built for the USN in WWII (See *Flying Aces*, May 1943. Composed of pressed paper and wood, it had excellent flight characteristics, but did not possess adequate endurance while floating in the water. Finally, our chief engineer remembers a rigged Paper Glider Contest run by the *Scientific American*, circa 1967.

How many historical turning points are caused by a chance remark? So, it was with the J-1. A noted model designer, who never actually builds models, once noted: "Too bad no one has a novel plane for tomorrow's Novelty Contest." The challenge was met that night as the cellar was being cleaned out. Heading for the garbage can with an armful of old model cartons, the inspiration burst forth! Why not? Thus, like Excaliber, was the J-1 born.

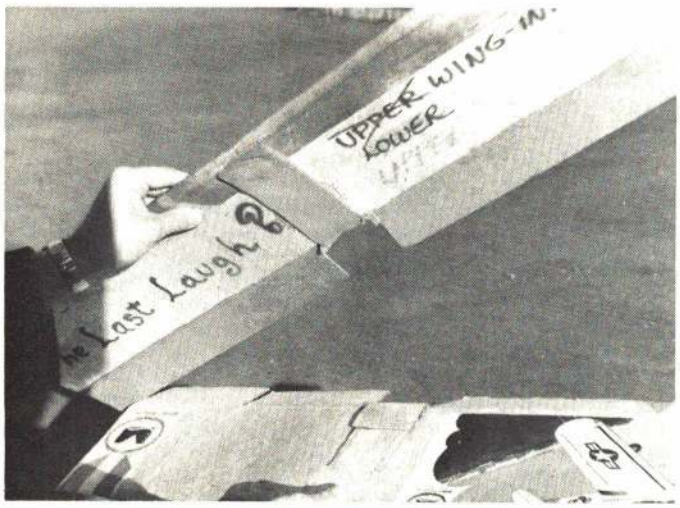
CONSTRUCTION

Choice of dimensions was somewhat limited by the sizes of the kit cartons available. And which way would the cartons be strongest? Leaning on an old tried and true friend, a Nobler carton was selected initially. For the first time, a Nobler let me down. The corrugations (technically known as flutes) ran the wrong way. A note has been sent to George Aldrich, who claims that he can take responsibility only for kit design and not the carton design. Everyone is so specialized these days. Further intensive research disclosed that the corrugations ran spanwise on Midwest and

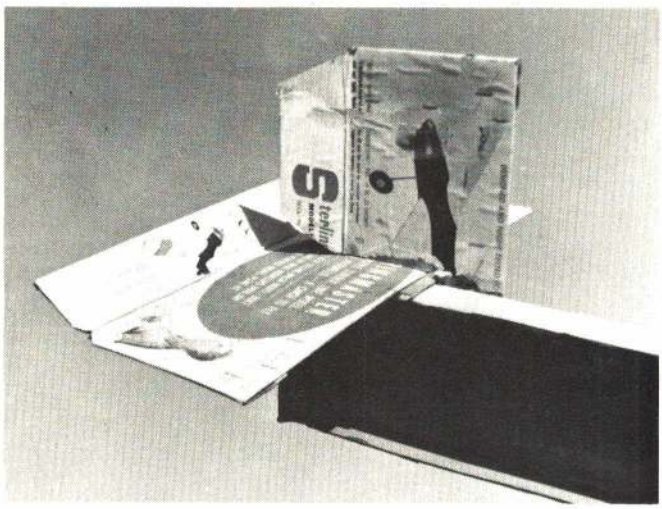




LEFT: Progress. Predecessor of Paper Cub in foreground shows, in striking contrast, what evolution can create. Care should be taken to reassemble model in same sequence each time, always putting one piece together, then another. ABOVE: Model breaks down for on-field access to linkage. (It also occasionally just breaks down on the field.) Ingenious modeler will undoubtedly use fuse for refreshment storage—thus re-introducing the box lunch.



The, uh. . .upper wing. . ., uh. . .lower wing. . ., uh. . .upper. . . . Anyway, these are the wings of the J-2. One of them is definitely an upper wing, and one is definitely a lower wing; beyond that, it's academic.



Subtle, isn't it! At first glance, one easily misses the staples (heavy-duty type), split corrugation hinging (a process which the U.S. Patent Office rejected), and the stressed skin control surfaces. Eat your heart out, EAA homebuilders; we modelers got all these methods first!

Everyone knows that a cowled engine increases performance. The Paper Cub shows how wrong everyone can be. Cowl does absolutely nothing for performance, and does almost nothing for the appearance of the plane. It does give the engine compartment that "boxy" look; hence, the Edsel design concept of maximum appeal through minimal good looks.

Veco boxes. Spirits lifted in the Clean Room.

With all dimensions dictated by the cartons, little calculating was required to determine wing loading and odd things like that. Bonding of one material to another did present some problems. Intuition suggested contact cement would suffice for one contest flight. To hold surfaces together while drying, however, staples were used as well. There is no need for further investigation in this area, since the craft has exceeded design specs by making two flights without failure.

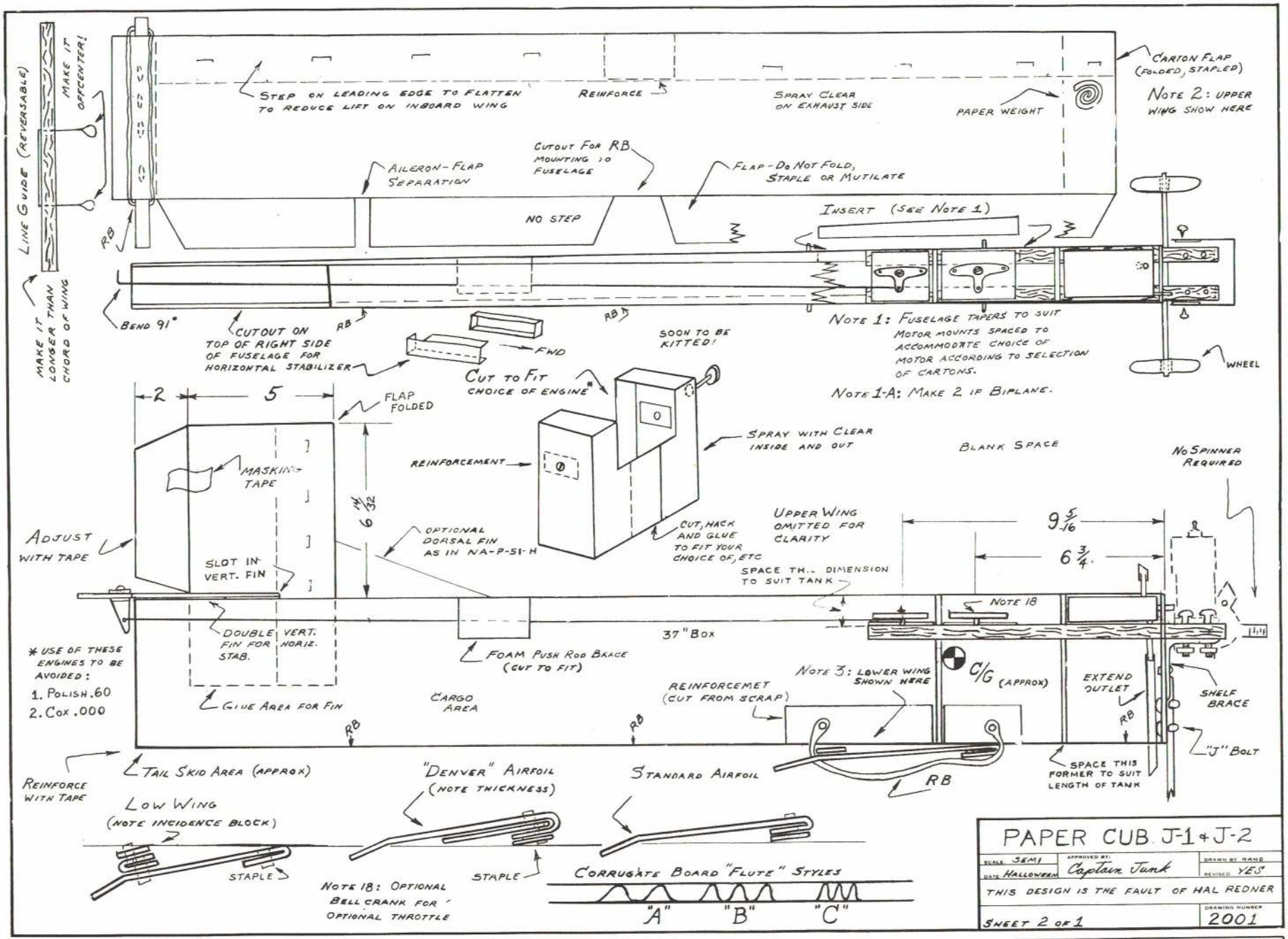
For the prototype, it was thought best to make a single-wing ship, since only one carton was available. (Don't forget the contest was now eight hours away, but then, some people work best under the pressure of a deadline.) The single, high wing concept proved to be a boon, since it halved the time necessary to construct a biplane.

The tail was a mere matter of form. Old faithful Ringmaster cartons were both strong and light, and the experienced model builder knows the importance of light tails for maneuverability. We drew upon an idea initiated by Anthony Fokker. The control surface was merely cut from the lifting structure so that the side flap of the carton became the elevator. Much laborious hinging was thereby saved.

Engine cowling for aesthetic effect proved difficult. Most engine boxes have cellophane cutouts which weaken the cardboard box. (Manufacturers take note!) Luckily, a Fox box was found that fit all design criteria. Some early incompatibility between the McCoy engine and Fox cowling was noted, but this was solved by using K&B fuel.

Wing construction is not critical either. Merely fold the side flap of the carton under and staple. You have now quickly created the airfoil and leading edge. Leave the other flap of the carton alone. This will become the trailing edge and serve as landing flaps and ailerons. A glance at the plans and pictures should clerify this point. Bend flaps to suit flying conditions and engine power. Builders are encouraged to scissor away the wing tip curve to any personal preference. Little harm can be done to the craft's efficiency.

(Continued on page 93)

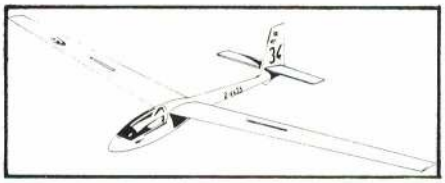


NO PLANS AVAILABLE-DO NOT SEE PAGE 84

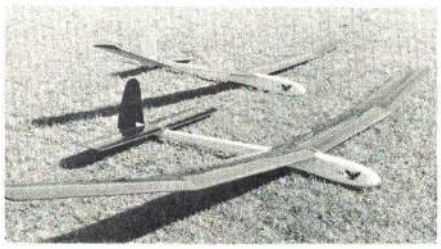
TELL THEM YOU SAW IT IN–

NEW PRODUCTS CHECKLIST

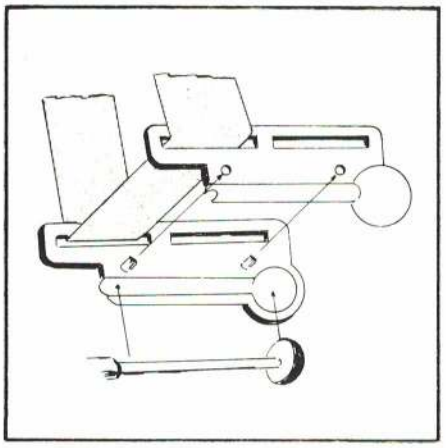
ERIC W. MEYERS



Hegi/ASW 15. A 1/5 scale replica of the ASW 15, this ship is constructed of a fiberglass fuselage and built-up wings. The fuse is large enough to handle old radios and can also carry a 10 to 15 size gas engine if a towline is not available. All hardware is included in the kit. $99.95. Associated Hobby Manufacturers, Inc., 621 East Cayuga St., Philadelphia, Penn. 19120.

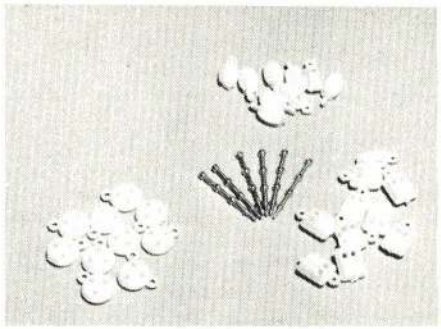


MalCo/Eagle. This high performance sailplane uses a 134-in. span to climb in the smallest thermal. The Eagle 134/118 can be cut down to a 118-in. span. Area of the wing is 1200 and 1060 sq. in. respectively. Kit features a partially built fuselage, plus all necessary balsa to complete the kit. Hardware is included. For ease of transportation, wing divides in the center. $75. MalCo, 316 South Bouldin, P.O. Box 508, Hamilton, Tex. 76531.

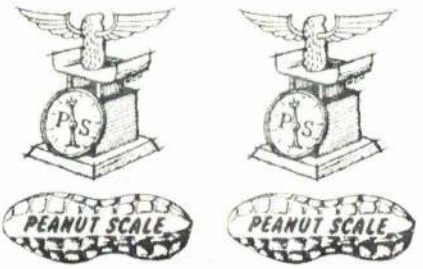


A&L/Snappy Flags. New transmitter frequency flags take a few minutes to assemble, yet have features never seen before in flags. This unit has two plastic halves which fit over the knob on top of antennae which prevents flag from sliding down the antennae. This unit also lets the flag easily swivel for wind direction. Bright ribbon colors for easy field identification. Available for all frequencies. $.89 each. A&L Manufacturing, 16509 Saticoy St., Van Nuys, Calif. 91406.

Stock Sales/Permabond Adhesives. Need an instant contact cement to glue nonporous materials together? Try Permabond, a transparent adhesive which bonds materials in just ten to 45 sec. with up to 5000 lb. per sq. in. holding power. No more clamping! Just place glue on item to be bonded and hold. Shown in the picture is the economy five-pack ($7.95) and the 1/3 oz. dispenser bottle ($3.98). Stock Sales Co., P.O. Box 606, Mineola, N.Y. 11501.



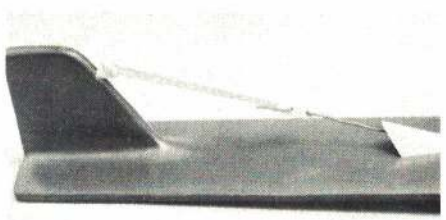
Kayeff/Ship Fittings. For those who build model ships, Kayeff produces a large assortment of brass and molded plastic fittings for scale authenticity. Pictured are rail stanchions, dead eyes, single and double blocks. Items such as extra brads, several sizes of blocks and dead eyes, port lights and two weights of rigging thread are a few of the more unusual fittings available. parts sell for between $.30 and $1.75 per package. Kayeff, Inc., 511 Campesina Rd., Arcadia, Calif. 91006.



W.C. Hannan/Insignia. Peanut Scale modelers unite! Show your colors with this new insignia for tool boxes, field boxes, airplanes, anything. Design is printed on adhesive-backed mylar. Unlike water slide type decals, these may be applied to delicate tissue-covered models without causing wrinkles. $.25 for two. W. C. Hannan Graphics, P.O. Box A, Escondido, Calif. 92925.

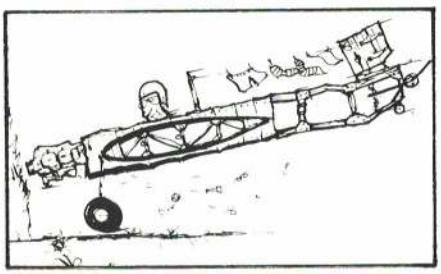
ARF/Super Kaos. An all-fiberglass version of Joe Bridi's Super Kaos combines a glass fuse with a precovered, Glaskin glass-covered wing for quick building. Included in the kit is a complete hardware package with torque rods, hinges, landing gear provided along with precision-machined wood parts. Fin and engine mounts are pre-installed in the fuselage. 644 sq. in. of area, 58-in. span, for 61 engines. $79.95. ARF Systems, 23326 Ladrillo St., Woodland Hills, Calif. 91364.

AMA/Kit Book. A great book for those who like to see plans of kits, this collection of plans contains a variety of kits of manufacturers who sponsored the NATS. Compiled by Frank Ehling, over 250 plans are reproduced in miniature form. A neat way to get an idea of a kit's construction. $2.50. Academy of Model Aeronautics, 806 15th St. N.W., Washington, D.C. 20005.

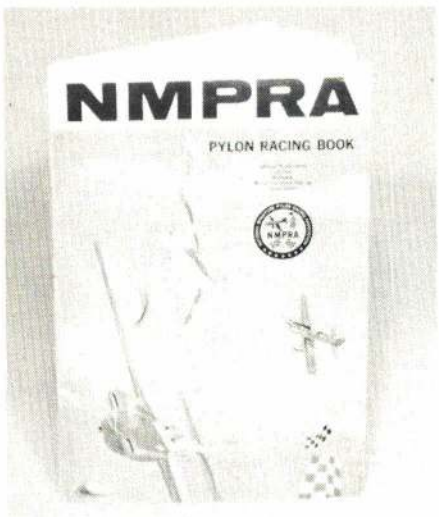


Simco/Hook and Keeper. A nifty little accessory for use by the RC flier, this antenna hook and adjustable wire keeper is great for fastening that antenna down neatly. The hook fits into hole drilled into stab or fin; rubber band provides tension between hook and keeper. Made of plastic, the pieces will not affect system tuning. $.45 for two. Simco Plastics, Box 462, Bartlett, Ill. 60103.

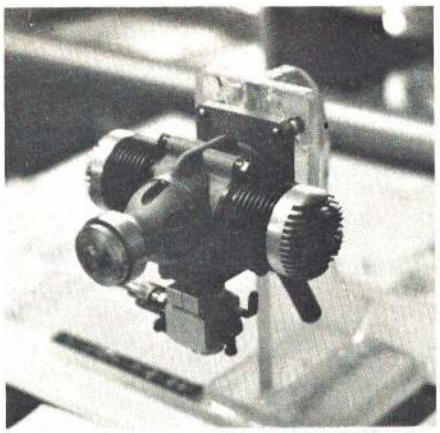
Better Built/Derringer. A large, exciting Stand-off Scale ship is twin-engine-powered. The 80-in. span and 915 sq. in. of area should really turn on those who like big scale airplanes. Model uses a fiberglass fuselage with a 1/16" balsa precovered foam core wing. This should eliminate much building time for those who would rather fly than build. For two 45s to 60s. Better Built Airplane Products, P.O. Box 163, Camarillo, Calif. 93010.[



Model Materials/"Crash Call". An ultra-simple U-control trainer can't be put together incorrectly because of its simplicity. Kit has a 1/2" balsa fuselage and uses a 36-in. span Pro-Foam preshaped wing panel. Sounds quick to build? It is. Design features a keyed insert for the bellcrank. Ship uses 19 to 35 size engines for semi-stunting capabilities. $8.95. Model Materials Co., 119 Mariposa, Waukegan, Ill. 60085.



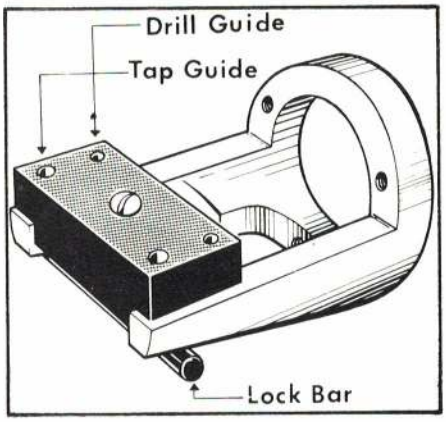
NMPRA/Racing Book. Ever thought about starting in Pylon Racing? This book published by the National Model Pylon Racing Association covers it all—design, racing techniques, engine hop-up, radio installation and more. The book also includes a section of scale three-view drawings and a products directory. $3.95 each. NMPRA, 1660 Ravenna Ave., Wilmington, Calif. 90744.



Micron Engines/Twin 30. Small, French twin features reed valve induction for running in either direction. Engine is a total of .30 cu. in. displacement and is Schneurle-ported for good power. Smooth running characteristics of a twin, plus rotatable exhausts make this engine a natural for scale enthusiasts. Carburetor is from Kavan. Radial mount. $195. A four-cylinder 60 is also available. Micron Engines France, 47-30 39th St., Long Island City, N.Y. 11104.

EMP/Retract and Throttle Control. One of the most exciting new accessories available to the RC scale or pattern enthusiast has to be this actuator. When plugged into the special charging jack, this unique device allows operation of throttle and cycling of retracts without use of the transmitter. Controls are operated through the trim lever and switch on the actuator. System is easy to install and works on most popular radios. Two versions are available: Dual with both controls ($37.50) and single with throttle control only ($32.50). Specify system desired. Electronic Model Products, P.O. Box 20462, Phoenix, Ariz. 85036.

Dodgson Designs/Maestro Sailplane. A super-advanced design, this ship incorporates flap-ailerons with flaps moving from -5° to +30°. At +20°, the spoilers automatically open to provide the utmost in precision spot landing control. Ship is versatile, so combinations of these controls produce a great thermal or Speed competition machine. 132-in. wing is built-up and the fuselage has a pre-rolled balsa tailboom and a fiberglass molded pod. $89. Price includes all specialized hardware. Dodgson Designs, 2904 South West Camano Drive, Camano Island, Wash. 98292.



Prather/Drill Jig. No more ruined engine mounts due to egg-shaped holes or broken bits and taps. This handy accessory will help you to drill and tap accurate holes in your mount for a particular engine size and type. Jig is made of case-hardened steel and has a lock bar to temporarily secure it to any mount. Jig has four holes—two for drilling and two for tapping. Jig is currently available for about 16 engine sizes. $4.98 each. Prather Products, 1660 Ravenna Ave., Wilmington, Calif. 90744.

Rex/150 Aerobat. Their third Stand-off Scale kit, this Cessna 150 Aerobat has a 65-in. span with 650 sq. in. of area, yet manufacturer claims only 5½ lb. weight! With flaps and the recommended 45 to 60 engine, "Aerobat" ought to be an understatement. All-balsa kit is complete with hardware, full-color handbook, full-size plans and handcrafted parts. Ship uses fifth channel for flaps. $59.95. Rex Model Products, 3323 Frederickburg Rd., San Antonio, Tex. 78201.

GMP/Messerschmitt Bf 109. Fiberglass and foam Stand-off Scale model includes many time-saving scale accessories such as molded canopy and exhaust stacks, wire screen material for oil cooler and radiator, airfoiled stab braces, and decals. Molded fuse has the fin and firewall pre-installed. Ship has a 64-in. span to give 600 sq. in. of area. For four- to six-channel radios, 56 to 71 size engines. $64.95. Gas Model Products, 110 Valley View, Southgate, Ky. 41071.

CORRECTION

In the February '74 Products Section, we erroneously listed the Williams Brothers' Boeing 247 as a metal kit. It is actually a plastic kit.

ACE R/C INC.

ACE R/C, INC. * BOX 301 * HIGGINSVILLE, MO. 64037

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

BankAmericard/Mastercharge Number _____

QUAN	CAT. NO.	ITEM	PRICE	TOTAL
1		CATALOG	$1.00	$1.00

ADD $1.00 for handling on all orders except catalog.

DIGITAL COMMANDER

The Digital Commander is a series of kits which are designed to be compatable with any modern existing system and offer expansion or replacement within the system without the need to buy a complete outfit.

SERVO

An IC servo amplifier and the popular D & R servo mechanics combine to make a servo that gives superior resolution and rapid transit time. Will operate with 3 or 4 wire IC decoders with positive pulse output.

Available in Bantam (rotary output) which measures 1 1/2 x 1 7/16 x 3/4 in. or Linear (linear and rotary output) measuring 1 13/16 x 1 7/16 x 7/8 in.

14G20 BANTAM SERVO KIT $21.95
14G20L LINEAR SERVO KIT $22.95

1-8 RECEIVER

This receiver features voltage regulated circuitry with AGC and double tuned front end. An 8 bit shift register in the IC decoder offers up to eight channel operation of positive or negative pulse servos with three or four wires.

Plastic case measures 1.45 x 1.72 in. Weight is 1.4 oz. Connectors are not furnished. Please specify frequency.

12G18 1-8 RECEIVER/DECODER KIT $34.95

TRANSMITTER

Our high output RF section and IC encoder is housed in an attractive vinyl clad aluminum case with the popular Rand/Ace control stick which provides smooth, accurate control and trim functions.

Case dimensions are 6 3/4 x 3 1/2 x 2 3/8 in. Kit is complete except for battery.

Conversion packages to expand to three or four functions are available.

11G20 2 Ch. TRANSMITTER KIT $39.95

FLITE PAK PRICES

Switch and connectors are furnished in the flite paks plus a money saving price!

12G18-2	1-8 FLITE PAK w/2 BANTAM SERVOS	$74.95
12G18-4	1-8 FLITE PAK w/4 BANTAM SERVOS	$114.95
12G18-2L	1-8 FLITE PAK w/2 LINEAR SERVOS	$76.95
12G18-4L	1-8 FLITE PAK w/4 LINEAR SERVOS	$116.95

The above are available on: 26.995, 27.045, 27.095, 27.145, 27.195, 53.1, 53.2, 53.3, 53.4, 53.5.

JONATHAN LIVINGSTON SEAGULL?

Maybe not exactly, but Ray Crawford of Crawford Communications, 16142 Forrest Ave., Victorville, Ca. tells it like this:

"When I first saw the Ace High Glider, my impression was: 'It looks like a large soaring bird--an eagle, a hawk, or even a seagull.' The gears began to turn. I decided on simplicity, since an elaborate finish would be lost from the ground.

"The natural shape of the nose lent itself nicely to the hooked beak so this was no problem. The painting of the feathers proved quite simple.

"A low-heat film such as TopCotE or Solarfilm can be used to cover the foam before painting, although I used a different approach.

"My covering consisted of watered down white glue in two coats; light sanding, then one more coat of white glue. Before that coat dried, I applied heavy duty silk span. Then one more coat of white glue solution. Then a very light sprayed on coat of white dope--just enough to cover to a uniform finish.

"I found that it was extremely important to keep the glue very thin. This assured a smooth, even and light finish. The easiest method I found for applying the glue was to squirt undiluted glue onto the foam, then wet a one inch paint brush with water and paint or spread over the glue until it was evenly distributed.

"The painting of the feathers was quite simple. I used a 1/2" brush and black dope. Feather trim is easy for the non-artist, because mistakes and broken brush strokes add to realism. Do not paint too heavily. Too wet a brush will not give a good feather look. You can begin on the tips and work in, although it will work from inside to the tips just as well. A finish coat of clear dope to seal out dirt is advisable and adds only a little weight.

"After the finishing touches were put on Jonathan, my sons and I went out for our first test flight. Much to our surprise and delight, our first flight was such a success that the people watching could not believe a Rudder-Only system would perform so well. The landing of that and following flights were so smooth, we were accused of having elevator control!

"The unusual appearance and the excellent flying characteristics made our Jonathan a source of amazement every time we flew."

Thanks, Ray, for sharing with us.

Give yourself some fun--fly simple Pulse Commander Rudder Only in an Ace easy-to-fly-foam airplane especially designed for R/O. It could be habit forming!

Yours sincerely,

Paul

Paul F. Runge

USE THE COUPON ABOVE TO GET OUR COMPLETE HANDBOOK/CATALOG

MAYBE THE TIME HAS COME. . . . . .

With the shortage and expense of gasoline needed to get to the large flying fields and the soaring cost of model fuel, maybe the time has come for you to move to a smaller airplane....one that can be flown in the local schoolyard and carried there in a Volkswagen--one that gets about ten times the flight time per ounce of fuel than your .60 powered beast--one that you can hand launch and not need a long, manicured runway--and one that can offer your as much enjoyment and excitement as your present gas gulper.

Below are two of the best .049 class airplane kits which excell in performance, quality, and appearance. From the small airplane experts, Ace R/C, Inc.

Whizard

DESIGNED BY OWEN KAMPEN

SPECIFICATIONS
Span--40¾ in.
Area--240 sq. in.
Length--30 in.
Power--.049 to .051.
Functions--Rudder-Only;
Rudder-Elevator; Rudder-Elevator-Throttle.

An ideal sport airplane for .049-.051 engines and single, two, or three channels. Features sturdy crutch fuselage construction, foam wing, band sawed parts, formed landing gear, and photo illustrated instructions.

Because the financial and emotional investment is low in the Whizard, you will find yourself doing more gutsy things flying this airplane and enjoying it more than ever before. Fun is the major characteristic of the Whizard.

13L105 WHIZARD KIT $17.95

WAR BIRD

DESIGNED BY ROMEY BUKOLT

The Warbird is an exciting approach to small plane appearance and performance. With one kit you can build either a P-51B, a ME-109, or a Hawker Hurricane. Because of the configuration of the kit, you can even be creative and design your own Warbird.

Performance is not sacrificed for the realistic appearance of this airplane. Using a TeeDee .049 or .051 with ailerons and elevator control the Warbird is a fast, groovy, responsive ship with excellent axial roll and inverted flight characteristics. Because of its clean lines, it penetrates well and the power-off glide is outstanding.

It builds quickly, looks great, performs beautifully, and is cheap to operate. What more do you need?

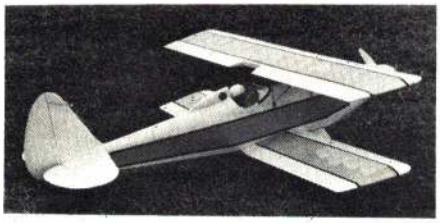
SPECIFICATIONS
Span--42 in.
Area--225 sq. in.
Length--29 in.
Power--.049 to .051.
Functions--Rudder-Only;
Rudder-Elevator; Ailerons-Elevator.

13L210 WARBIRD KIT $17.95

ACE R/C INC.

AAM TESTS

THE ACRO-STAR
JIM McNERNEY



The Acro-Star is a beautiful new bipe designed by Don Dewey and kitted by Airtronics. The excellent materials and fine craftmanship which we have learned to expect in Airtronics' glider kits are present in this, their first power model. The full-size, rolled plans are accompanied by a complete reprint of the magazine building article text.

By the way, there were a few discrepancies in the text to be on guard for. Formers and cabane supports are misnumbered in the text. Check all formers for fit and mark with numbers shown on the plan. The text incorrectly gives the nylon wing bolt size as 8-32. They are actually 10-32. The text also neglects to indicate tail installation. These are minor discrepancies, but the text is basically excellent, with step-by-step instructions and many useful building hints, including recommendations on type of adhesives to use in each step. Caution: Zip Grip 10, recommended for windshield installation, has been taken off the market along with other so-called super glues.

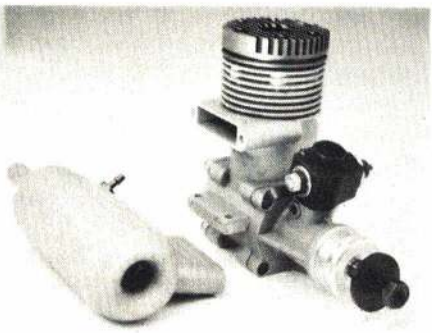
One deviation from recommended construction was made in the test model. The entire fuselage and tail surfaces were covered with 1/2 oz. glass cloth and surfacing resin, thinned 50 percent with Styrene Monomer. It has been our experience that surfaces covered with resin alone are extremely brittle and subject to dings. The glass adds little weight and improves surface strength markedly. The final finish is K&B Superpoxy. Wings were covered with Super MonoKote after the center sections and strut locations were glassed and coated with resin. Although we had a set of Citabria wheel pants, we didn't install them because we fly from a pretty rough field. We powered the test model with a Webra 61 Blackhead with extractor muffler. The engine was installed per the plan, but if we had it to do over we would offset the engine mount so that the spinner would be centered in the nose despite all that right thrust. We also found it necessary to add a 1/2" block to the nose to cowl in the engine. The blocks provided are too short to reach to the rear face of the spinner, if you install a Webra on a Kraft 60B mount with the thrust shim provided in the kit.

The wings can be built flat on a building board or on a jig. Building is fast due to precut parts, including shear webs and cap strips. By the way, all parts are sawn and sanded—not die-smashed. Hardware, including hinges, horns, screws, bellcranks, pushrods, etc., is provided.

The Acro-Star is an extremely lively flyer with excellent slow speed characteristics. It is also an excellent aerobatic airplane. The airplane is fairly critical on CG location. The test model weighed 6 lb. 15 oz. all up. The Webra made it stand on its tail. At full bore, the plane reacted just like a pattern bird.

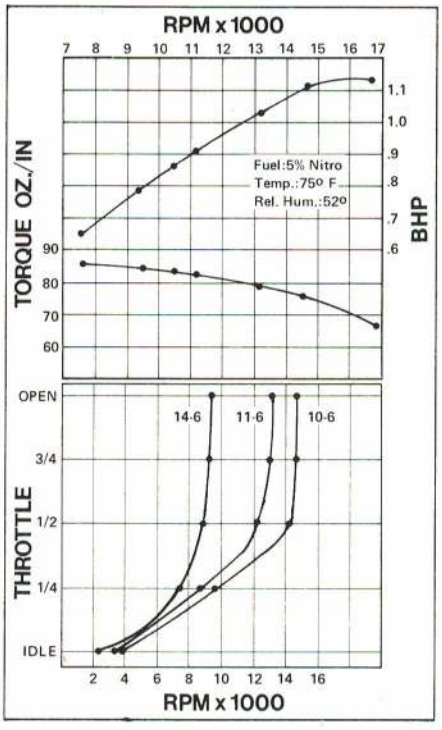
Specifications: Wingspan—50.6 in. **Wing area**—820 sq. in. **Power**—40-60. **Weight**—6-7 lb. **Channels**—4. **List price**—$79.95.

HB 61 RC
CLIFF TELFORD & DON JEHLIK

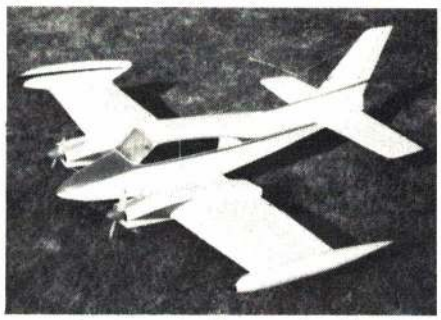


The HB 61 is quite attractively finished with a grey casting and red anodized head. In many respects, this Austrian engine resembles the American Veco 61. In fact, the Perry carburetor and the muffler are identical to those used on the Veco. The HB differs in that it has a removable shaft housing and a 1/2 x 28 propellor shaft (the Veco is 5/16"), and does not employ a chromed sleeve as the Veco does. The head on the HB has a hemispherical combustion chamber with no squish band. The piston is of the baffle type and features a Dykes ring. The wrist pin is full floating with no circlips. The connecting rod is bronze bushed at both ends, but seems rather small for an engine of this size. The workmanship in the engine is excellent throughout. Tolerances and surface finishing are superb. The cylinder liner is perhaps the roundest and straightest we have checked in some time. This contributed to a rather quick break-in period of about 40 min. and an excellent compression seal. Starting the engine is a snap. Although the engine comes with a small nozzle like attachment to aid in priming through the exhaust, this was seldom needed.

Power tests proved that an engine with a conventional layout dating back to the McCoy 60, can still produce high power if the engine is accurately produced. The peak horsepower of 1.14 puts it in the strong class, along with the best 10 cc RC engines we have seen. The relatively flat torque curve should make this engine an ideal choice for helicopters and boats as well as aerobatics. Because the horsepower peak is reached at around 15,000 rpm, an 11 x 6 or 11 x 7 prop should prove best for aerobatics.



ROYAL PROD. CESSNA 310G
STEPHAN A. HABERSHAW



Anyone interested in an enjoyable winter project with gratifying end-results would be well advised to invest in a Cessna 310G kit from Royal Products. It is of standard, built-up construction but with a different flair in that it's a twin. Kit materials are excellent throughout with beautifully cut plywood fuselage formers and die-cut balsa parts which require little sanding. Balsa blocks comprising fuselage nose, tail and wing nacelles do require shaping, however.

Wing construction was begun by building the right panel first. Care should be taken in protecting the wing plan as it illustrates only the right half. I built the left half by first applying baby oil to the plan and inverting it so the lines could be seen. Wing tip tanks are built with formers over which are applied 1/8 x 3/8" balsa strips. Although the plans do not show a method for incorporating retracts, they are easily installed with hardly any modification necessary. I used Goldberg retracts and they handle this phase of the action very well. Fuselage and tail are constructed in the usual manner with no problems encountered.

Engine installation is optional in that they may go mounted upright or inverted using the aluminum mounts provided. I chose the latter method because a clean looking airplane is the result.

With the construction phase complete, the model was silked, doped and K&B Superpoxy used as finish. This paint is the most durable and best looking paint I have used to date.

With two Enya 45 engines, an eight-oz. tank in each nacelle and radio installed, my plane turned out tail heavy which required the addition of six oz. of lead in the nose. This brought the all-up weight including 16 oz. of fuel to 12 lb. 9 oz.

Needless to say, it was with some anxiety that I approached the flight line for the all important first flight. Flying a twin-engine model was something I had not previously experienced. After a takeoff run of about 75 ft., a little up elevator was fed in and it became airborne immediately. Neither rudder nor aileron correction was necessary, but down elevator trim was applied because the rate of climb was too steep. Subsequent flights showed that very little if any up elevator is required on takeoff.

Engine failure was of primary concern to me and has happened on a few flights. This bird will not fly on one engine, but will yaw toward the side of the stalled motor. Opposite rudder and aileron helps some, but pulling the throttle back to low motor is the solution. The plane corrects itself immediately and transitions into a flat glide. In spite of a weight of almost 13 lb., this plane has an excellent glide ratio and thus far has returned to the landing spot anytime this situation has developed.

Because my intentions are to enter the model in Sport Scale events I have not tested its aerobatic capabilities to any great extent. It does do loops and rolls quite well. With wheels retracted and both engines running full throttle, it's a great stopper on a low pass over the field.

Specifications: Wing area—722 sq. in. **Wingspan**—72 in. **Engine size**—Twin 35-60. **Airfoil**—Flat-bottom. **Price**—$74.95. **Fuselage length**— 51 in. **Imported by**—Royal Products Corp., 6190 E. Evans Ave., Denver, Colo. 80222.

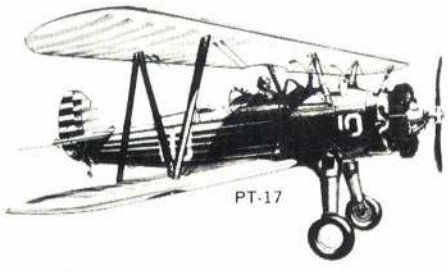
"SCALE JOBS AS ONLY GUILLOW MAKES 'EM"

Kit 802
Cessna Skyhawk
Popular private aircraft
1" scale — 36" wing span

Kit 803
Stearman PT-17
World War 2 Trainer
3/4" scale — 28" wing span

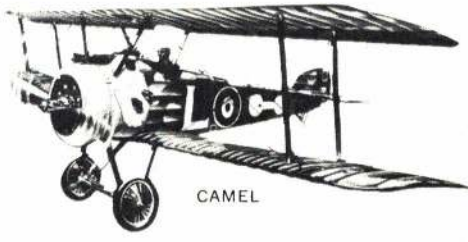
FOR .049 TO .15 U-CONTROL, .049 FREE FLIGHT AND RUBBER POWERED FLYING

RETAIL: **$10.00 each**

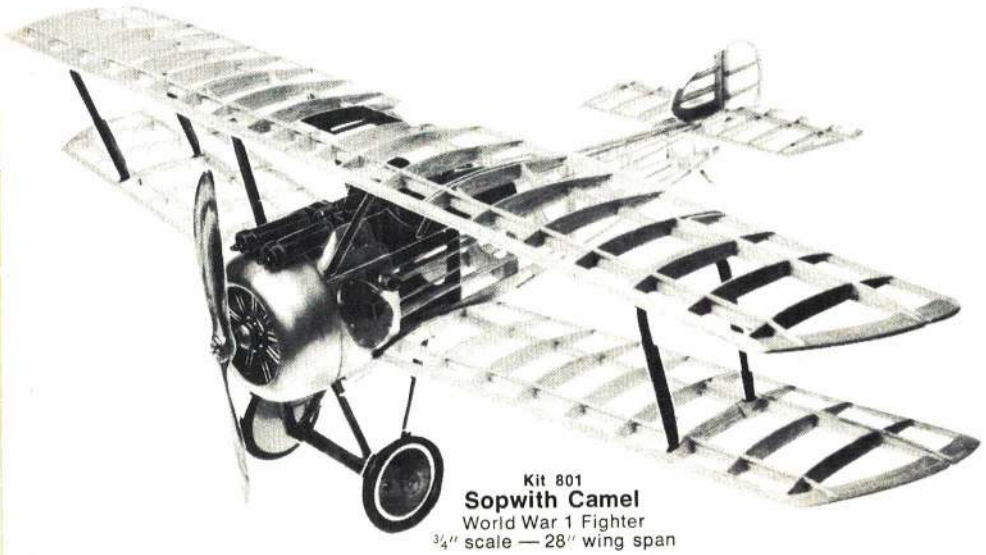


PT-17

CESSNA 172



CAMEL



Kit 801
Sopwith Camel
World War 1 Fighter
3/4" scale — 28" wing span

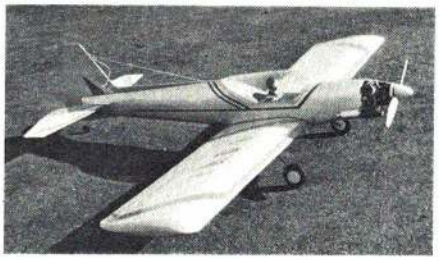
Exceptionally beautiful display models with all the scale detail that have made Guillow kits the "Best in Balsa." Pilot figures (Camel and PT-17), plastic rotary engine (PT-17), plastic cockpit deck and twin machine guns (Camel), unique one piece canopy (Cessna 172), full set of decals, scale wheels, and scale propellers (all 3 models). Gas motors and liquids not included.

Guillow's

Paul K. Guillow, Inc., Dept. AM, Wakefield, Ma. 01880

Hobby stores have Guillow models. Check Yellow Pages for one nearest you, or send direct to factory adding $1.00 handling in U.S.A., $1.50 outside U.S.A. Send 10¢ for catalog.

WAREHOUSE SYSTEMS STRATO 210
PAT MURPHY



This unusual looking airplane was intended for the sport flier who wants a plane capable of aerobatic maneuvers and for the competition flier who wants a sport airplane capable of flying precision pattern. It is also strong enough to fly in open pylon or sport pylon.

I found the building instructions included in the kit to be very good, especially when used in conjunction with the plans. It is important to follow the construction sequence laid out by the designer. One of the more appealing aspects of this particular design is the turtle deck, even though it makes the construction a little more complex. The turtle deck and the planked round nose gives the 210 a very sleek look.

The parts in the kit that I built were well made, square with straight edges and clean die-cutting, even in the 1/4" balsa. Balsawood quality was very high and plywood was also good.

I used Ambroid glue in construction of the wing and in as many other places as possible if the joint was to be sanded. Where Alphetic resin (Titebond, Sigbond, etc.) is used, it was applied with a brush, so the joints did not show an excessive build-up of glue. A fillet of this glue does not make a stronger joint; strength is obtained by fitting the wood parts together with no air gaps. If necessary, use a sanding block to get this type of fit.

To bend the wood to shape on the turtle deck and on the leading edge of the wing, I used household ammonia on the outside of the curve instead of water. The wood is a little less likely to split.

I painted the engine and tank compartments with epoxy for fuelproofing and additional strength in the nose of the plane. The only deviation from the instructions was that I built the wing on an A-Justo-Jig. In the past I have used the method described in the Construction Manual and found it also to be very fast and accurate. It is imperative that you use a straight building board.

I covered the 210 with Kwik Coat and Solarfilm. The radio was installed as shown on the plans and I found that the plane was balanced as directed in the Construction Manual.

Before flying, check to make sure there are no binding surfaces in the control rods and that all surfaces accurately recenter. Don't use excessive travel on any of the surfaces until after you have flown the plane and determined how much travel you really need. I used: ailerons—± 5/16"; rudder—± 3/4"; elevators—± 3/8".

There are several of these models in my area and all of them seem to fly a little better than the average sport plane. It will perform excellent pattern maneuvers, and the design lends itself to being a good fun fly airplane.

Specifications: Wingspan—59 in. **Area**—572 sq. in. **Weight**—4½ lb. **Engine**—29-45.

5-CHANNEL SPORT SERIES
FRED MARKS

The Test System: A five-channel set consisting of the transmitter, receiver, four servos, all nickel-cadmium batteries and charging connectors. The test set was on 72.320 (violet-white), but is available on all RC frequencies.

Transmitter: Electronically, the same as Orbit six-channel sets have been for a number of years. High power output of about 800 milliwatts. For primary channels and trim of functions provided by two D&R nylon open gimbal sticks. These sticks use the same ceramic potentiometer element used in servos for a number of years by all manufacturers. Encoder uses free running multi to set repetition rate at greater than 70 frames per second. Five half-shots used for control. The fifth channel, for retract gear, is controlled via a switch.

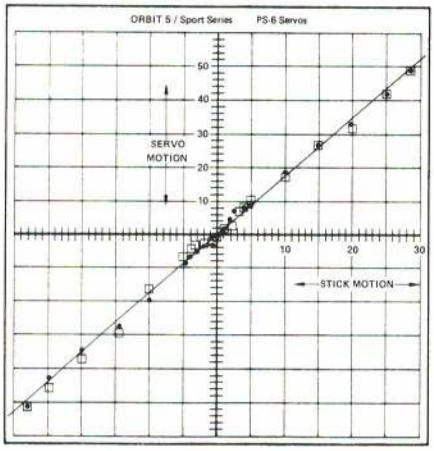
Receiver: Receiver front end is the same solid unit used in previous Orbit receivers. Uses double-tuned front end, three stage IF; local oscillator is a doubler that uses third-overtone crystal. Detector stage uses silicon diode clipping with new "keep-alive" feature that assures clean baseline to maximum range. The decoder uses discrete components for squaring and set pulses but uses an eight bit shift register for decoding. The receiver/decoder power supply is zener regulated at three volts and can operate without loss of range with one cell discharged. Receiver is all on one deck, housed in a vinyl-clad metal case.

Servo: The PS-6 mechanism is used. Servo amplifier is Orbit/Texas Instruments IC amplifier that has all active components including output transistors on the chip. Nineteen external passive components are used.

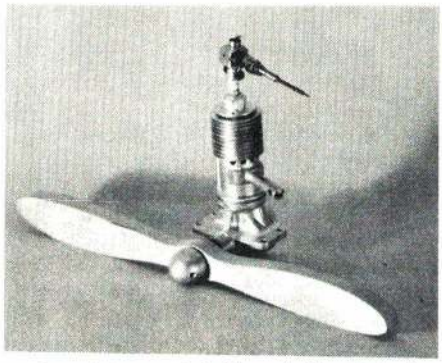
Power Supplies: Transmitter has 9.6 volt nickel-cadmium pack, receiver uses 4.8 volt pack. Charger is built into the transmitter and is voltage dropping type.

Evaluation: The test set performed satisfactorily under all flight conditions including verifications of Orbit advertised claim of one complete flight with the transmitter antenna collapsed. Operation at 0°F and at 150°F satisfactory. Other performance data shown below. The D&R sticks are smooth and have very tight centers; however, a tiny bit of slop is present at center. This was not enough to show up in the system accuracy checks in the Fig. An excellent set that sacrifices nothing over the excellent Orbit systems except for the sixth channel and buddy-box feature. An

(Continued on page 95)



P.R.E.
ROBERT A. CAMARATA



Soon to be marketed here in the States is a trio of new Polish Racing Engines, 60, 40 and 15 sizes. These new engines have many advanced design features which set them apart from our U.S. products. Taken at random, some of these include: glow plug and head of one-piece construction to eliminate any loss of compression around the out-of-date copper seals. The entire engine is constructed of steel to insure strength and long life. The head is welded to cylinder, for still more insurance against compression loss.

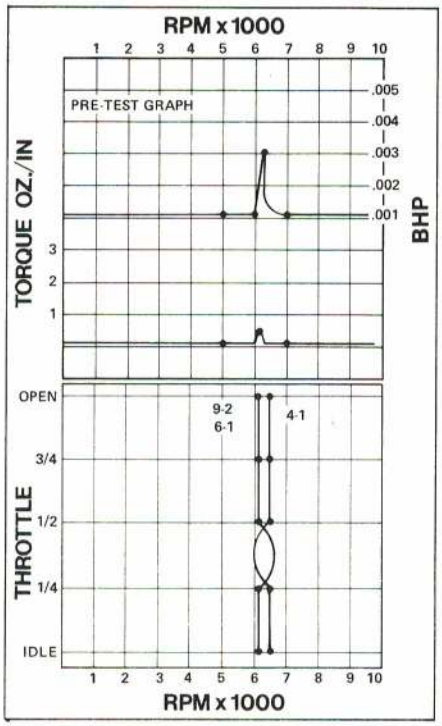
Last but not least, to eliminate internal damage from dirt and grit, several new ideas are being tried. The clearance between the piston and cylinder walls has been increased to .010, and the size of the carburetor intake has been decreased to a .003 dia. Thus, anything that can pass through the intake will have sufficient clearance to prevent damage to piston or walls.

Cooling fins have been eliminated to cut down on weight, and noise has been effectively reduced by a muffler which is an integral part of the engine. A steel pipe 3-29/32" long runs off of the right side of the engine. The inside dia. of this pipe is .8000 metric or .031496 in. Here lies the key to this unique muffler, in that any American-made cigarette may be inserted in the pipe to act as the filter element.

Production short cuts have yielded large savings and allow a surprisingly low suggested retail price ($1.298 F.O.B.P.O.E. ed.). Of course, due to this, the exterior of the engine comes unfinished and the mounting holes are undrilled.

A prototype engine has reportedly turned a 4-1 prop at a respectable 13,000 rpm. However, there seem to be a few bugs which must

(Continued on page 95)



New FUTABA PROPORTIONAL SERIES

FP-6DN

6-CHANNEL RADIO CONTROL

The FP-S5 is uniquely designed with Futaba Custom ICs and a 3-wire, gold-plated 3P mini-connector for compactness, light weight and powerful torque with low power consumption. A highly advanced servo.

FP-T6D 6-channel transmitter
complete with 8/450mAH nickel cadmium battery package.
Built in battery charger.

4/450mAH nickel cadmium battery package

FP-R6D
6-channel IC receiver
Weight: 1.96 ounces
Dimension: 2.71×1.57×0.75 inch.

FP-S5
Compact, 3-wire servo.
Power consumption: 7mA
Weight: 1.3 ounces
Dimension: 1.54×1.48×0.71 inch.

The Futaba Tx, Rx and Sx are all interchangeable due to consistent quality control plus design and production to rigid specifications. Use them as a set for maximum performance.

Transmitter (FP-T6D)
High maximum output assures complete 6-channel control. Throttle position can be varied (mode 1, mode 2). Smooth control with the ball-bearing equipped stick mechanism and the neck strap makes the transmitter the easiest ever to use.

Receiver (FP-R6D)
A light, compact and rugged unit including an 8-bit decoder and a 3-wire, gold-plated 3P mini-connector. Includes 2 low power ICs, 8 silicon transistors and 7 silicon diodes. The RF and OSC coils are housed in a shielded case making them strong against spurious signals.
A constant voltage circuit guarantees stable operation from 4V~6.6V (guaranteed from 0~150°F). A double-tuned pre-selector circuit is included.

Servo (FP-S5)
Futaba's original BA-607 and BA-606 monolithic ICs, 16mm mini-motor and 3-wire, gold-plated 3P mini-connector makes the unit compact, light weight and rugged and provides high output torque (2~2.5 kg/cm) and high resolution with low power consumption (7mA). A temperature-guaranteed constant voltage circuit gives complete control up to 4V without mutual interference from servos.
The BA-607 monolithic IC has 73 transistors, 13 diodes and 79 resistors —a total of 165 parts.
The BA-606 monolithic IC has 2 PNP and 2 NPN type high output (500 mA) transistors, 4 diodes and 4 resistors—a total of 12 parts.

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WALT MOONEY ON FF

Flightmasters Jumbo Scale Contest: Once in a while, we get to see a masterpiece. Usually in the model airplane field, it is one of the larger models. At the last Flightmasters Jumbo Scale Contest, we had that opportunity. It was John Oldenkamp's Peanut Scale model of the Eastbourne Monoplane. Not only was the model superb, but John, who is a photographer for *Psychology Today*, has also come up with a picture of his model which is a masterpiece in its own right.

If I could get several of these every month, the column would be a cinch. Don't hesitate to send them, even if they don't match this quality. If I don't get much news from elsewhere, most of the section will be about contests I can attend—and I live in San Diego. Enough said?

The Jumbo Scale meet was a lot of fun, but there was one minor problem. The rules said the models must ROG. Elsinor dry lake is mostly dry, weedy grass on top of soft sand—not really the best surface for Rubber Scale ROG. An official vote among the contestants, as to their preference HL or ROG, resulted in retention of ROG. It was surprising how many Jumbo Scales managed to meet the challenge. Ray Berens won with his well tested Skyfarer.

Chicago Scalemasters Newsletter: The Chicago Scalemasters put out a monthly newsletter, available to non-members for $3.50 per year. Write to the Editor, Keith Ward, 636 Swain, Elmhurst, Ill. 60126. Keith probably doesn't need much extra work, but if you really want to improve your ability in making scale models, this newsletter has consistently come up with excellent model making tips. It also has local contest news and schedules, and a few thought provoking editorials.

Boeing Free Flight Scale Meet: The Boeing Hawks held their first annual Free Flight Scale meet at Kent Field. Jim Walters reports that, in spite of high winds and threatening rain, 26 fliers showed up with 66 models. The six-hr. event proved several things—modelers are crazy (not really news), P-Nuts will fly inverted, dethermalizers should be used (especially in conjunction with a full tank of gas), and one can have fun, even in a gale.

Jim Walters took first in Rubber (15 models were entered), flying a Reisler R III. This model has a 24-in. span. It has Hungerford wheels. It won, even though engine and rigging details had not yet been added.

Second place was taken by Joe Deady's Consolidated PT-3. The model was built directly from enlarged Nieto drawings. It has a 35-in. span, Hungerford wheels (quality wheels show up on quality planes—keep up the good work, Fulton Hungerford), Williams Brothers cylinders (another excellent source of quality details), and an air brush finish. This model had to top scale points overall and placed second in Rubber Scale.

The photos of the Reisler and the PT-3 were taken by Mark Vercammen, a 14-year-old Junior who also flew in the contest.

Dick Stark entered a Guillow kitted Fokker Triplane, powered by a Cox 020 Pee Wee engine. It was flown out of sight forever and netted him second place, behind Bill Gaiser's 1910 Caudron. Because of the wind, only four of 23 Gas models were flown. Question? Is it better to fly your model and be a hero, or save it for a better day, and not even place? Our kudos go to the heroes.

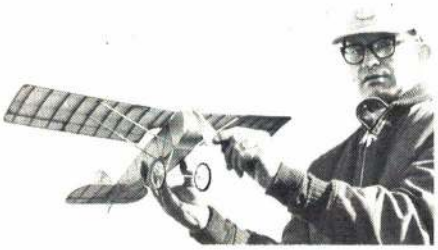
In Peanut Scale, almost all the models were flown. (It's easier to be a hero when the price is small.) Joe Deady took first with his Andreaason BA-4B, and John Kamla took second with his Huntington. Thirteen models were flown.

Junior Scale was won by Steve Harvey, flying a Microplano Velo; Rod Schakeford took second, flying a Guillow Nieuport.

In addition to 17 original designs, the following kit manufacturers and/or designers were represented by models built from their plans or kits: Guillow, Sig, Sterling, Peck, Tern, Goldberg and Mooney.

In addition to the models already mentioned, some of the rarer birds flown included: an Aeronca C3, Aeronca Defender, Boeing P-26, Winnie Mae, Fleet 7, Itoh Eaglett, Hurricane, Corben and a Hornet Moth.

Reisler R III by Jim Walters still didn't have all the engine and rigging details completed, yet it took top honors at the Boeing Hawks meet. (Photo by Mark Vercammen)



Who says that kits don't fly as well as scratch-built? Guillows' Fokker Tripe went OOS! Maybe a re-evaluation of the potential of out-of-the-box models is needed. (Photo by Mark Vercammen)

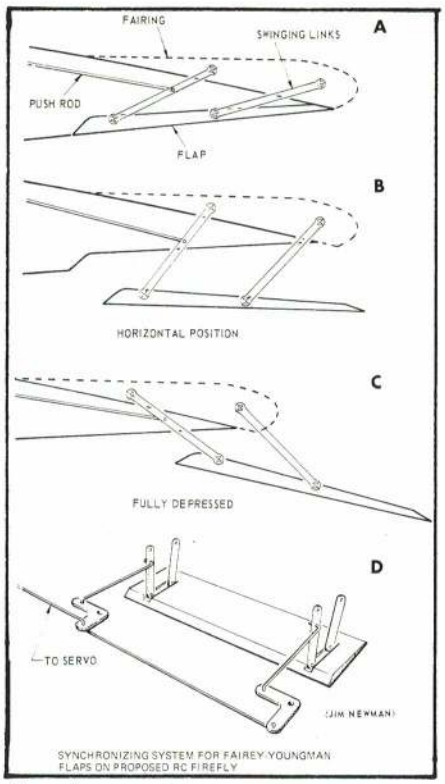
Joe Deady took second place at the Boeing Hawks meet. Consolidated PT-3. (Photo by Mark Vercammen)

CLAUDE McCULLOUGH ON RC

Firefly Flap: In the November 1973 **AAM**, extensive coverage of the Fairey Firefly MK 5 included suggestions from Dave Platt on building an RC scale model from his three-view drawing. According to Jim Newman, who has personal experience, including carrier landings as a crewman aboard this big Royal Navy aircraft, the Fowler-type flaps shown in the article were not in fact used. Instead, Fairey-Youngman system flaps were fitted. These had an unusual motion, moving down horizontally before moving back and down, as shown in Jim's accompanying diagrams. He feels that fitting this type of action would not only be more scale-like but would offer improved mechanical reliability over a sliding system, which might jam at the wrong moment.

Two sets of swinging links are required on each flap. The inboard set is nearly at the root rib, and concealed by the root fairing. A streamlined fairing out on the wing trailing edge covers the other pair. The position of the upper pivots is critical. They are not located on a horizontal datum line, nor are they exactly parallel. Experiment with pins, pieces of 1/8" sq. balsa, and a cardboard or plywood profile of the wing section to determine the proper layout for a desired model size. This simple mockup procedure is one that every scaler should use before attempting to build any kind of unusual control action.

Jim recalls that the gap between the wing trailing edge and flap, when it was lowered to the horizontal setting, was only about six in. Fully depressed at a 40-45° angle, the gap at the flap LE and wing underside was approximately three in. He feels that care must be taken to insure that the movement of the outboard and inboard pairs of links is synchronized and (in drawing D) suggests a method of doing so, by using two 90° nylon bellcranks.

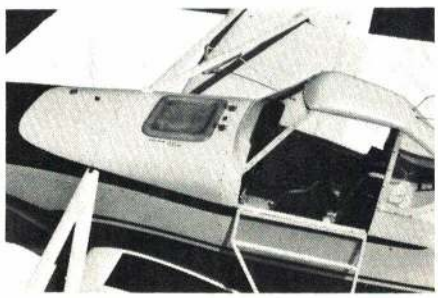


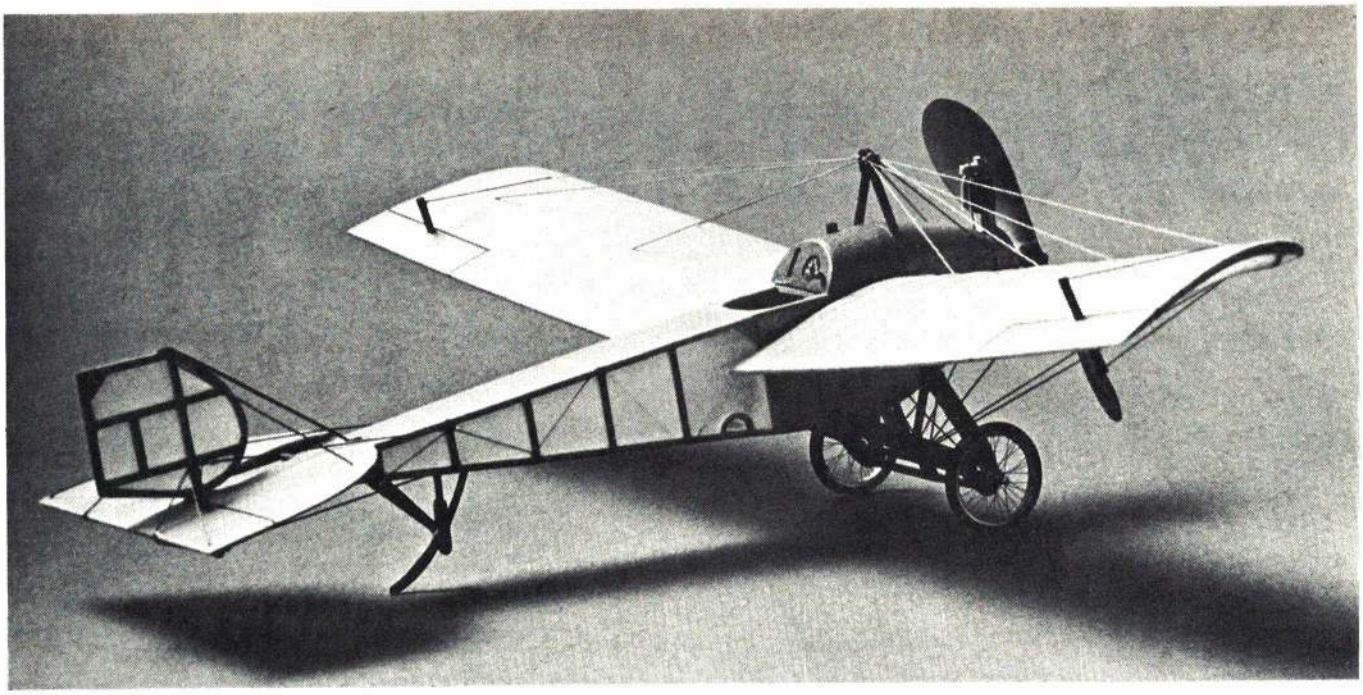
SYNCHRONIZING SYSTEM FOR FAIREY YOUNGMAN FLAPS ON PROPOSED RC FIREFLY

Square: Some years ago, the writer, deter-

Dick Graham's ill-fated Piper Pawnee. Radio problems caused the model to bite the dust. Model had exceptionally smooth flight characteristics.

Cockpit detail of Dick Graham's Piper Pawnee. The hopper to hold the chemicals directly in front of the pilot was complete down to the handmade operational latches. Excellent interior detail is a Graham hallmark.





This Eastbourne Monoplane provided John Oldenkamp with a photographic study. One picture is worth. . .in this case, Peanuts!

mined to get an unspoiled and exact scale look around the cowling of an RC scale model, decided to dispense entirely with the usual protruding needle valve adjustment handle and associated hole. The idea was that, at the beginning of a contest or flying session, the engine would be run up and the needle valve set at the correct running position. Then the cowl would be replaced, and flying done without any further tinkering.

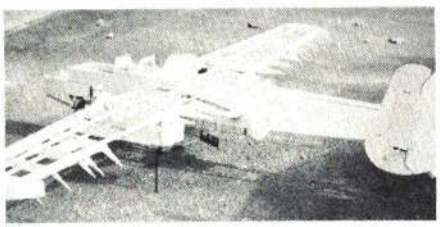
Be advised that this did not, and will not, work. It was learned the hard way—through flights aborted before completion, and actual crackups caused by engine failure. Atmospheric changes can occur in an hour or two that will radically alter a carburetor setting—even if you go a step further and run up the engine with cowl in place and alter the needle valve to allow for increased operating temperature. So back to the hole in the cowling—this time with a screwdriver adjustment slot filed in the top of the valve. Elimination of the handle sticking out is at least a partial improvement. However, it is not without difficulties, since the screwdriver is hard to get in the slot and hard to keep there with the engine running. Dick Graham used a better way on his Pawnee, which unfortunately bit the Oshkosh dust at the NATS due to RC trouble. He used standard hobby shop square brass tubing, adjacent sizes of which will telescope together. A piece, long enough to reach up almost to the cowling surface, was soldered to the top of the needle valve. He made the next size of tubing into an adjustment tool with a handle. When slipped down over the internal tubing, positive adjustment can be had without trouble. For appearance's sake, stick a small square of colored plastic tape over the cowling hole when the model is on display and after starting the engine at a contest.

BILL BOSS ON CL

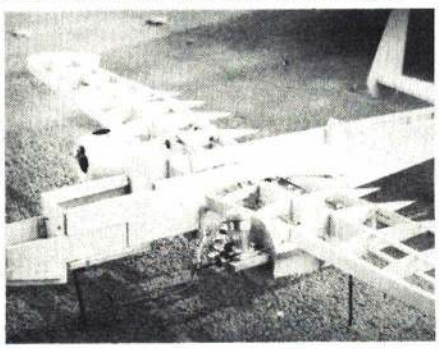
Sport Scale Control System: As most of you probably know by now, a CL Sport Scale event has been added to the list of AMA events. And, as I pointed out in the February '74 Scale column, it's an event aimed at getting more modelers into scale activity at a level which should not be much more demanding than building and finishing a full-bodied plane. In addition, there is a wide selection of Sport Scale kits on today's modeling market, and more being produced all the time. I also see this event as a proving ground, or experimentation event, for the more serious scale enthusiast. It's an event for which a modeler can build a model (from a kit), in a relatively short period of time, in order to test new finishing techniques, control systems, etc. These models could be used at a later date in a super scale job. The bonus for the super scale builder is that he not only gets to try out his new ideas, but also has an event in which to fly the experimental snip.

It is with this last idea in mind that I set out last November to build Top Flite's P-40. I chose this kit because it is close to the 1½" scale in which I am already building a set of scale plans. I wanted to develop a control system that would fit within the center section of the wing, and provide split flap operation, throttle control, and auxiliary fuel tank drop, yet use only the typical Roberts bellcrank system. Devising a system to do these few operations may not seem like much of a task but, when you try to build a system that

(Continued on page 96)



B-25 under construction is an ambitious project for Senior Dan Blum, Livingston, N.J. Model will have retracting gear, throttle control, flaps and lights. (Photo by Dan Blum)



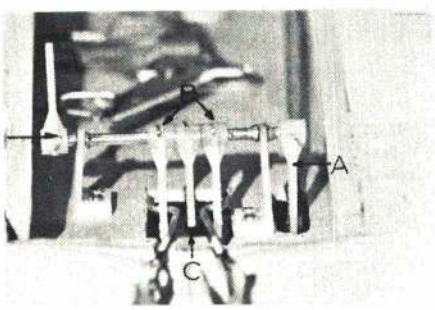
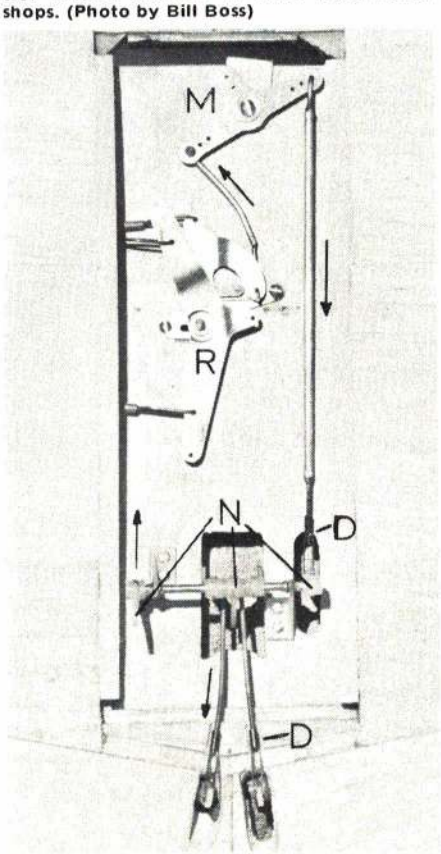


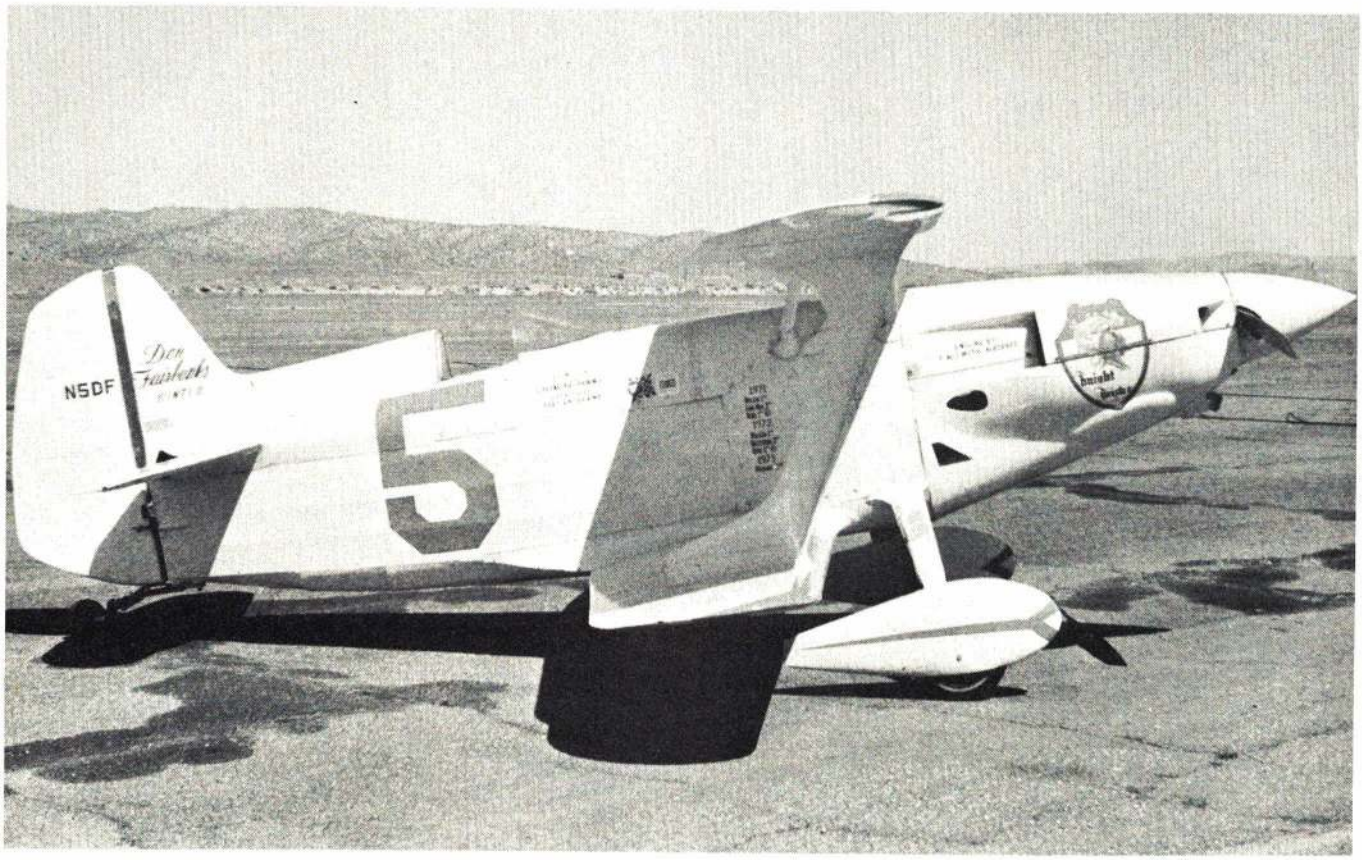
Photo B—Close up of rear control assembly shows simple construction and placement of crank arms for throttle, flap and auxiliary fuel tank drop controls. (Photo by Bill Boss)

Photo A—Overview of P-40 control system shows use of inexpensive, and standard control devices available at most local hobby shops. (Photo by Bill Boss)



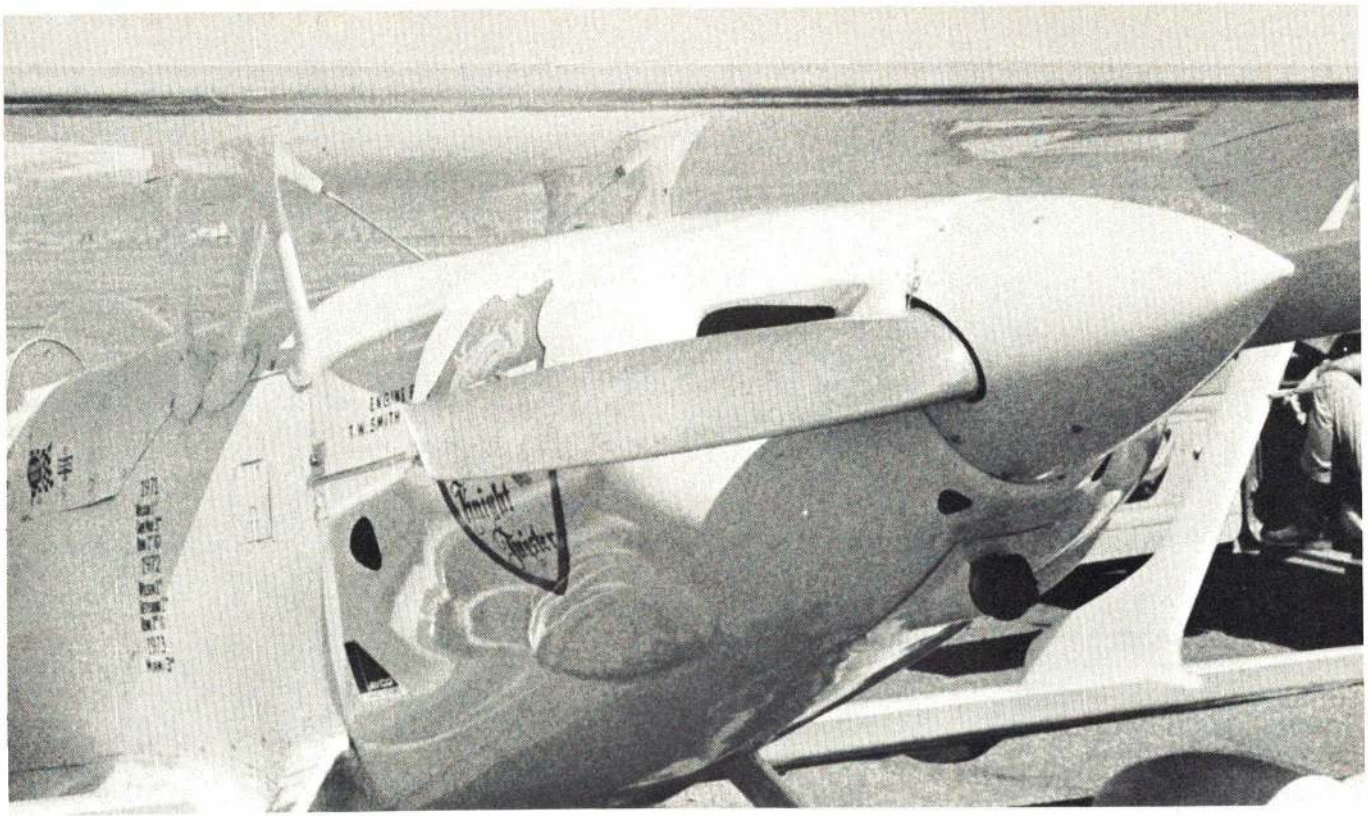
KNIGHT TWISTER

As sleek as a piece of contemporary sculpture, yet with the classic aura of the traditional biplane, the Knight Twister was the first of the biwinged racers. Today, there is a resurgence of interest in prolonging a winning heritage that reaches back to the days of Lindbergh. / by Don Berliner



ABOVE: Everything about the Twister is contoured, streamlined and smooth. Pilot sits far rearward, necessitating the extended nose for balance.

RIGHT: Orange emblem of the Knight Twister. Below the tight-fitting cowl is a Lycoming 135.



The snout is like a needle, ready to weave its way through slower traffic.

How do you change a bad reputation?

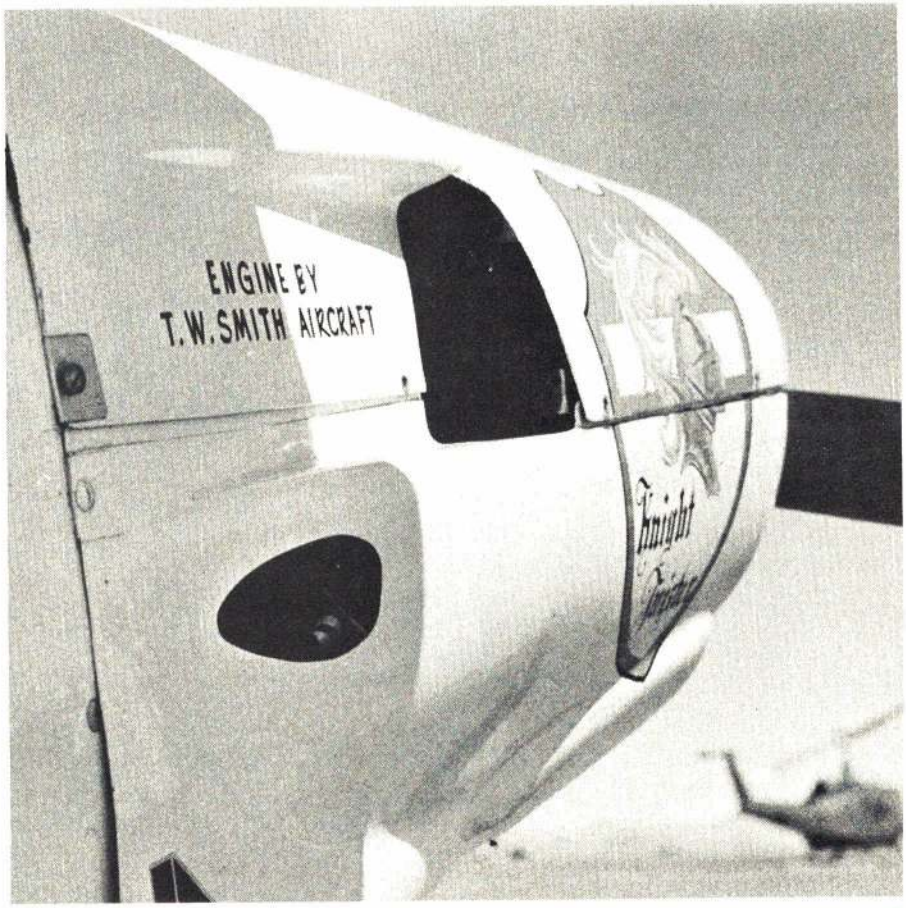
That problem faces the Knight Twister, first of the tiny sport biplanes, and considered by many to be a most difficult craft to handle. That is, unless you talk to a few of the guys who have been flying them for years without any sign of trouble. They say it's just another little airplane, like a Pitts or a Miniplane or a Starduster.

But it's a whole lot older than those other biplanes, and perhaps that's the source of its bad reputation. Back in 1928, when the Knight Twister was designed by Vernon Payne, it was in a class by itself: much smaller and much quicker than anything else flying. By comparison with a lot of the lumbering two-wingers then popular, the Twister was a hot little item, indeed.

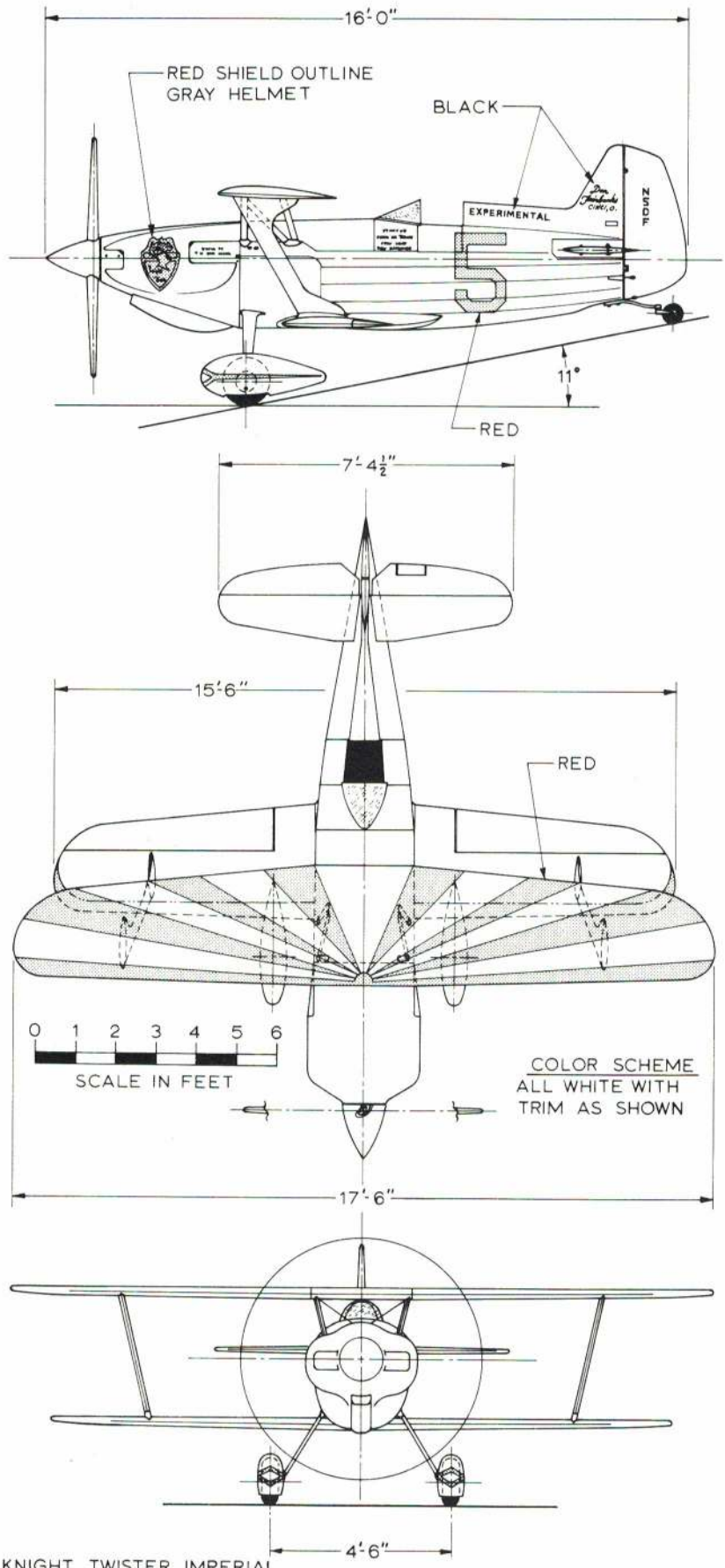
Today's amateur airplane building scene is dominated by one organization —EAA—which concentrates on communicating information about aircraft performance and pilot experience to its tens of thousands of members. If a new airplane has some big flaw, everybody finds out about it in a matter of weeks. Similarly, if a new airplane is a couple of notches above average, that gets around fast, too.

But in the 1930s, when very few people were building their own airplanes, good words or bad spread slowly from coast to coast via the grapevine. If someone had a bad experience with a new design, the news got around slowly, but it got around. And it was usually accompanied by all manner of rumor and exaggeration, until the report was so negative that it might bear little resemblance to truth. But it was remembered nontheless.

And that's about what happened to the first few Knight Twisters. They were



Exhaust ducts are small in order to minimize parasite drag. Cowl shells are fiberglass. Plane is by Don Fairbanks.



hot little airplanes, and sometimes got bent. And that's all it took to create a reputation for trickiness and danger. Some careful checking might have corrected this, but who could a guy ask? And who was sufficiently interested to dig for the facts?

Those who remember the pre-WWII aviation scene at all, usually remember the Knight Twister with a mixture of awe, respect and fear. Few ever saw one —only three were built. But pictures of the tiny machine that appeared in every aviation magazine showed an airplane that could sit proudly beside today's prettiest little biplanes. But it was so small. . . . And such a fine subject for hangar-flying sessions. . . "You'd never ketch me up in one o' them things!"

Most of aviation was changed drastically by the war, but not the Knight Twister. It retained its aura of mystery and its ability to strike fear in the hearts of those who had repeatedly tangled with Messerschmitts and Zeros. Of course, it was all hearsay—there was not a single Knight Twister in the air, as far as anyone knew. And it was doubtful that many would be built, since the CAA (now the FAA) had just about outlawed amateur-built planes.

Still, many plans sets had been sold before, and even during, the war to people who had been excited by the glamour of the Twister. One was reportedly being built at Pearl Harbor when the Japanese attacked, and designer Payne says he was even approached by an agent of Hitler who wanted to use them for heaven-knows-what.

In 1947, a Twister was begun in Oregon (one of the few places where building was legal), and bits and pieces were being worked on elsewhere. But little happened until the early 1950s, when the rules were rewritten to allow people to build their own airplanes just like the Wright Brothers had done. Gradually at first, then faster, the hobby of airplane building took hold.

Most of those early homebuilt airplanes were one-of-a-kind "puddle jumpers" with little performance and less looks. But they flew, and that was what counted—except for the few Knight Twisters that began appearing in scattered parts of the country. They looked great and, when built properly, flew very well. Tony Sablar, of New Philadelphia, Ohio, may have been the first guy to do something serious about improving the airplane's reputation. A true craftsman, Tony modified the airplane with an extended nose, and built for himself an airplane that flew as well as anything in its class.

Pictures of new ones occasionally appeared in EAA's *Experimenter* monthly and, once in awhile, one would be seen at a new type of event called a "Fly-In". Then, in 1964, the Knight Twister got an opportunity to show what it was made of. If it could hold its own with the rapidly growing collection of Miniplanes, Stardusters, EAA Biplanes and other little bipes, then maybe its name would no longer strike terror into the hearts of otherwise brave birdmen.

(Continued on page 88)

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MODEL TECHNIQUES

ED SWEENEY ON ELECTRIC FLIGHT

New Column: For the next two issues, I will be writing a short column on electric flight. I'm an RCer, so my projects and experiments with electric flight will reflect this involvement with RC. There is, of course, much happening in electric FF and CL.

My experiments are directed toward finding a substitute form of model power which is not environmentally objectionable. It should also use minimal energy (unlike our typical glow fuel), and offer good performance. The above items are very different; performance is so different, but so much fun, that no one knows which way electric flight should go. Even AMA does not know how to handle this new possible flight form (the rules now allow electric in FF Scale).

What is performance? It depends on what you want, and whether you insist on comparing the flight of an electric plane to a gassie. Although it is somewhat oversimplified, it is correct to say that, with a given plane, prop and electric motor, one can either power a given vehicle for a fast aerobatic flight of several min. duration, or power it for very long duration (cruising around and climbing steadily, but slowly). Change the battery pack and there is a change in flight characteristics. It would be like mixing apples and oranges to compare an Astro 10, to the Electro-Prop, yet both will climb a model quite high. Both are a great way to fly.

Electric flight experimentation is extensive around this country and in Europe. A full-size, man-carrying plane has shown excellent ability on electric power, too. As we have said in a recent editorial, electric flight is certainly the "coming thing" in modeling.

Our full-color lead photo for this section shows the array of aircraft types I have been flying during the past few months. They represent many different abilities and illustrate the variety of electric flight. It is not confined to pushing gliders aloft, as many modelers think.

This issue describes in detail, construction of the smallest plane in the picture—the FF Mattel SuperStar adapted to RC. I built it to try out the article in this issue and I like it—you will too. The larger, single-channel electric plane is also a Mattel product; however, after only a short production run, the product was discontinued. It does fly very well, it shows imaginative construction and outstanding toy-market engineering. The Signal Command is a collector's item now.

All other models here are rudder/elevator-equipped; the big glider has motor control, too. The silver winged plane is a Flyrofoam kit from Aristo Craft. Pat Potega put it together to fly the Astro 10 motor system. This is a fast and smooth flyer. Even with a flat-bottomed wing, aerobatics can be done during its five-min. flights, including an almost completed outside loop!

There are two Goldberg Ranger 42 models here—one has the standard length wing, the other uses an extended wing. Both are powered by a readily available, cordless, electric power tool motor and eight pencell Ni-Cads. Look for one of the first issues of the coming **Sport Modeler** magazine for the full story on this plane and power system.

The glider is obviously a Graupner Cirrus. It has had several seasons of flight as a sailplane, and was almost ideal for adaptation to electric flying with Graupner's new Electro-Prop power system. The Cirrus is heavy and big for the electric flight motors, but performance is quite satisfying anyway. I fly this with eight "C" cell General Electric Perma-Cell nickel-cadmiums, instead of the 12-volt Graupner battery pack. Dead-air power flights of 1/2 hr. are enjoyed with this combination. Graupner's batters give much more climb rate, but less duration.

None of these models have ever showed noise problems with their radios. All of them recharge in ten min. or much less.

I'd like to know what testing and experimenting has been done with control line and free flight. The greatest potential and most important application of electric motors may be in control line. Here, one can carry the battery at the center of the circle and just pass the current down the lines.

For this column, please write. If you have developed something big and special, we may want to do a feature article on it. If you have tried some motor from a common tool, tell us about it so we can list what's suitable and what is not suitable for electric flight. In future issues, we will list AMA events where electric power can be used and on what basis. We will also comment on all product developments in motors and batteries. Equally important we will pass on information about adapting present kits to electric flight.

After the next issue, this column will be handled by Mitch Poling. We hope you try his SuperStar conversion, as seen elsewhere in this issue.

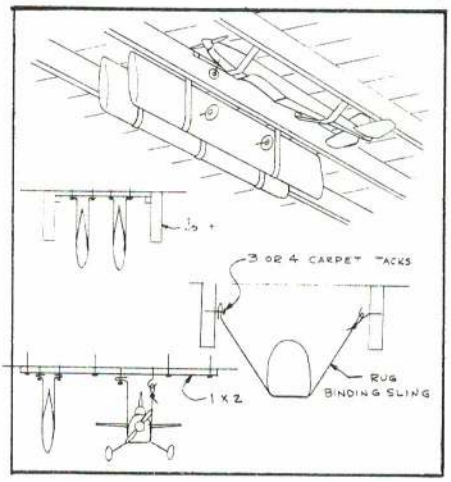
REAL ELECTRIC PLANE: A long-term project of Mr. Fred Militky, in cooperation with Bosch, Varta, and Henkel, is now an unqualified success. At the time of this writing, we only know that the first flight included a climb to over 1000 ft. in nine min. on what was supposed to be only a short test hop! There was over 50 percent more power and duration available at time of landing. We hope to present the whole story (including drawings) on this project in a future issue.

Where the Action Is columns are what you readers are doing, making, or flying. Support your columnist with articles, photos, and ideas. Sketch your neat gadget. We'll draft it for presentation. Each item earns you a $5 bill. Submit to the writer, c/o AAM.

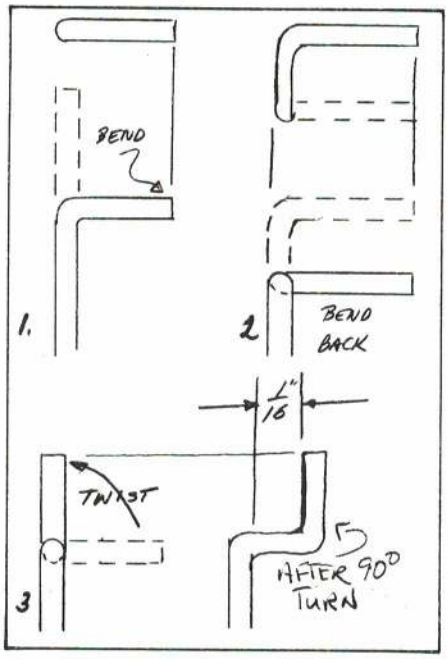
FRED MARKS ON RC

From *The Tom-Tom:* Bob Mayhew suggests the use of cloth slings for storing models. It works well and keeps the fuselages and wings neatly out of the way. Maybe you can use this idea.

My workshop ceiling is not finished; the floor joists are exposed. The plane parts hang in between these joists, well over my head. This idea should work just as well on a smooth ceiling. First attach 1 x 2 wood strips to the ceiling and then attach the rug edging. Rug edging can be bought by the roll from most rug edging shops. It is strong; it is wide, about 1½", and is soft, so that it doesn't mar the planes. Use long carpet tacks which have large heads for attaching the slings. The loop on one end can be made by a knot such as the Bowline. The sketches show this technique.

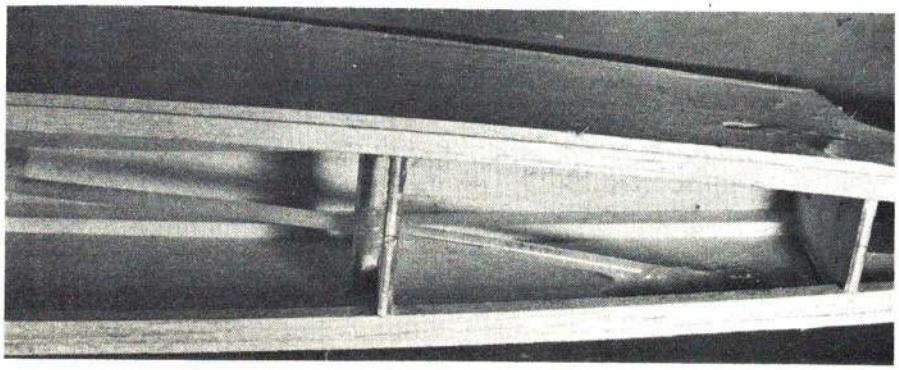


From The Valley Forge Signal Seekers' Newsletter: Bill Patterson took the trouble to draw and describe a technique we've used for years—a method for making Zee bends in music wire. The figure explains it all.



And One Of Our Own: Steel pushrods for use inside nylon rod give much greater stiffness than the usual 1/8 inner nylon rod. First, the servos must be set up so that a straight line leads to the control horns. (Photo shows how—use hot melt glue on inside of fuselage to hold nylon rod.) Use 9/64 music wire, not the shiny stuff; use the chintzy black stuff—it's the right size. Use a propane torch to heat the wire for one in. from the tip to a straw color (beyond cherry red, through orange, to almost white). Let it cool in air, then use a 1-56 die to thread the first in. A nylon or threaded metal clevis fits. Place the pushrod in position with the servo mounted in neutral and with the clevis at the center of the threaded run. Center the control surface, mark the wire for connection to the servo arm. Remove the pushrod and cut it off 3/16-1/4" beyond the marked point. Put the pushrod back in place (you'll only hate yourself if you bend it first!); *then* make a 90° bend at the point marked. Any one of many nylon retainers can be used.

Yes, we know the commercial variety uses a soldered clevis at the front end. We don't—we once saw how vibration crystallizes solder. It was apparent when we examined the remains of a beautiful Triton which had just attempted to uproot a 100-ft. oak because the elevator pushrod desoldered!



orbit
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getting started in R/C

SIXTY-EIGHTH IN A SERIES

HOW TO DRESS FOR THE SPORT. / by Jim McNerney

A bunch of us were sitting around in the basement the other night and one of the group, a prominent glider guider and electric airplane driver, made an interesting observation. He said, "Power plane fliers are a grubby lot." He went on to explain that members of his glider club dressed properly for the occasion and brought baskets of food and wine so that they could eat and quaff in sartorial splendor while participating in their favorite sport. We resisted the temptation to inquire about the nature of their favorite sport, but this started me thinking about proper attire for participation in RC. Hopefully, this column on the subject will save some newcomer to RC the embarrassment of being caught at the field in white tie for a black tie event.

There are certain obvious considerations underlying choice of attire, i.e., climate, weather, time of day and terrain. There are basic guidelines for dress, based on the phase of the hobby in which you participate, as hinted earlier. I mentioned only two categories, but these can be broken down into more finite groupings. For instance, in soaring there are the slope soarers and the thermal soarers, more commonly known as the "Mountain Men" and the "Flatlanders." In power flying, there are the weekenders or sport fliers hereafter known as "Sports," pattern fliers who are called "Aerobats," and pylon racers or "Wild Men." Dress is further delineated by the club, society, tribe, herd, gaggle or gang to which the flier belongs. There are sub-categories within these organizations, particularly in the Scale ranks which include, Barnstormer, Balloon Buster, Rebel, Yankee, G.I., Crop Duster, Rotor Head and Sea Scout.

For the newcomer to RC, first impressions are extremely important. Once you have located an RC field, make several forays as a spectator. Observe the natives in their natural habitat. This will help you to classify them. Don't say or do anything to put them on their guard. As a spectator, you blend into the background and go unnoticed, but if you strike up a conversation with a participant, you are immediately subject to scrutiny by the Elders. The Elders control both entrance into the organization and taboos concerning dress. If you make contact before learning to adapt to tribal dress codes, you could be banished forever (before you've even had a chance to break your finger with a prop or participate in other bloodletting ceremonies).

These are some basic rules which will help you to adapt more quickly. More detailed information is available from Abercrombie and Fitch or from that famous tome, *Through the Wilds of RC with Pushrod and Heat Gun.*

The Mountain Men, particularly Northeastern tribes, affect parkas, mukluks, goggles and mittens. An anchor, tied securely around the waist, is a charming touch that just might save your life during a Nor'easter.

(Continued on page 83)

GRAND CHAMPION
PERPETUAL AWARD

DAVE BROWN

Well, our boy Dave Brown did it again. He went out to Tucson and won 1st in "C" Expert for which he received (and is able to keep) the trophy shown lower right (salad bowl). The other trophy (the large one) Dave gets to keep for one year and then it must go back to Tucson for the next battle. This year Dave won "C" Expert and also won the flyoff. First time anyone did both. Last year Dave won "C" Expert but lost to Bill Salkowski on the fly-off. You might be interested in the other names that appear on this trophy—1968-Ted White, 1969-Tony Bonetti, 1970-Bill Salkowski, 1971-Norm Paige, 1972-Bill Salkowski, and now, in 1973-Dave Brown gets his name on the plaque. We are putting this in our World Engines ad because Dave was using a World Engines Expert Series R/C System. This uses open gimbal sticks. Dave uses S-5 servos and flys on 72.960. Dave sets the control on his Phoenix pretty loose. This means that in order to get the roll rate he wants, he uses all the stick throw. We might also add that Dave was using a Supertigre Blue Head in the Phoenix. Dave is in charge of the tool room at World Engines and designs many of the mechanical parts for our systems. We are certainly glad to have a man who is out on the firing line in the plant helping to design our product. At the time this is being written, we might add that we are redesigning a new Expert Series for 1974 which we hope to show at Toledo. Our Mark IV 6 channel Blue Max System $340.00 with 4 servos is now available as is its semi-kit for $265.00. In a month or two we will have our complete new RCM WORLD 6 full kit out.

1st PLACE
"C" EXPERT
(SALAD BOWL)

Dave Brown wins 2nd place CLASS "C" Expert at "73 Tangerine

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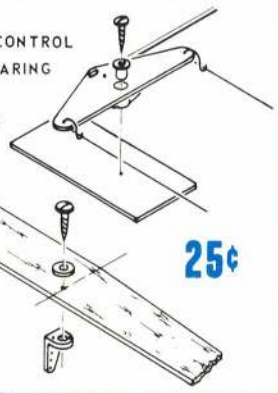

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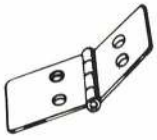

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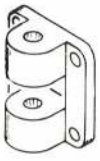

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.015 x 2-52"	2.75	.018 x 2-70"	
.015 x 2-60"	2.95	.021 x 2-60"	
.015 x 2-70"	3.20	.021 x 2-70"	

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For those who prefer to make their own Su with steel clips, end hardware and instructio

.008 x 2-35"	1.20	.015 x 2-70"	2.80
.008 x 2-52"	1.50	.018 x 2-52"	2.35
.008 x 2-70"	1.75	.018 x 2-60"	2.60
.012 x 2-35"	1.80	.018 x 2-70"	2.80
.012 x 2-52"	2.35	.021 x 2-60"	2.75
.012 x 2-70"	2.80	.021 x 2-70"	3.15
.015 x 2-52"	2.35	.027 x 2-60"	3.20
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.012 x 3-70'	4.10
.015 x 3-60'	3.85
.015 x 3-70'	4.35
.018 x 3-60'	4.35
.018 x 3-70'	4.60
.021 x 3-60'	4.60
.021 x 3-70'	4.85
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1/16 x 1/4	.10
1/16 x 3/8	.12
1/16 x 1/2	.15
1/16 x 3/4	.19
1/16 x 1	.22
3/32 x 3/32	.08
3/32 x 3/16	.10
3/32 x 1/4	.11
3/32 x 3/8	.14
3/32 x 1/2	.18
3/32 x 3/4	.22
3/32 x 1	.27
1/8 x 1/8	.09
1/8 x 3/16	.11
1/8 x 1/4	.14
1/8 x 3/8	.17
1/8 x 1/2	.20
1/8 x 3/4	.25
1/8 x 1	.29
3/16 x 3/16	.12
3/16 x 1/4	.16
3/16 x 3/8	.18
3/16 x 1/2	.24
3/16 x 3/4	.29
3/16 x 1	.33
1/4 x 1/4	.19
1/4 x 3/8	.23
1/4 x 1/2	.25
1/4 x 3/4	.33
1/4 x 1	.41
5/16 x 5/16	.23
5/16 x 3/8	.30
5/16 x 1/2	.35
5/16 x 5/8	.42
5/16 x 1	.48
3/8 x 3/8	.30
3/8 x 1/2	.35
3/8 x 3/4	.44
3/8 x 1	.53
1/2 x 1/2	.40
1/2 x 3/4	.53
1/2 x 1	.66
5/8 x 5/8	.47
5/8 x 1	.74
3/4 x 3/4	.64
3/4 x 1	.83

STICKS
48" Lengths

1/8 x 1/8	.12
1/8 x 1/4	.18
1/8 x 1/2	.26
3/16 x 3/16	.17
3/16 x 1/2	.33
3/16 x 3/4	.40
1/4 x 1/4	.27
1/4 x 1/2	.35
1/4 x 3/4	.46
5/16 x 5/16	.31
3/8 x 3/8	.40
3/8 x 1/2	.46
3/8 x 3/4	.59
1/2 x 1/2	.52
1/2 x 3/4	.70

SHEETS
36" Lengths

1/32 x 2	.36
1/16 x 2	.39
3/32 x 2	.44
1/8 x 2	.49
3/16 x 2	.61
1/4 x 2	.77
3/8 x 2	.88
1/32 x 3	.43
1/20 x 3	.47
1/16 x 3	.49
3/32 x 3	.59
1/8 x 3	.68
5/32 x 3	.75
3/16 x 3	.83
1/4 x 3	.95
5/16 x 3	1.10
3/8 x 3	1.23
1/32 x 4	.71
1/16 x 4	.77
3/32 x 4	.88
1/8 x 4	1.02
3/16 x 4	1.15
1/4 x 4	1.34
3/8 x 4	1.76
1/32 x 6	1.32
1/16 x 6	1.43
3/32 x 6	1.60
1/8 x 6	1.76
3/16 x 6	2.00
1/4 x 6	2.35
3/8 x 6	2.75

48" AAA SHEETS

1/32 x 3	.62
1/16 x 3	.66
3/32 x 3	.79
1/8 x 3	.92
3/16 x 3	1.10
1/4 x 3	1.30
3/8 x 3	1.64
1/16 x 4	1.04
3/32 x 4	1.18
1/8 x 4	1.35
3/16 x 4	1.54
1/4 x 4	1.79
3/8 x 4	2.34
1/16 x 6	1.92
3/32 x 6	2.15
1/8 x 6	2.35
3/16 x 6	2.65
1/4 x 6	3.15
3/8 x 6	3.67

BLOCKS
3" Lengths

1 x 1	.09
1 x 2	.17
2 x 2	.24
1 x 3	.24
2 x 3	.31
3 x 3	.49

BLOCKS
6" Lengths

1 x 1	.17
1/2 x 2	.22
3/4 x 2	.27
1 x 2	.32
1-1/2 x 2	.37
2 x 2	.43
1/2 x 3	.29
3/4 x 3	.40
1 x 3	.45
1-1/2 x 3	.53
2 x 3	.58
3 x 3	.85
1/2 x 4	.42
3/4 x 4	.49
1 x 4	.56
1-1/2 x 4	.71
2 x 4	.83
3 x 4	1.22
1/2 x 6	.62
3/4 x 6	.77
1 x 6	.90
1-1/2 x 6	1.07
2 x 6	1.17
3 x 6	1.95

BLOCKS
12" Lengths

1 x 1	.30
1/2 x 2	.42
3/4 x 2	.54
1 x 2	.62
1-1/2 x 2	.72
2 x 2	.84
1/2 x 3	.52
3/4 x 3	.68
1 x 3	.84
1-1/2 x 3	1.00
2 x 3	1.20
3 x 3	1.82
1/2 x 4	.84
3/4 x 4	.93
1 x 4	1.05
1-1/2 x 4	1.35
2 x 4	1.64
3 x 4	2.40
1/2 x 6	1.15
3/4 x 6	1.35
1 x 6	1.60
1-1/2 x 6	2.05
2 x 6	2.40
3 x 6	3.55

BLOCKS
18" Lengths

1 x 1	.45
1 x 2	.94
2 x 2	1.25
1 x 3	1.25
2 x 3	1.80
3 x 3	2.75
1 x 4	1.55
2 x 4	2.45
3 x 4	3.60
1 x 6	2.40
2 x 6	3.55
3 x 6	5.30

BLOCKS
24" Lengths

1 x 1	.60
1 x 2	1.24
2 x 2	1.68
1 x 3	1.68
2 x 3	2.40
3 x 3	3.65
1 x 4	2.20
2 x 4	3.30
3 x 4	4.80
1 x 6	3.20
2 x 6	4.80
3 x 6	7.10

PLANKS
36" Lengths

1 x 1	.88
1/2 x 2	1.25
3/4 x 2	1.60
1 x 2	1.85
1-1/2 x 2	2.15
2 x 2	2.50
1/2 x 3	1.50
3/4 x 3	2.00
1 x 3	2.50
1-1/2 x 3	3.00
2 x 3	3.55
3 x 3	5.45
1/2 x 4	2.50
3/4 x 4	2.75
1 x 4	3.10
1-1/2 x 4	4.00
2 x 4	4.90
3 x 4	7.15
1/2 x 6	3.30
3/4 x 6	3.95
1 x 6	4.75
1-1/2 x 6	6.00
2 x 6	7.10
3 x 6	10.60

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3/16 x 3 36	.91
1/4 x 3 x 36	1.03
1/4 x 4 x 36	1.42

36" TAPERED TRAILING EDGE

1/8 x 1/2	.24
3/16 x 3/4	.30
1/4 x 1	.39
5/16 x 1-1/4	.49
3/8 x 1-1/2	.55

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3/32 x 3 (35)	.42
1/8 x 3 (25)	.50
3/16 x 3 (20)	.60
1/4 x 3 (20)	.77
3/8 x 3 (15)	.96

C-GRAIN AAA
8-12 LBS.

1/32 x 2	.41
1/16 x 2	.44
3/32 x 2	.49
1/8 x 2	.54
3/16 x 2	.66
1/4 x 2	.82
3/8 x 2	.93
1/32 x 3	.48
1/16 x 3	.54
3/32 x 3	.64
1/8 x 3	.73
3/16 x 3	.88
1/4 x 3	1.00
3/8 x 3	1.28

VH-VERY HARD

1/16 x 3	.54
3/32 x 3	.64
1/8 x 3	.73
3/16 x 3	.88
1/4 x 3	1.00
3/8 x 3	1.28

CONTEST BALSA
4-6 Lb. Stock
Very Light

1/32 x 3	.53
1/16 x 3	.54
3/32 x 3	.67
1/8 x 3	.77
3/16 x 3	.94
1/4 x 3	1.05
3/8 x 3	1.30

ROUNDED EDGE AILERON & ELEVATOR STOCK

1/4 x 1	.60
3/8 x 1	.70
1/4 x 2	.82
3/8 x 2	.92

36" BALSA TRIANGULAR CUT

1/4 x 1/4	.22
3/8 x 3/8	.27
1/2 x 1/2	.33
3/4 x 3/4	.44
1 x 1	.59

LEADING EDGE
36" Lengths

1/2 x 3/8	.46
3/41x 5/8	.70
1 x 3/4	.95

TAPERED CUT SHEETS 36"
Tapered to 1/16" Edge

1/4 x 3	1.05
1/4 x 4	1.40

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NYLON BEARING FOR LONG LIFE AND LOW FRICTION!

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Or May be Shortened to Two-Inches For Use On
Smaller Airplanes.

BOB STOCKWELL ON RC

On Getting Started In Pylon: When this appears, the '74 racing season will be just getting underway. But it is written on New Year's Day. So here, at the beginning of the year, my thoughts have turned to the question of recruiting new blood into what I consider to be the most exciting and exacting of the Miniature Flying events.

Who should be racing Formula I? Not absolute beginners, certainly. First, learn to fly. But suppose that you're a moderately successful Class B Pattern flier; you're probably a good enough pilot to enter Pylon Racing. There are many highly competitive Pylon fliers who are far from belonging in the Expert Class in Pattern flying: Indeed, only a very few Pylon experts have been conspicuously successful in Pattern. Larry Leonard is the most obvious candidate for double success, since he alone has won both events at the Nationals in the same year—1969. Some of the others like Bob Smith and Whit Stockwell, have flown well in Pattern events. Of course, Cliff Weirick was famous first as a Pattern competitor.

But most of the famous Pattern fliers apparently do not care much for Pylon competition: Chidgey, Kraft, Edwards, Oddino, Kirkland, Whitley never race at all, as far as I can recollect. Kraft had one abortive outing in the early years; and in one race at San Marcos, Weirick twisted his arm. Jim Martin and Norm Page have raced from time to time, and in fact, Jim was set to win the NATS in 1973 when his very fast bird died of a mid-air collision. And in the other column, two of the most successful Pylon Racers of recent years, Terry Prather and Kent Nogy, have never been competitive in Pattern (if they have tried it at all). Everybody's number one nice guy, Joe Bridi, was a major Pylon competitor in the earlier years, but has concentrated on Pattern recently.

Anyway, from the brief survey it is evident that you can be good in both. You can lean more strongly to one or the other, but still participate in both; or you can forget about one and just concentrate on the other. In general, if you go in for Pattern, you'll spend a lot less time building and a lot more time practicing. When you go to contests, you'll spend a lot more time relaxing and passing the time of day with your friends—second guessing the judges.

If you go in for Pylon, you won't spend much time practicing, both because you don't want to break up your racer, and because you don't want to use up the relatively small number of peak runs of which your engine is capable. At contests, you'll spend a lot more time preparing your aircraft between flights and checking everything out for peak performance. And certainly you'll do more building. Pylon aircraft are simply not noted for longevity. But, on the other hand, they are easier to build than a Pattern ship of comparable quality.

If you pick a single high-quality aircraft and build it every time you need one, you'll find that you can build it in about one-third the time it takes for a Pattern ship. Once you develop your techniques, you can even set up radio and servos identically, so that you can change the entire set to another ship in about 15 min., to say nothing of being able to change engines or tanks in even less time.

The question that is often raised about Pylon Racing is expense. For two reasons, it is more expensive than Pattern competition. First, you have to build more airplanes, unless you're fantastically lucky. Very few Pylon ships survive a single season: The yellow Minnow that Whit and I have flown for two full seasons is the first, and doubtless the last, that has survived even half a season in our six years of experience in this game. Jack Stafford has a Midget that he has flown, off and on, for four seasons. But, in between, he has tried some other new birds that passed away early. To have a reasonable chance of getting through a season, you need to spend the winter building three new racing birds.

Second, engines for Pylon Racing are more expensive than Pattern engines. The initial cost may be no more (say, $100 including custom setup), but they go over the hill sooner than Pattern engines, and they require constant maintenance. There is no point in racing without a good engine. But today, it is easy to get a good engine—the only trick is to have access to a good customizer (Clarence Lee, Jim Nightingale, Cliff Telford, George Aldrich, or almost any old-time control line Speed flier—those guys all know their stuff).

So how much money is really involved? The number of trips you take to contests is about the same in either event. Fuel for Racing is more expensive, but you use a heck of a lot less of it. If you were a skiing fanatic, you would spend about five times as much as you would on racing. If you were a real golf enthusiast, you could go 20 times higher without even trying. The costs of full-scale powered flight or even of soaring are incomparably higher. Tennis is probably quite a bit cheaper, and no doubt better for your health. A really dedicated hi-fi enthusiast can outspend you with little effort.

In the end, Racing may cost maybe $1000 a year more than Pattern competition. Both cost perhaps $2000 more than Sunday flying. Both kinds of competition are addictive, not quite in a class with heroin, but certainly with alcohol. But unlike other addictions, they are creative and valuable to the individual who yields to the addiction. Who should race? Maybe YOU should. I hope so.

JOHN SMITH ON CL

FAI Information: Here is some FAI info that may interest all those keeping up with international Speed events. Checking times of some European fliers and teams who qualified for the FAI CL Internationals this summer should give us all food for thought.

At the Russian FAI CL CHampionships, Team Race ratings were:

	Heat	Semi	Finals
(1) Shapovalov/ Onufrienko	3:54.6	4:07.7	8:19.6
(2) Efremov/ Maslov	4:09	4:09.3	8:46
(3) Babichev/ Bebeshko	4:16	4:05	Disq.

Winners used 50-lap airplanes running 93-97 mph. In Speed, first and second place winners used homebuilt engines while Rossi was in third.

Top men were:
(1) Burtsev (Kharkov)—227 kph
(2) Baidalinov (Kharkov)—225 kph
(3) Pereverzev (Leningrad)—225 kph

Scandinavian results were:

SPEED
(1) Veikko Fagerstrom (Finland)—222 kph
(2) Markku Pietirnen (Finland)—218 kph
(3) Mats Bohlin (Sweden)—214 kph
(All three used Rossi engine.)

TEAM RACE
(1) Hasling/Rivold (Denmark)—4:34/9:36
(2) Nore/Ekholm (Finland)—4:37/9:52
(3) Aamipalo/Fagerstrom (Finland)—4:31/NT

First, second and third used Rumpel/Supertigre G15 Diesel, Rossi 15D and TMA. No Bugis in the finals.

By comparison, our own CL Team (FAI) results were:

SPEED
(1) Chuck Schuette—227 kph
225 kph average
(2) Bob Spahr—230 kph
219 kph average
(3) Bob Heminway—215 kph
215 kph average

First place winner used a Tigre X 15; second and third place winners used Rossi 15s.

TEAM RACE

	Average	Best Time
(1) Hodgkins/ McCollum	4:35	4:21
(2) Albritton/ Joy	4:43	4:33
(3) Fischer/ Oesterle	4:54	4:43

Since the Team Finals, Albritton/Joy have dropped off the team and Mearns/Mearns have taken their place. Hodgkins used an ARM, while Albritton and Fischer both used a Bugl.

From the USA results, one can see that we are not the fastest group around, but are running with the best of them. The Russians look to have the best chance in TR, as they have done the past two years. There has been some talk of dropping the TR tank capacity, to force more pit stops. This would give more meaning to the word "team," and would certainly increase the excitement in a good, fast race.

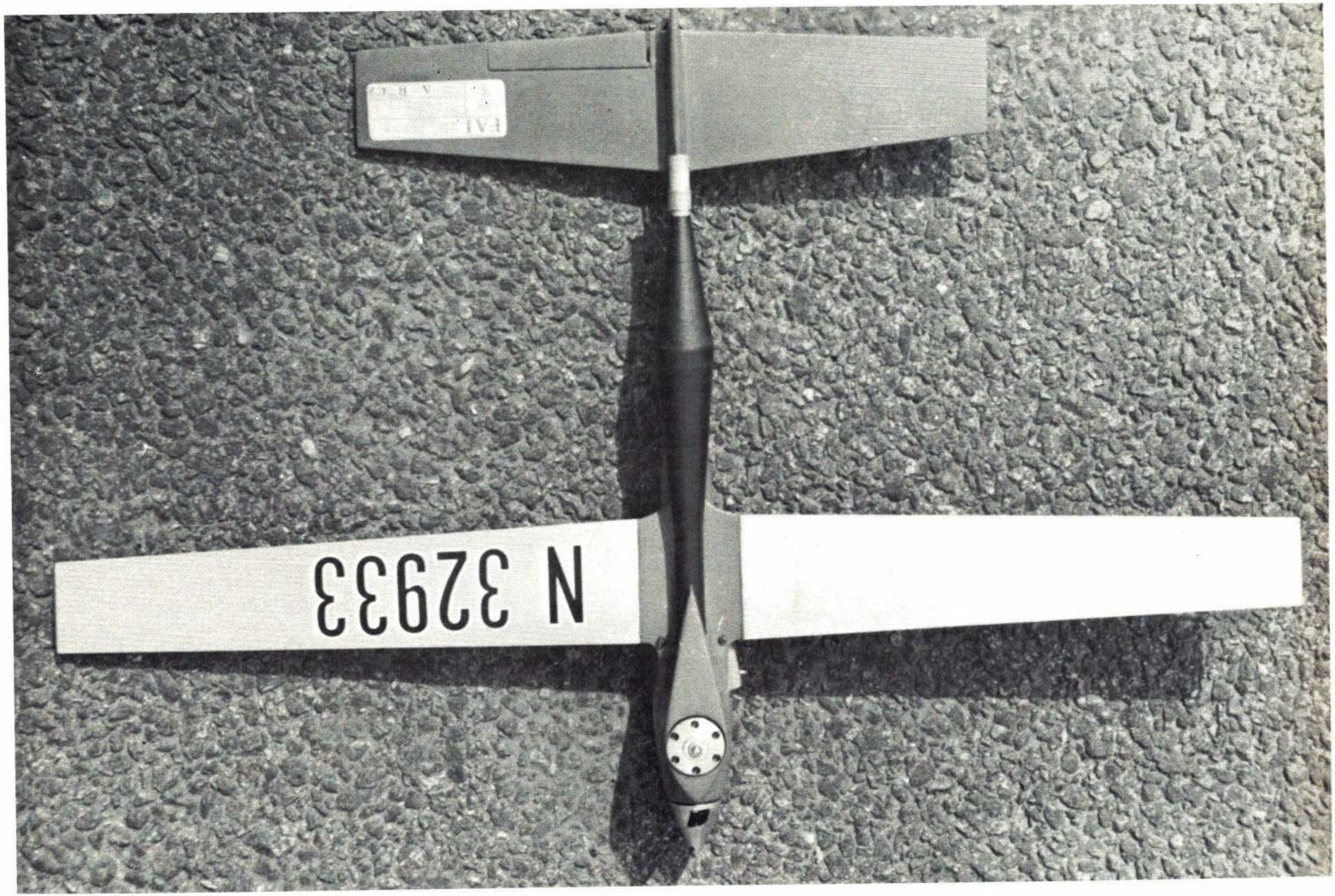
New Products: It's been a long time since we mentioned anything new on the market. However, a couple of new products have come on the scene that bear mention. First, Walter Brassell, 4361 Montview Dr., Chattanooga, Tenn. 37411, of Speed Dolly fame, now has mono-line twister handles available. His dollies have been redesigned to put the front wheels farther forward. Walter says that you can stay on the ground in these as long as necessary with no chance of tipping forward out of them. Dollies can be custom built to fit your airplane and workmanship is excellent.

Nick Arpino, 301 Wood Acres, Patchoque, N.Y. 11772, has a new mag speed pan for A engines now. This is the same design as his popular B and C size pans. Lots of room for tank, ample hold down lugs, and a long enough length for any pipe design. The castings need a small amount of work (engine fitting, drilling and tapping), and have a cast on skid under the engine area.

Aerotique, 19900 Ingersoll Dr., Rocky River, Ohio 44116, specializes in the unusual. One of the more exciting items is a new hard hat for Team, Rat and even those RC Pylon guys. It can be had with sun visor, and even a self-contained set of hearing protectors (retractable earmuff type sound deadeners). The muffs can be obtained separately. Also available is an engine "Stooge." This is a replica engine casting to be used as a dummy to build your airplane around, doing all fitting and balancing, keeping your good engine nice and clean in the drawer until needed to go flying. Also plans in 3/4", 1" and 1½" scale of many popular Goodyear/Formula I Racing planes, great for "scratch builders." A line of gift items will include lapel pins of all popular models and unusual model airplane related items.

The Energy Crisis: What the energy crisis will do to model flying is really unknown, but it will probably show its head in reduced contests and possibly in some products like plugs (plastic seals) and such. Fuel shouldn't be curtailed too much, since we can use synthetic oils. With the NATS scheduled for Lake Charles, Louisiana, everybody better start putting bigger tanks in their airplanes. If the gasoline is rationed, we may have to fly part way!.

Why isn't this man smiling? Come to think of it, when you do what this man did, you don't have to smile if you don't want to. In May AAM, Bob Stockwell will tell us what this man did, as well as what other men did, or were trying to do, at the time this man wasn't smiling. There will also be other pictures, some of men smiling, others of men not smiling, just as this man is not smiling, but not for the same reasons that this man isn't smiling. Hint: this man is Bob Violett.

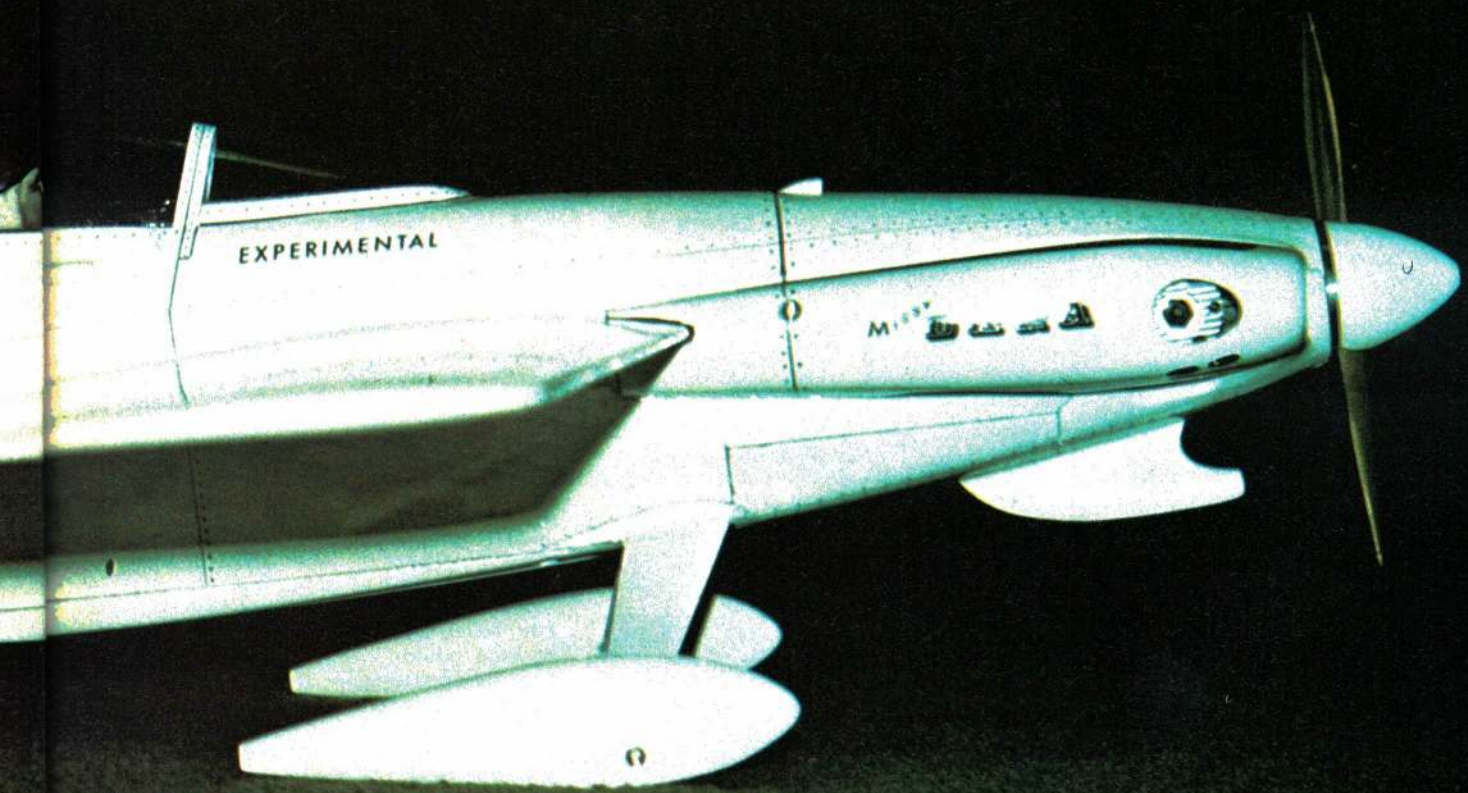


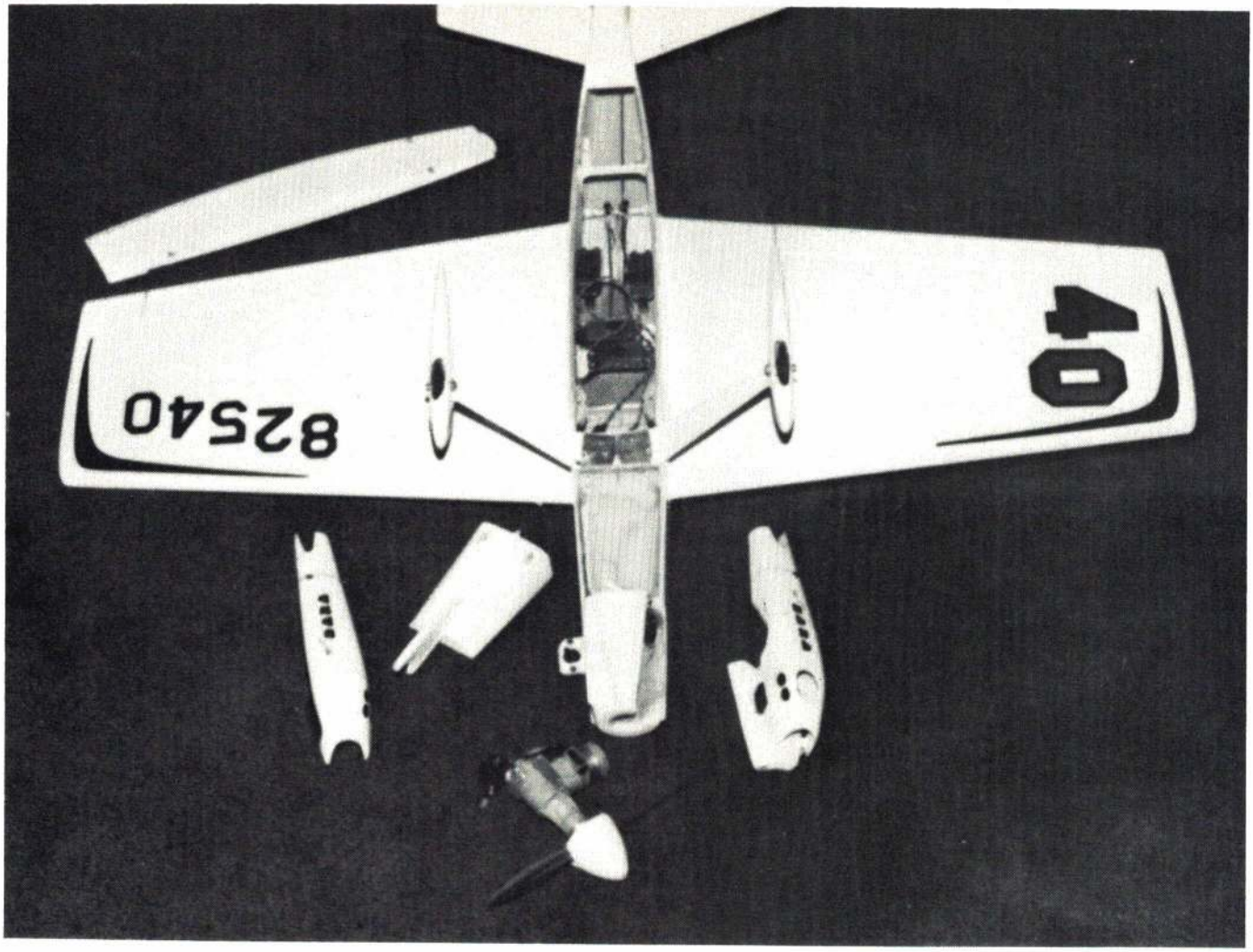
TWA 15-powered "PINK LADY", by Arnold Nelson, Long Beach, California


40
NCPL
N40J

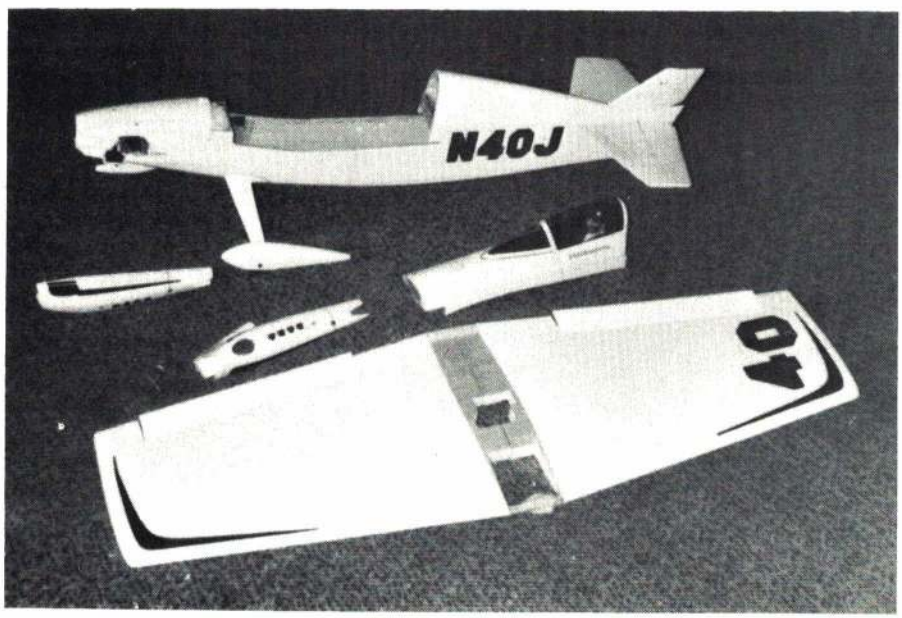
MISSY DARA QM

The most exciting QM to ever take a checkered flag, Missy DARA is an all-out effort at maximum scale fidelity. It's fast, to boot! / by Loren O. Jacobsen





Stripped down for routine maintenance, the model is a myriad of necessary hatches. All systems can be safety checked in a matter of minutes.



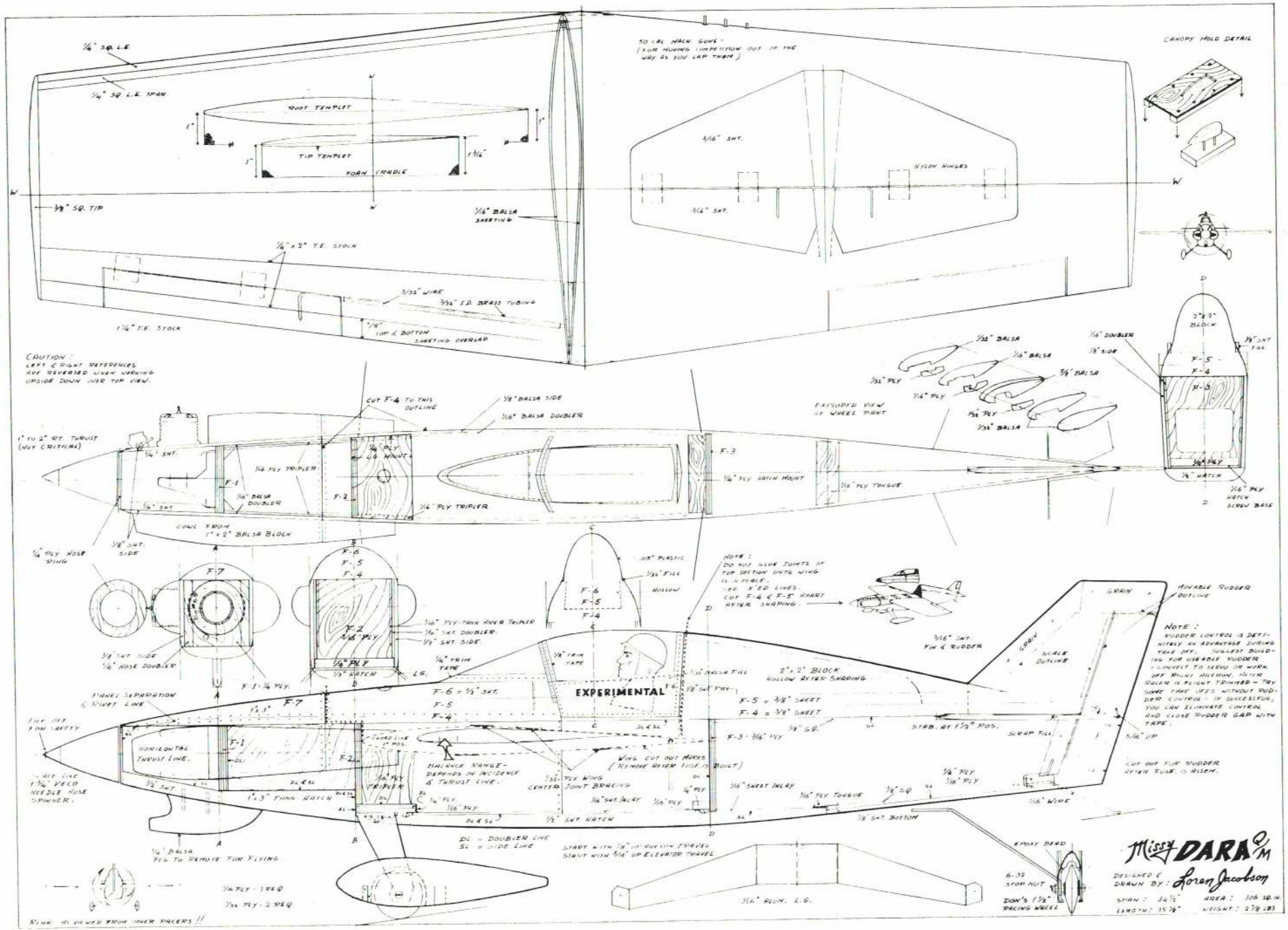
The wing is pre-MonoKoted, except for the gluing area. The canopy assembly will be permanently affixed later. It's nice to build in this modular fashion, since the components may be easily handled all the way through the finishing stages.

The original full-size Miss DARA was a Formula racer of the mid 1960s. After several attempts at competing, however, it suffered a fatal crash in a test flight and never appeared on the race scene again. I couldn't resist trying to recapture its appealing, unique shape in the form of a Quarter Midget (QM) racer.

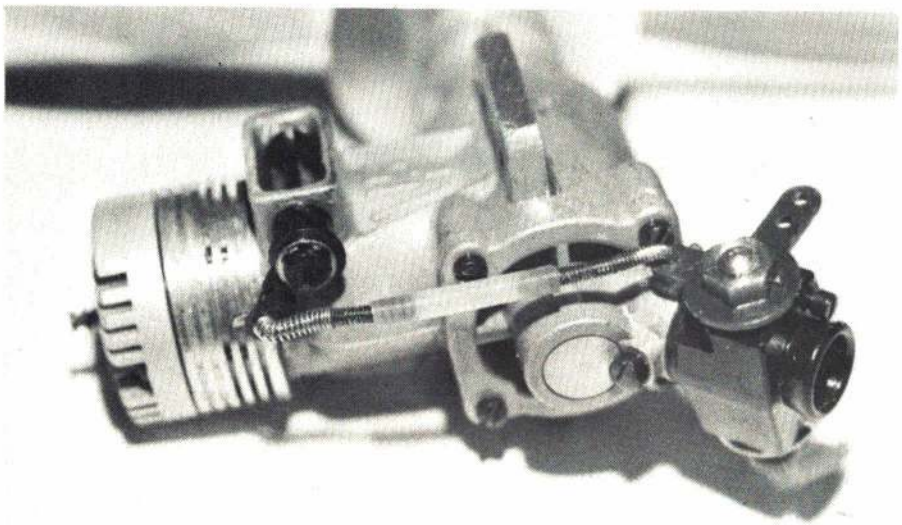
It is my impression that many modelers buy modeling magazines for the inspiration from the photos of other modelers' efforts. Besides the information that can be gleaned from the articles, pictures of fellow modelers' planes inspire daydreams of the perfect flying model. Missy DARA was designed to race, but she should also inspire other QM enthusiasts to build racers which are more representative of their full-scale counterparts.

According to the rules, QMs should be "semi-scale or recognizable replicas" of aircraft that have raced in one way or another. Maybe the rules should say "easily recognizable," because, as the competition gets faster, the racers become less recognizable. Extremely distasteful to me is the kit practice of supplying a mass-produced fuselage of *minimum* dimensions, along with a variety of canopies and flying surface tip designs. The simple fuselage form, not resembling any full-size aircraft, is used merely to attach two or three features of the airplane it supposedly models. Whatever happened to the "Builder of

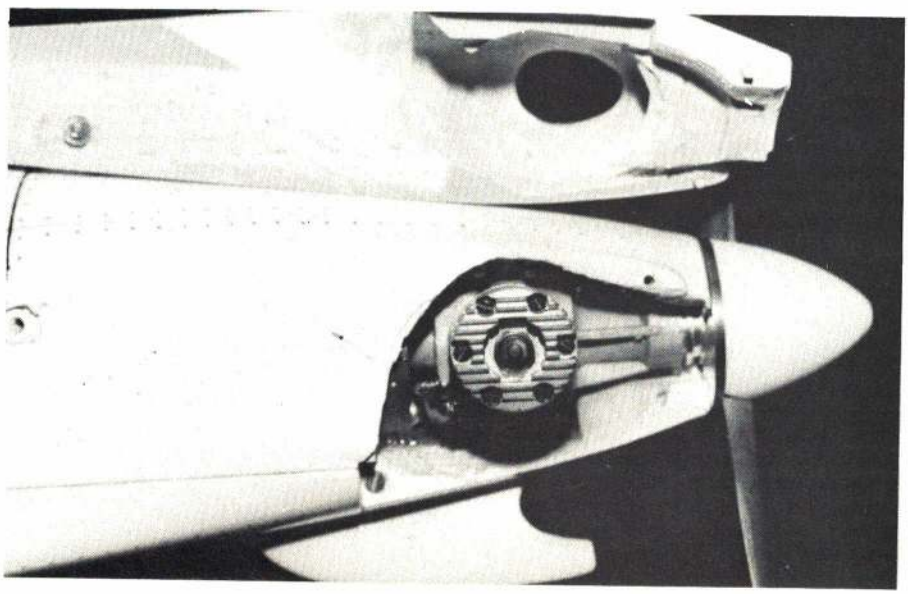
FULL-SIZE PLANS AVAILABLE – SEE PAGE 84



Jenesco fueling system hidden under the cowl keeps nitro uncontaminated.



ABOVE: The first prototype Missy DARA used a modified K&B Schnuerle. The backplate and rotor were rotated 180° for more efficient location of the carb (better breathing makes for faster running). Linkage conversion is a snap. BELOW: Tucked away nicely is the Schnuerle. It just sits there, saying, "I'm gonna get ya!"



the Model" pride cultivated by transforming either a drawing or a well-engineered kit into a good looking, recognizable airplane? I am not advocating super-scale, detailed QM racers—only more scale effect.

The 7/8" wing rule makes way for more scale wing planforms, which Missy DARA has. Fuselages built to the five-in. minimum depth, however, are hard pressed to capture the spirit of the racers after which they are modeled. So I chose to maintain the unique outline of the Miss DARA, despite the fuselage depth. I also decided to retain the low aspect ratio and outline of the Miss DARA wing. You can see that Missy DARA is not a scaled down Formula I racer, but was built to be a QM. But! Can a racer with a deeper, more scale outline fuselage be competitive? Missy DARA, though over six in. deep, answers YES!

The accompanying photos (for inspiration, remember) show her with a scale fin and rudder outline. She was flown many times this way, but she proved to be a wayward girl in the tight scatter pylon turn. The plans show her with a larger vertical fin, which proved to be the answer to keeping this little cutie in the groove.

Two other changes have been made to the model since the photos were taken. Competition in the North Central Pylon League (NCPL) here in the Minneapolis-St. Paul area, has become so fierce that I found I could afford neither the luxury of a sub-rudder and steerable tail skid, nor the large cheek cowls.

I found that Missy DARA could be raced without rudder control. Takeoffs are quite straight because of the right thrust in the engine mounting. I taped the rudder in place and eliminated the servo and linkage. The plans show an optional movable rudder.

Also shown on the plan are smaller, more scale cheek cowls, intended to present a more streamlined front end. Note in the photos that Missy DARA originally had a rear rotor engine installation, utilizing the left cheek cowl as the

(Continued on page 64)

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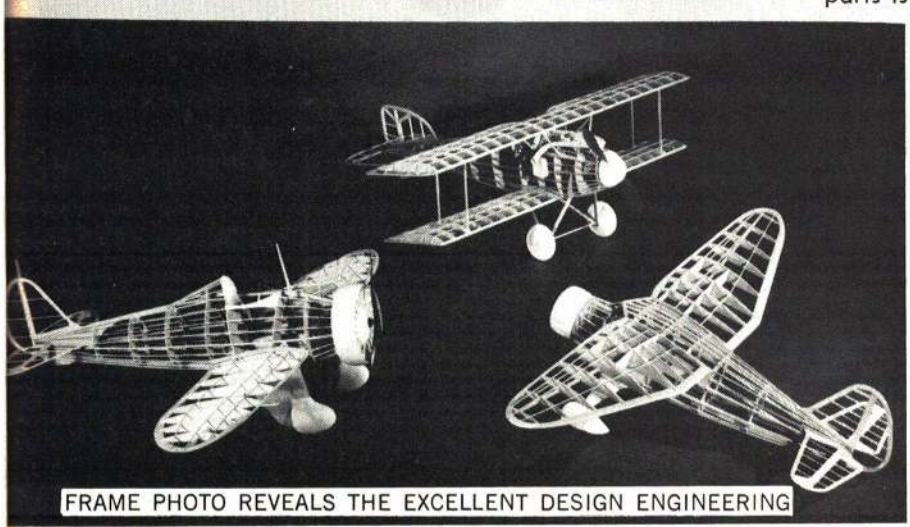

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air intake for the carburetor. Also, only the simpler front rotor engine installation, which is easily maintained and allows more room for an uncramped fuel tank area, is shown on the plan. I believe that most model builders are innovators by nature and will make construction changes to suit their building techniques and engines.

For innovators who want to use rear rotor engines, I would suggest incorporating hardwood beam mounts, and allowing for fuel tank access from the radio compartment through F-2. Or you may want to move F-1 back, and use the long Tatone mount. I have included a photo of the rear rotor K&B 15 Schnuerle engine, which has had the backplate and rotor rotated 180°, in order to bring the carburetor around to the left cheek cowl. Linkage from throttle arm to exhaust baffle was made from nylon rod and two short lengths of 2-56 threaded rod. If you use this engine setup, the left cowl will have to be removable.

The strength of this design is in the one-piece unit of wing and fuselage. The wing can be built in two halves, and finished separately with Super MonoKote before joining. The lower half of the fuselage is constructed over the plan top view. The upper half of the fuselage is shaped from blocks of balsa, with the portion over the wing separating to allow for wing attachment. All parts of the fuselage can be painted and detailed before cementing the wing in place.

CONSTRUCTION

Wing: Cut the foam wing cores according to the templates shown on the plan. Be sure to make right and left cores and mark them as such. The cores will actually be oversize in planform, so that the leftover foam cradles can be used later as support for the leading and trailing edges during sheeting. Using a straightedge and sharp razor, cut LE and TE of cores per plan. Cut the front edge of the Sig 1/4 x 2" aileron stock to plan. This piece will closely match the taper of the core, and is epoxied in place. Epoxy 1/4" sq. LE spar to core and sand to airfoil shape. Locate the aileron torque rod postions and make slots for them. Cut sheeting with razor and straightedge and butt glue together, allowing extra sheeting over the core edges. Note that there is a 5/8" overlap of sheeting at the TE. Sheet the bottom of the wings and cut the aileron sections out of the cores.

Use rubber cement for balsa to foam joints and epoxy for balsa to balsa. Do not overlap these cements, and be sure to allow the solvents to evaporate from the rubber cement for at least 15 min. before attaching the sheeting. Epoxy the torque tube assemblies in place, raising them in their slots so that the centerlines are 1/32" above wing chord lines. Now sheet the top of the wings and trim excess sheeting to the core edges. Don't remove the entire 5/8" trailing edge. Add the 1/4" sq. LE and tips, and sand to shape. Cut the ailerons from 1¼" TE stock and locate the hinges and the holes for torque rods. Groove the ailerons so that the rods will lay flush in their front edges. I finished the wing halves at this point with Super MonoKote.

Join the wing halves with epoxy, using each respective cradle as a dihedral jig. Block up the tips so that the top of the wing is straight and the bottom offers a small amount of dihedral. This will not be a strong joint, but will hold until the wing is fitted to the fuselage.

Fuselage: Again, using a straightedge and a sharp blade, trim two sheets of 1/8 x 3 x 36" balsa, so that two edges are parallel and cut to the side view shown on the plan. Cut the 1/16" balsa doubler to outline and sand the front edge of the RIGHT doubler 1/32" shorter so that when F-1 is positioned, it will give right thrust to the engine mount. Mark the wing cutout areas on the fuselage sides, but do not cut them out yet. Accurately mark the wing chord lines on the fuselage, so that the LE is 3/32" above the TE in relation to the thrust line. Cut the slot for the stabilizer to the positive angle shown. Mark cheek cowl outlines so that you will not cut or sand into these flat areas. Epoxy or contact cement the doublers to the sides. The sheeting can be blocked up during doubler attachment to provide a slight inward curve. Bevel the rear inside edges to the fuse sides.

Cut F-4 from a flat piece of 3/8"

balsa sheet to plan top view, and mark the centerline and the former locations. Pin F-4 down over top view and tack glue F-2 in place. Glue on F-3 and the fuselage sides, taping the rears together. Pull the front together to a 1¾" inside measurement and secure with tape. Push a couple of pins through the rear fuselage on the rudder hinge line. Angle these to aid in fitting the scrap balsa block for hinging optional rudder and holding skid wire.

Bend the 1/16" wire tail skid and sandwich between the ply pieces. Epoxy it in place flush with the fuselage bottom. Glue in the 1/8" sq. balsa corner longerons, and add 1/8" sheet bottom. Epoxy the 1/4" ply bottom servo hatch mount at F-3. Fit the 1/16" ply hatch mounting screw bases at F-3 and secure the landing gear mount. Then accurately cut 1/16" balsa sheets to fit between the pieces of ply and the fuselage sides. Glue the 1/2" sheet bottom to these parts without getting glue on the fuselage sides. Drill for No. 4 screws. The hatch will hold the fuselage sides in position when the wing is mounted.

Attach the Kraft-Hayes No. 19-B mount to F-1 for a Supertigre installation, or adjust F-1 to the desired engine and mount. Epoxy in place, checking the thrust offset. Epoxy the 1/16" ply triplers between F-1 and F-2, and fill the corners of the tank area with 1/2" triangular stock. Glue the 1/4" balsa nose doublers in place, and add the 1/2" bottom nose block. Fill all the corners of the engine area with scrape balsa. Cut out the right side of the fuselage until the engine is easily inserted into the mount. Now, with the prop and spinner on the engine, adjust the location of the nose ring and cement in place. The bottom fuel tank hatch is shaped from 1 x 3" balsa block and can be hollowed for the battery pack, if it will fit here.

The lower fuselage is now a solid unit and can be turned over. Cut F-5, F-6, F-7, 2 x 2" turtle deck block and canopy block to their approximate outlines. Tack glue all of these in place and rough shape with a spokeshave and sanding block. When the basic shape is achieved, remove the blocks, hollow, and add desired cockpit detail. Cut F-4 and F-5 apart at the separation line at the rear of the cockpit. Glue all blocks back into place, but don't glue the separation joints. Attach canopy and add the 1/32" balsa fill to each side of it. Mask off the canopy for protection and finish shaping and sanding the fuselage.

Cut out the wing slots marked on each side of the fuselage and lift out the section above the wing location. Sand the wing openings until the wing can be easily slipped into place, inserting TE first. A force fit can twist the fuselage out of shape. Now, with wing in position, check alignment of stabilizer and vertical fin, and glue them to fuselage.

If you will be painting the wing and the fuselage together, cement in the wing now and add check cowls and fillets. If finishing fuselage separately, proceed now without wing in place. Leave flat cowl areas unfinished for a good glue bond. When you finish painting the fuselage, cement in the wing and top section and attach cowls. Be sure to epoxy 1/32" ply braces across wing center joint after wing is set in fuselage.

Landing gear: The landing gear (LG) struts were cut from a 1/16" thick aluminum blank. Although a one-piece unit would be best, I cut mine in two pieces from a Sig blank. File the LE and TE of the struts round and rubber cement 1/32" sheet balsa to top and bottom sides. Lightly sand the balsa to a streamlined shape and cover them with wide vinyl tape. Presto! A streamlined LG that is no thicker than 1/8" wire.

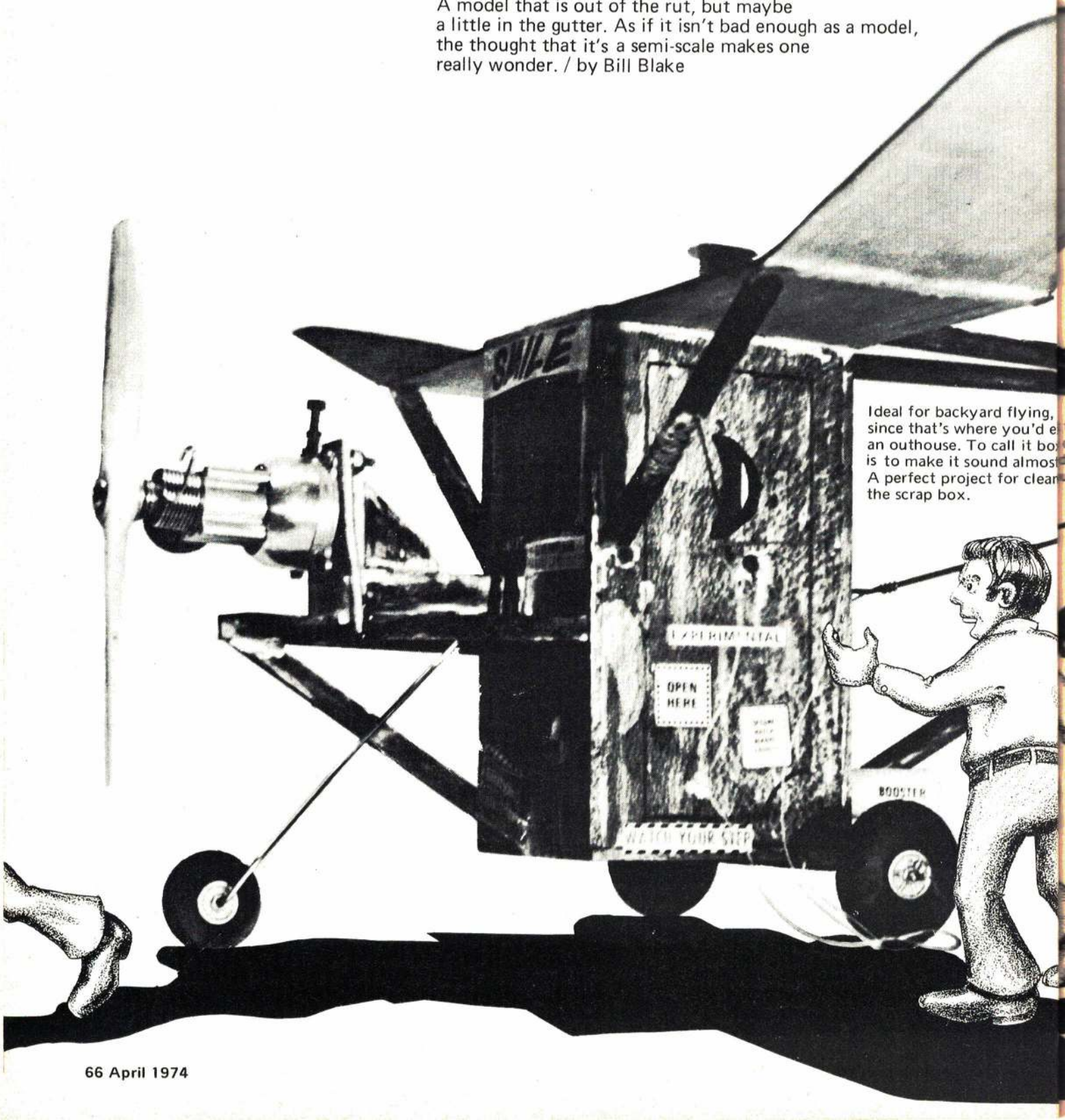
Wheel Pants: Missy DARA looks stark naked without her wheel pants on, so make the extra effort to give her some neatly shaped wheel coverings. The pants shown on the plan are trouble free on black-top landing strips. If you fly from a grass field, you might try larger wheels and move the pants a little forward on the struts. The inside 1/16" ply piece fits around the edge of the strut and is the key to keeping the pant in place. Adjust the width of the center balsa section to the wheels you intend to use. The epoxy bead around the edges of the wheel wells allows the pants to be sanded very thin if desired. The balsa fill around the ply pieces will make the sanding job easier.

(Continued on page 101)

FOR THE TENDERFOOT

THE FLYING OUTHOUSE

A model that is out of the rut, but maybe a little in the gutter. As if it isn't bad enough as a model, the thought that it's a semi-scale makes one really wonder. / by Bill Blake



Ideal for backyard flying, since that's where you'd e an outhouse. To call it bo is to make it sound almos A perfect project for clear the scrap box.

A Flying Outhouse? That's right! And what's more, it's a semi-scale model of the real thing, the Family Two-Holer. The Family Two-Holer showed up quite unexpectedly at the 1969 Experimental Aircraft Association Fly-In at Rockford, Illinois. The full-size "aircraft," the non-flying type, was dreamed up and constructed by an Illinois chapter of EAA. At Fly-In time, the aircraft was disassembled and hauled up to the Fly-In. Sometime during the night it was re-assembled on the field. When the sun peeped over the horizon the next morning and shone down on the hundreds of beautiful homebuilt airplanes, there sat the Family Two-Holer in all it's regal glory. Needless to say, it was the hit of the Fly-In in 1969. The model is also a hit wherever people see it. We have scaled the drawings up to three times the original size for an RC job, but as yet have not found time to build it.

The model is easy to build, and the plans show both the flying and non-flying version. For the display model, be sure to cut a door in the left side and complete the interior with the two-hole bench seat and a tiny Sears catalog, etc. For the flying model, keep two things in mind. First, the upper tailbooms must line up with the main engine boom when viewed from the side and the top. Second, wheels can be any size or shape, as long as the largest is on the left.

CONSTRUCTION

Step 1: Cut the floor outline to shape and glue in the 1/4" sq. floor braces 1/8" from the edges to allow for fitting the sides, front and back. Next, glue in the right side, front and back. Cut the main landing gear wire to length and glue and wrap with thread to the hardwood gear mount. Glue the gear mount to the extreme bottom rear of the cabin.

Step 2: Glue the engine main boom in the large cutouts in cabin front and back. Glue the 1/8 x 3/8 x 3/4" plywood bellcrank mount to the engine main boom, as shown on the plan side view. Insert end of pushrod in bellcrank and screw or bolt bellcrank to the mount. Let the pushrod hang out the rear window. Now glue the plywood engine mount squarely on the end of the main engine boom. Next, add the upper and lower engine braces in the notches of the cabin and engine mount. Cut and bend the nose gear wire to shape, and glue and wrap with thread to the hardwood strut. For added strength, cover engine mount joints with small strips of hinge cloth and glue. Cut the left side to shape and draw a door outline with black ball-point pen. Be sure to include the quarter moon cutout in the door (most old time outhouses had one). Drill leadout holes to fit two pieces of plastic soda straws and glue in place. Now glue in the left side. Next add the 1/8 x 1" boom mount in cabin top rear.

Step 3: Bevel the rear ends of the two upper tailbooms and glue together directly over plan top view to get the correct angle. When dry, glue to the boom mount in the top of the cabin with at least two coats of glue. Make the splice in the lower tailboom and wrap with thread for looks. Fit the lower end into the notch at cabin bottom rear and the upper end between the upper booms. Cut the tail-wheel from balsa sheet, draw a tire on it and glue to the hardwood support which is glued to the tailbooms.

(More of this nonsense on following pages)

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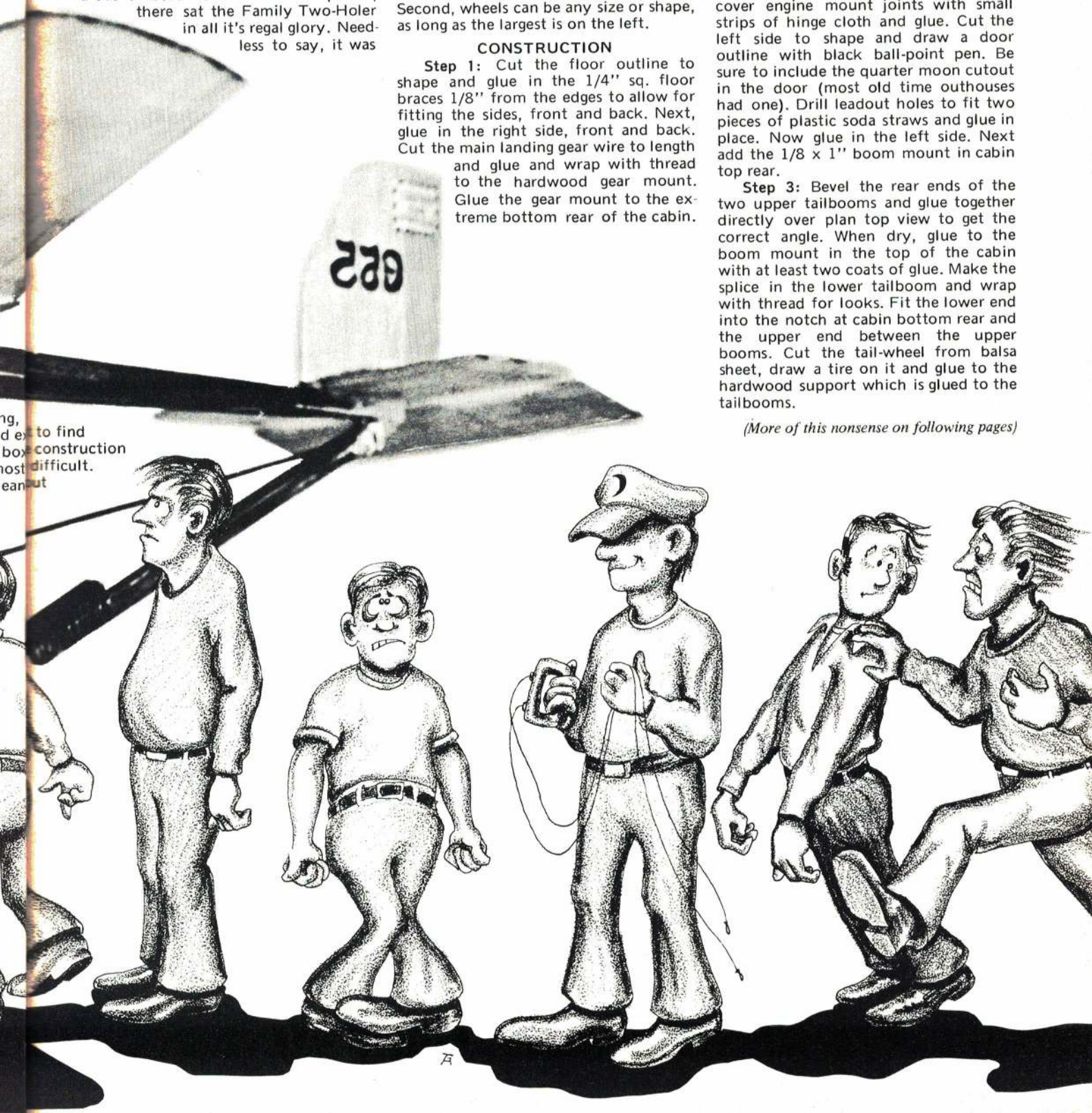
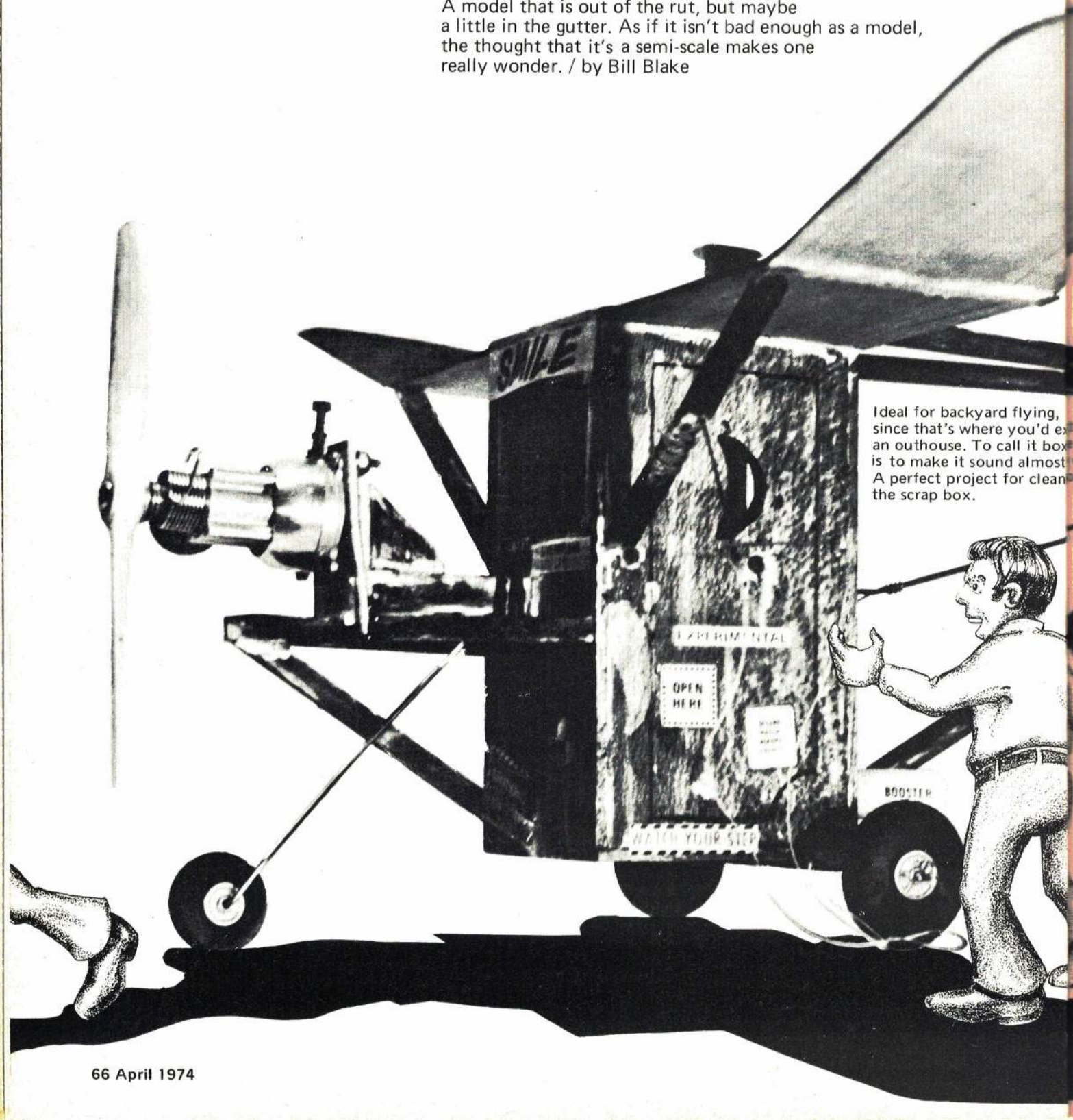


FOR THE TENDERFOOT

THE FLYING OUTHOUSE

A model that is out of the rut, but maybe a little in the gutter. As if it isn't bad enough as a model, the thought that it's a semi-scale makes one really wonder. / by Bill Blake



Ideal for backyard flying, since that's where you'd ex an outhouse. To call it box is to make it sound almost A perfect project for clean the scrap box.

A Flying Outhouse? That's right! And what's more, it's a semi-scale model of the real thing, the Family Two-Holer. The Family Two-Holer showed up quite unexpectedly at the 1969 Experimental Aircraft Association Fly-In at Rockford, Illinois. The full-size "aircraft," the non-flying type, was dreamed up and constructed by an Illinois chapter of EAA. At Fly-In time, the aircraft was disassembled and hauled up to the Fly-In. Sometime during the night it was reassembled on the field. When the sun peeped over the horizon the next morning and shone down on the hundreds of beautiful homebuilt airplanes, there sat the Family Two-Holer in all it's regal glory. Needless to say, it was the hit of the Fly-In in 1969. The model is also a hit wherever people see it. We have scaled the drawings up to three times the original size for an RC job, but as yet have not found time to build it.

The model is easy to build, and the plans show both the flying and non-flying version. For the display model, be sure to cut a door in the left side and complete the interior with the two-hole bench seat and a tiny Sears catalog, etc. For the flying model, keep two things in mind. First, the upper tailbooms must line up with the main engine boom when viewed from the side and the top. Second, wheels can be any size or shape, as long as the largest is on the left.

CONSTRUCTION

Step 1: Cut the floor outline to shape and glue in the 1/4" sq. floor braces 1/8" from the edges to allow for fitting the sides, front and back. Next, glue in the right side, front and back. Cut the main landing gear wire to length and glue and wrap with thread to the hardwood gear mount. Glue the gear mount to the extreme bottom rear of the cabin.

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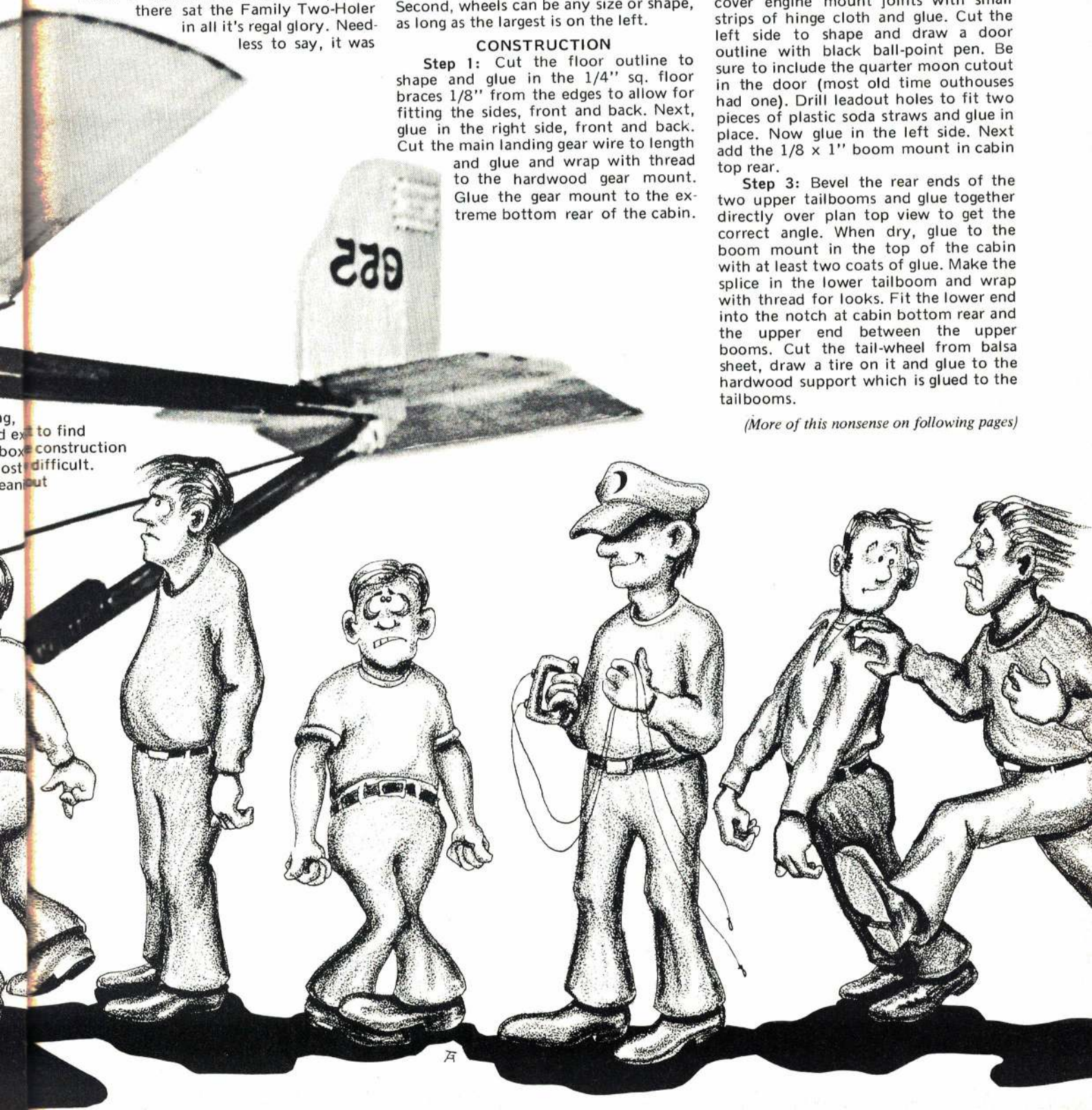
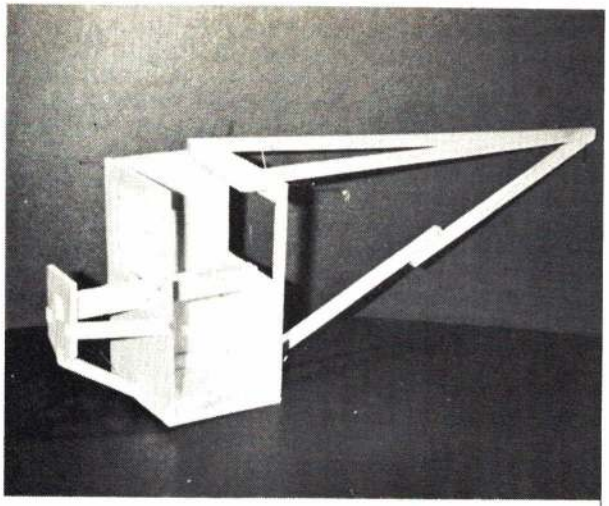
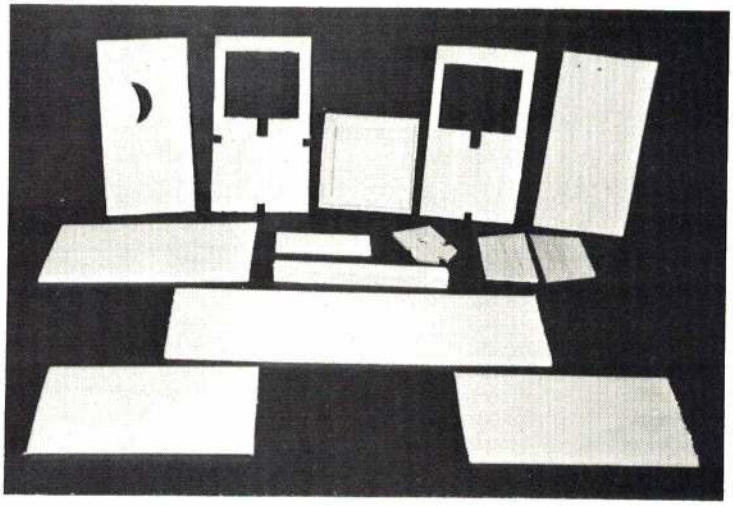
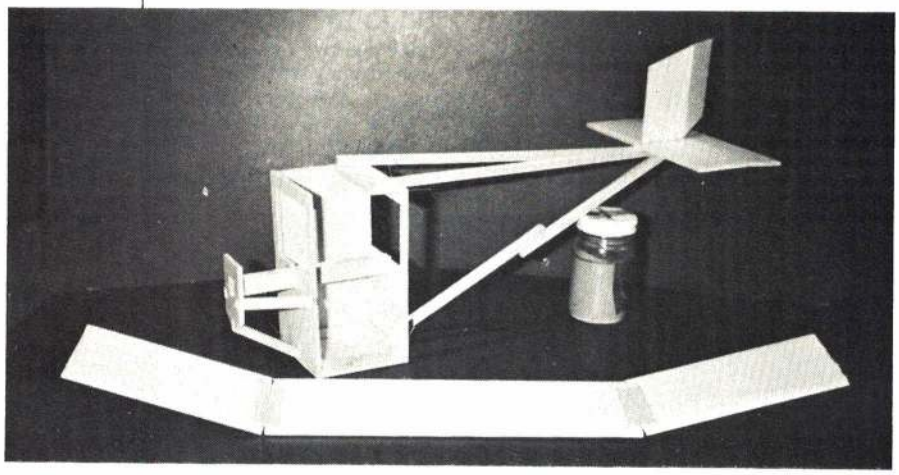
(More of this nonsense on following pages)

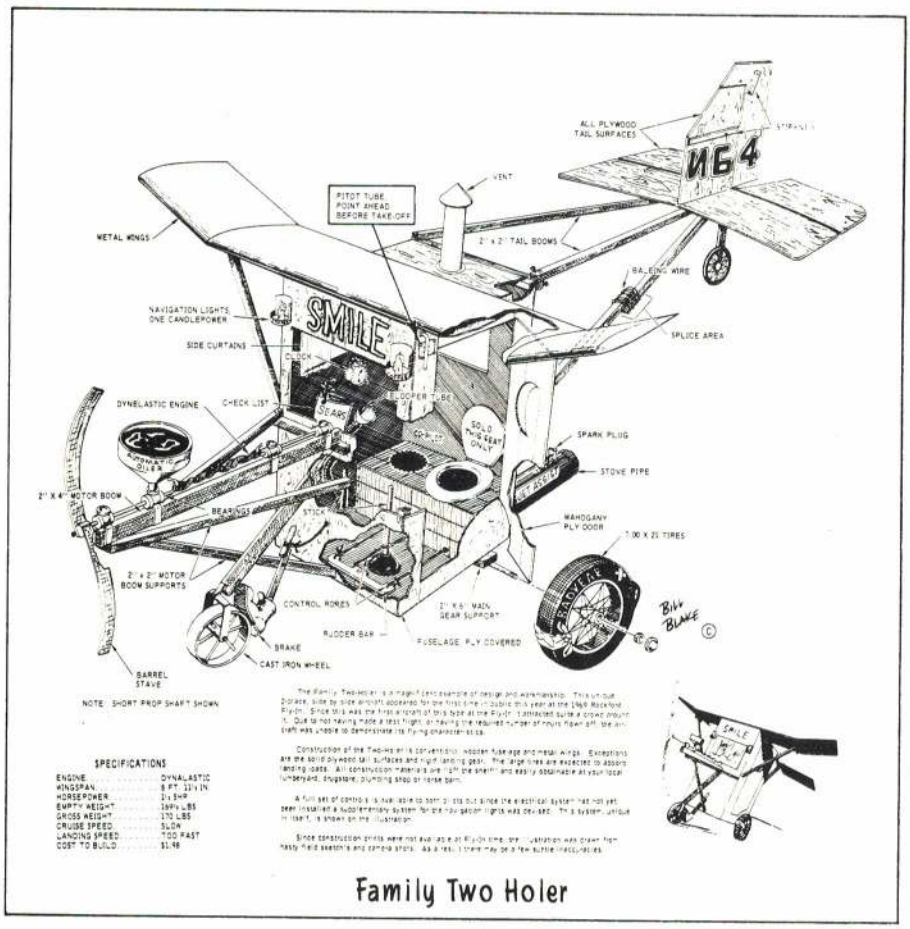






ABOVE: Framing up an outhouse doesn't require a carpenter. A good building rule-of-thumb is to always keep things flush, but in this case, well. . .let's leave it at that. ABOVE RIGHT: If you can't cut a straight piece of balsa, don't worry about this building project. Keep things aligned, of course, but a few jagged edges only add to the appeal. RIGHT: The wing is prepared for gluing to the "cabin." Having made our readers privy to this information, all that can really be said is that this photo shows a dope behind the water closet.



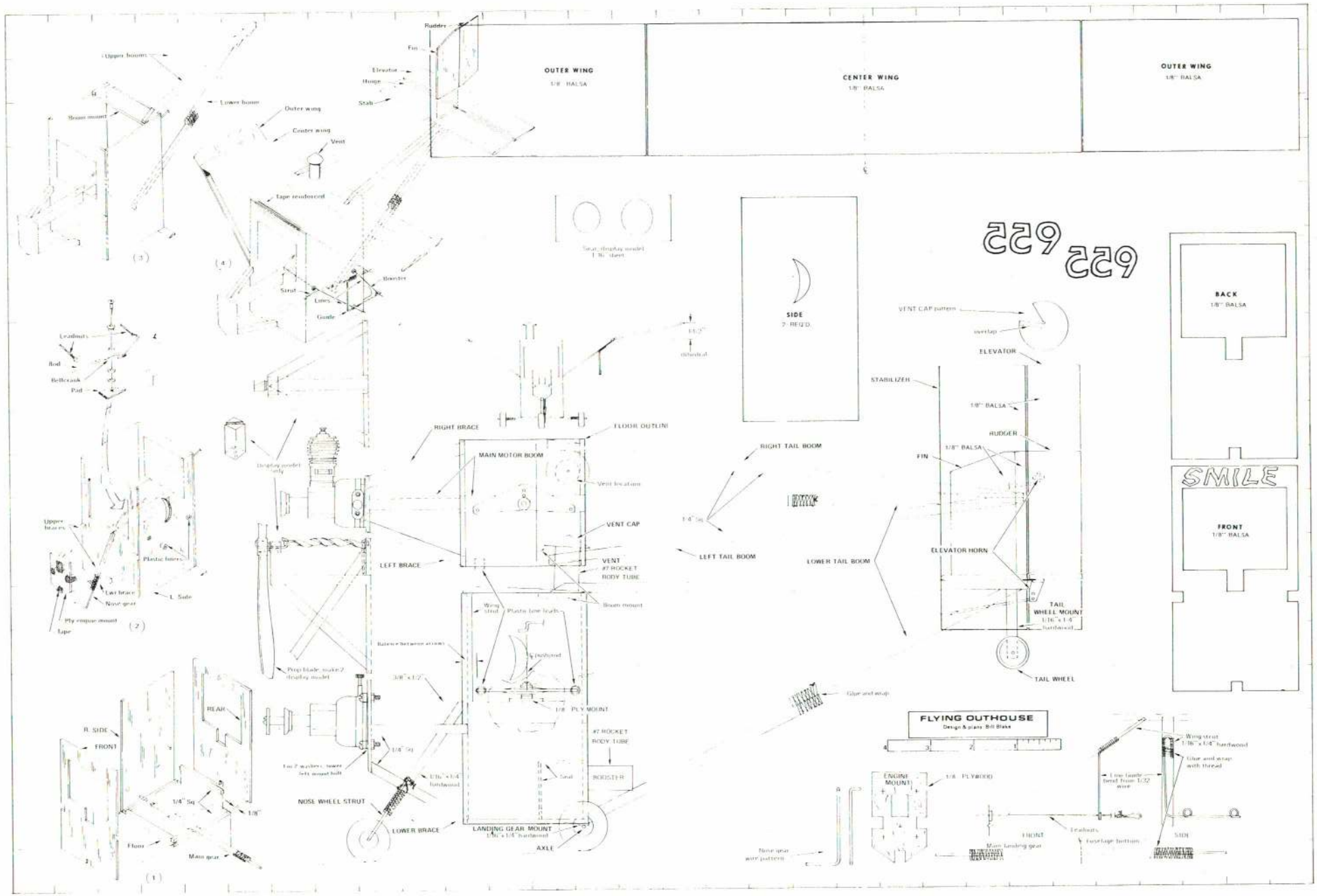


Family Two Holer

Step 4: Cut the stabilizer and elevator to shape and fasten together with a strip of cloth hinge material; leave a 1/16" gap between them. Install elevator and horn. Cut the fin and rudder to shape and glue together, with the rudder offset 1/2" to the *outside* of the flying circle. Glue fin to the stabilizer on the stab centerline. Glue stab to upper booms and place end of pushrod in elevator horn. Secure the pushrod with a soldered washer or 1/2A wheel retainer.

Step 5: Cut the center wing panel and the two outer wing panels to shape and sand in a slight airfoil section. Pin the center panel flat to the workboard and glue the outer panels to it, blocking the tips of the outer panels up 1½". Give the joints two coats of glue and add cloth reinforcement top and bottom. When dry, cut the wing center section to fit around the upper booms on top of the cabin. Mount the wing to the boom mount, cabin front and sides with glue. Cut wing struts to length and glue in place. Bend line guide to shape, glue and wrap with thread. Be sure to put it on left wing strut. Cut out the vent cap, form it into a cone shape and glue to the vent tube. A piece of No. 7 rocket body tube is the booster tube at cabin lower rear. Or, the tubes can be rolled from stiff paper.

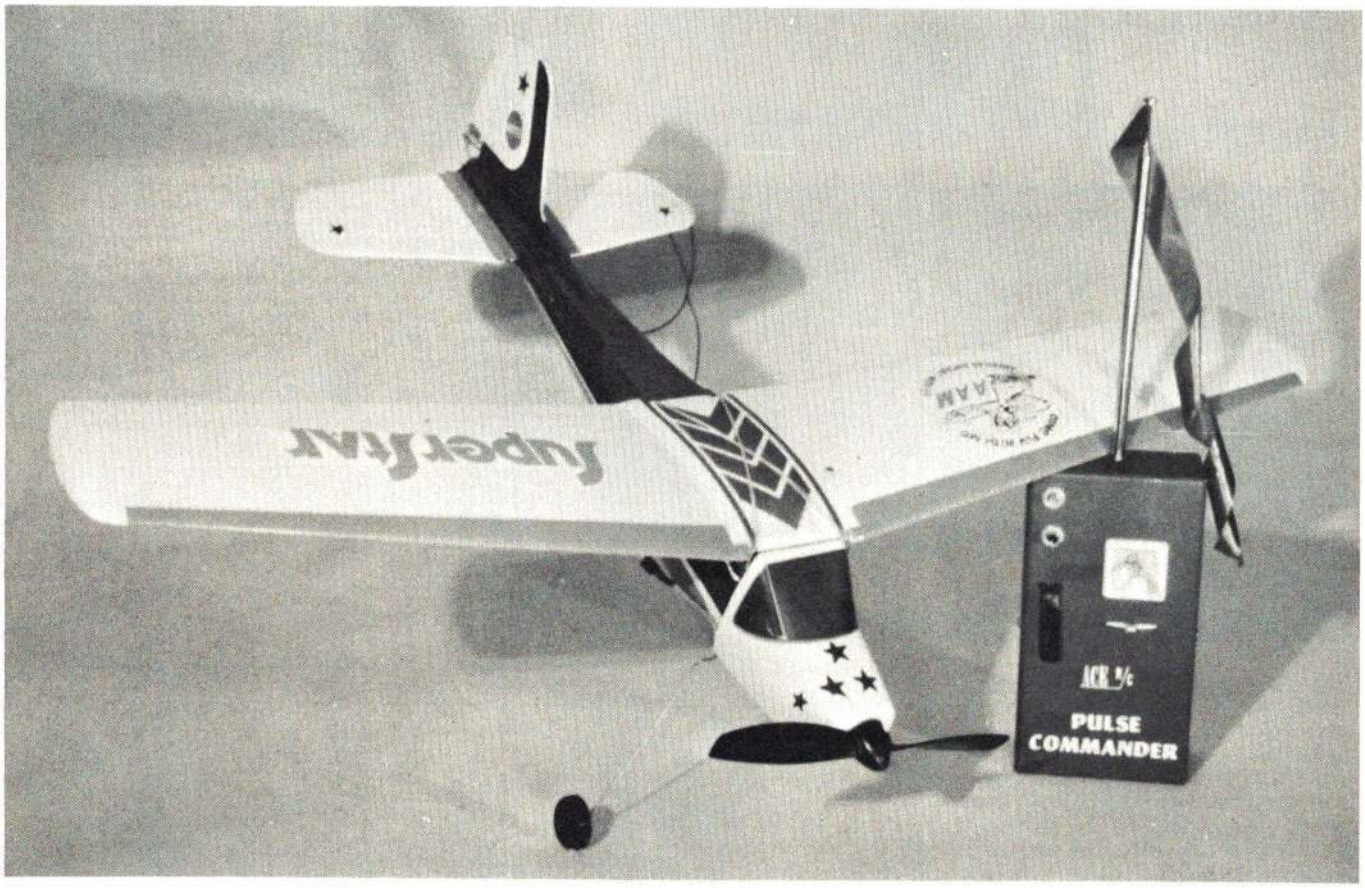
(Continued on page 99)



FULL-SIZE PLANS AVAILABLE – SEE PAGE 84

RC SUPERSTAR

Mattel's electric free flight toy/model becomes a fantastic flying, lightweight RC with rudder control. / by Mitch Poling



Would you like to have a radio-controlled airplane that starts instantly, is as quiet as a bird in flight, and lasts and lasts because there is no castor oil or alcohol to eat up the woodwork? The RC SuperStar fits this description. It is also already assembled and is so stable that beginners can learn with it.

The SuperStar fascinated me when it first came on the market. I soon owned two of them. About this time, my fiancee learned to fly RC, and became a good pilot and plane builder. However, she didn't like the problems of engine starting and castor oil. Electric power was the solution. When the Sky Show version of the SuperStar (with 15 percent more power) became available, I decided to try it.

I removed the autopilot, installed the Ace Baby RO system, and it flew just great. Flying time was short until I installed 500 ma nickel-cadmium batteries. Flying time then increased to six min., with altitudes almost out of sight. Now there are two in the air, one for me and one for my fiancee. If all this interests you, get a pair of 500 ma General Electric or Gould nickel-cadmium pencells, the Sky Show SuperStar (or the older version—order the new power unit from Mattel), and read on!

CONSTRUCTION

FUSELAGE: Refer to Fig. 1 for the actuator and linkage installation. Straighten out the autopilot torque rod at the tail and remove it. Save it for use as the actuator torque rod. Extend the rudder wire to one in. with heat shrink tubing. Drill a 1/16" hole for the torque rod exit 1/4" below the original torque rod hole. Drill four, equally spaced 1/16" holes in the rudder hinge, and remove material so that there are three hinges. Cut a 1¼ x 3¾" opening in the cabin roof.

Cut two polystyrene foam blocks 5/8 x 5/8 x 5/8", and one polystyrene foam block 1 x 1/4 x 1-7/8". Cut a piece of 1/16" plywood 3/8 x 2" and drill a 1/8" hole in the center for the Baby actuator bolt.

Epoxy (five-min. epoxy is used throughout construction) the actuator nut under the 1/8" hole, and the small polystyrene foam blocks at each end of the plywood. Shape the blocks to fit the inside curve of the fuselage. Epoxy the actuator mount so that the bolt hole is 3-1/8" back from the bottom lip of the front fuselage frame. Cut the foam bulkhead to fit and install it 4-3/8" from the bottom lip of the front fuselage frame. Bend the actuator end of the torque rod to shape, put on a bearing tube, install, and bolt in the actuator. Bend the yoke to shape at the tail, check for binding, and epoxy the bearing tube.

WINGS: If the older version of the SuperStar is used, join the wings as shown in the Mattel plans, but epoxy the joint for extra strength. If the Sky Show version is used, cut the overlap section (a strip one in. wide) off the right panel, and butt join with epoxy. Set the dihedral two in. under each wing tip. After the epoxy has set, apply the label as shown in the Mattel plans. The wings are strong enough for ordinary flight maneuvers, but should be reinforced if dives and loops are desired.

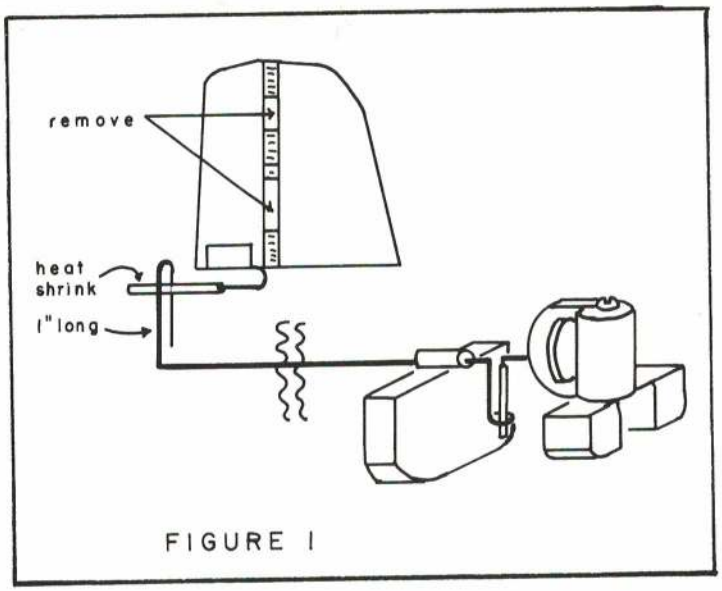


FIGURE 1

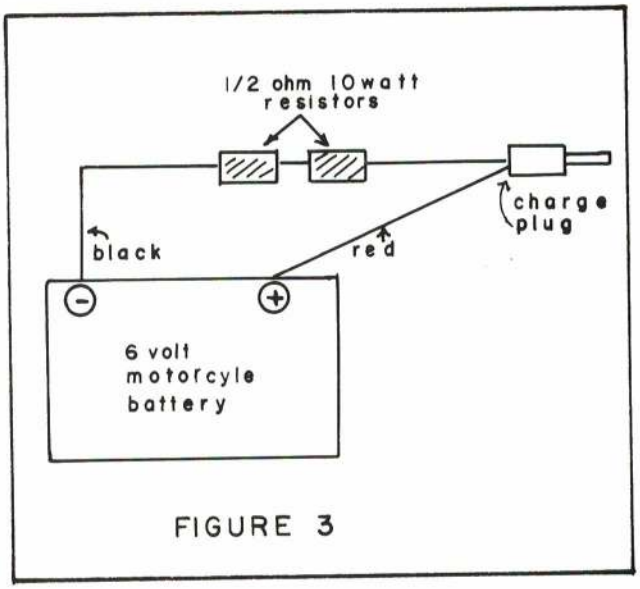
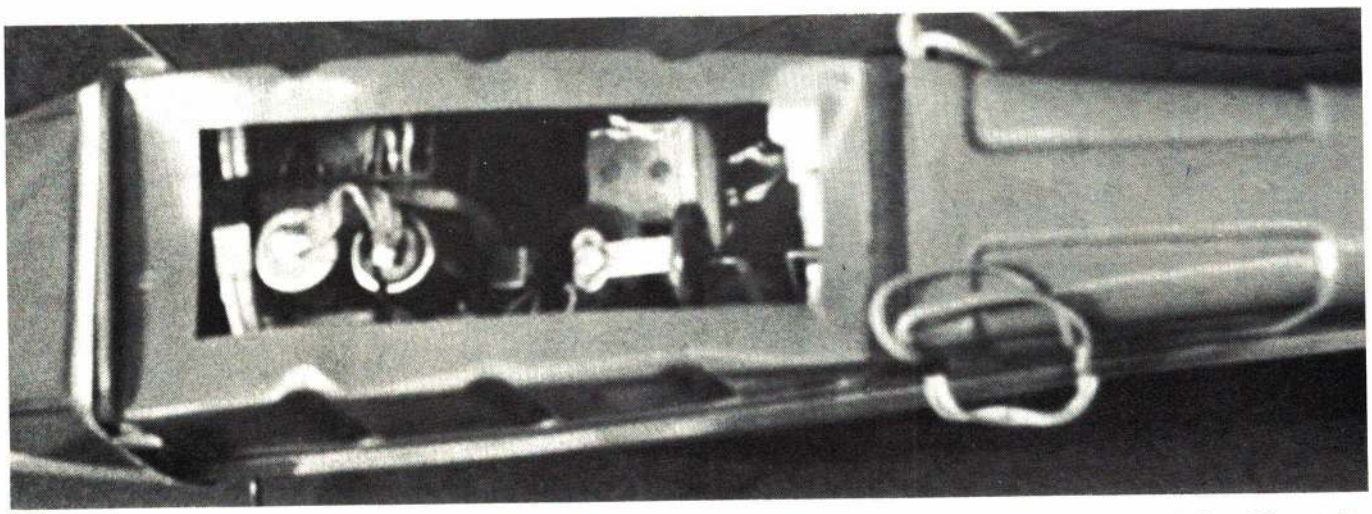


FIGURE 3



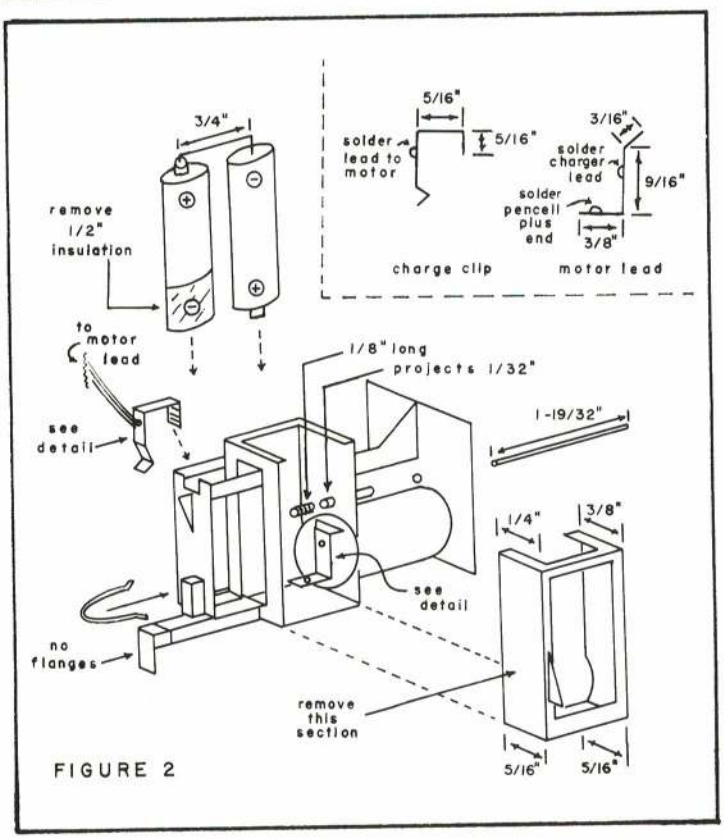
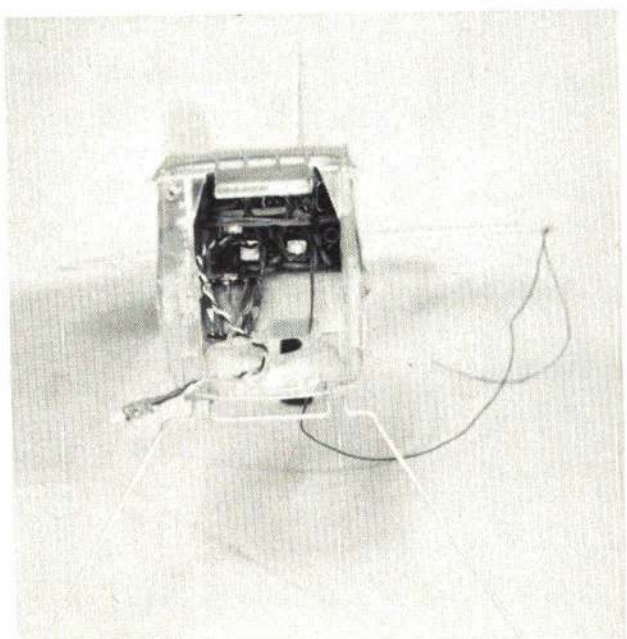
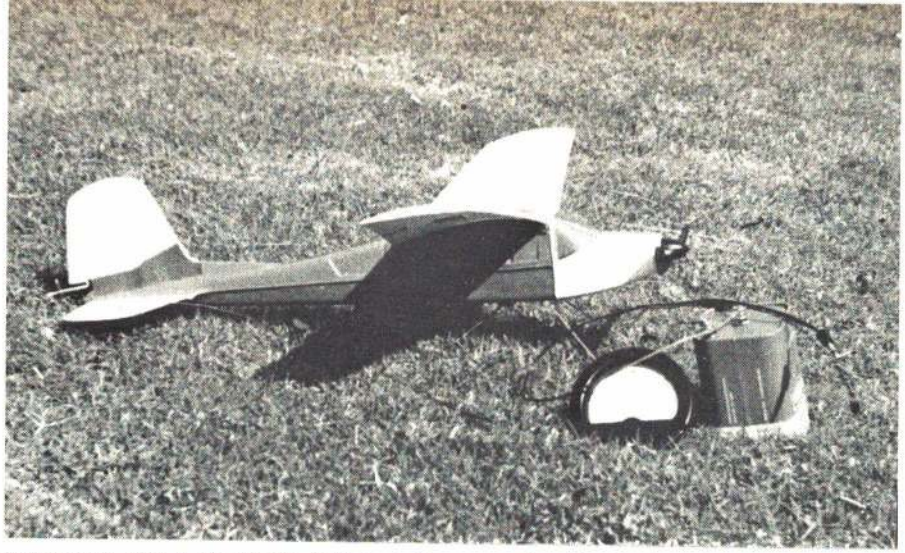


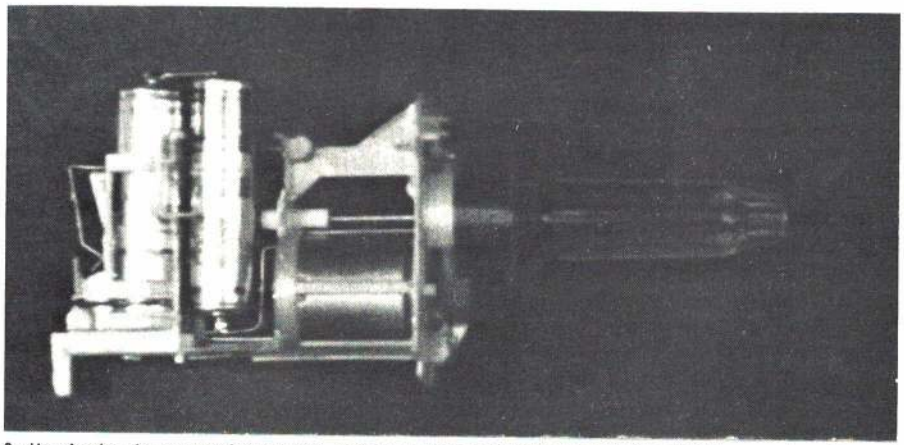
FIGURE 2

OPPOSITE PAGE: Ed Sweeney's converted SuperStar, as inspired by Mitch Poling, gives five-min. flights in dead air, and has even cruised for over ten min. with some thermal lift. ABOVE: Everything stuffs easily in the SuperStar fuselage. Note that the receiver is located at the forward right side and the Little Mattel battery (now wired for the ACE radio system) is on the left side. BELOW: Editor's receiver and actuator installation is quite different. Text describes this, too.



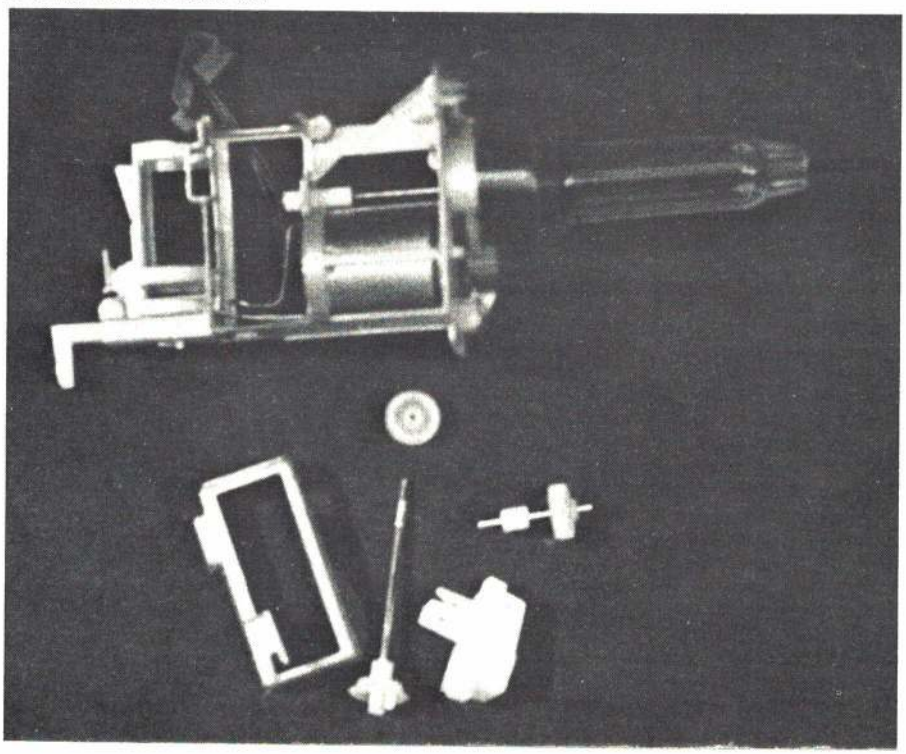


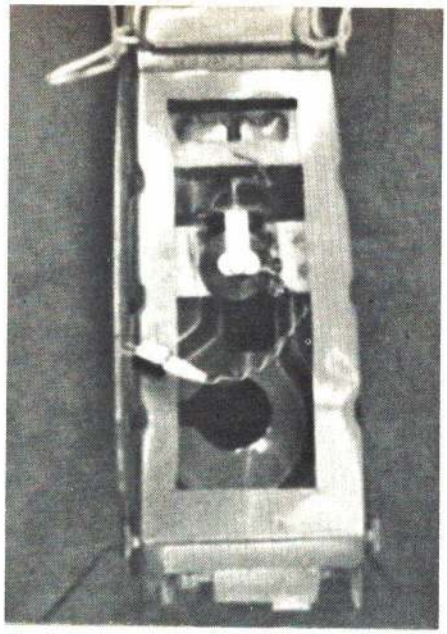
Charging up with a 6V lantern battery and an ammeter. For the best in quick and reliable charging, read about and build the DC to DC charger for electric flight presented in the January '74 AAM. What you see is the entire paraphernalia needed for schoolyard electric flying!



Author's simple conversion of the Mattel power unit for long duration flights uses two General Electric PermaCell AA size NiCads.

Process of converting to the larger batteries is easy. The original Mattel batteries are now used to power the ACE radio set.





Radio installation involves mounting the actuator and torque rod bearing on small foam blocks which are glued in the fuselage. Keep it light; spare the glue.

Editor: I found the reinforced wings necessary too. But rather than adding struts, I just taped an 8 x 1½" piece of sheet plastic to the forward underside of the wing. This also raises the leading edge which I also found necessary. The plastic sheet is 1/32" semi-stiff vinyl material—such as that used in ARF model plane fuselages. Taping an 8-in. length of 1/16 music wire to the underside of the wing might also be adequate.

MOTOR UNIT: Refer to Fig. 2 for the motor unit modifications. Discharge the batteries completely to avoid burns (rings especially). Cut off the motor switch flanges and the area illustrated on the autopilot compartment. Holding the autopilot shaft with pliers, pull off the gear, and remove the shaft and the smaller gear assembly. All that remains in the autopilot compartment is the gear housing, the bearing which is molded into the housing, and a retainer worm gear on the propellor countershaft. Cut the bearing free from the gear housing with a coping saw blade. Be careful not to damage the bearing or worm gear. This finishes the motor unit conversion as on the prototype. Go to the section on radio installation, and have some fun flying. Once you have the feel of your new outfit, read the addendum for a longer duration version.

RADIO INSTALLATION: Install the motor unit and the receiver battery. If the Ace 225 ma batteries are used, leave the switch on and tuck it in the fuselage. Position the batteries in the left side of the fuselage against the front bulkhead. Use a small piece of foam rubber to secure them. Install the actuator next, then the receiver. Insulate the receiver from the motor unit with a 1/4 x 2 x 1-5/8" piece of foam. Install the receiver on the right side, against the front bulkhead, with the printed circuit board facing the motor unit. Run the

(Continued on page 90)

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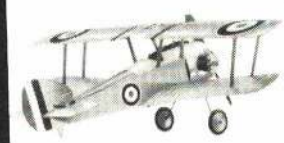

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JOHN BURKAM ON HELICOPTERS

German Activity: Fritz Bosch and son, Hans-Michael, have both been very active in European RC helicopter competition. Hans won fourth place in the Italian competition and first at the German NATS. Fritz came in third in the latter. Both contests required hovering, vertical flight, spot turns, forward and backward flight, sidewise flight, figure eight and rectangular landing approach. The Italian contest offered high points for autorotation and looping, but no one even attempted either maneuver.

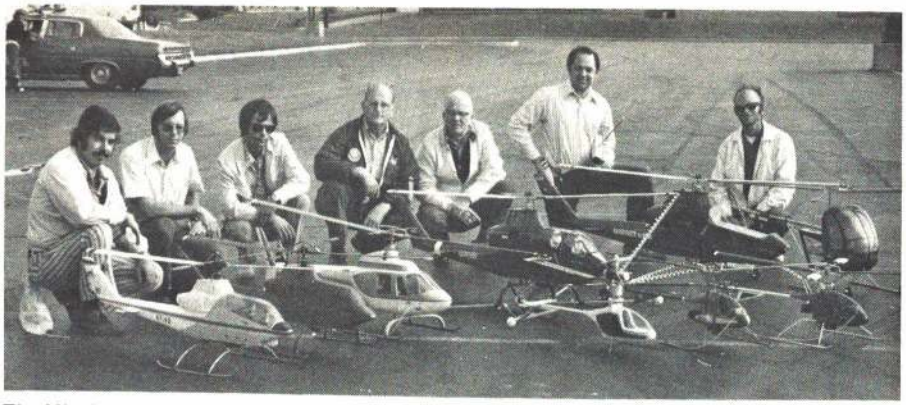
Ernie Huber, U.S. NATS winner in RC Helicopter, was allowed to compete in the German NATS and came in eighth, flying his new Kavan Bell Jet Ranger instead of his more familiar Schuco-Hegi Hueycobra. It takes a good bit of flight time to get used to a different type model. Even reducing collective pitch and flying at a higher rpm quickens all the controls (as I found out at the cost of a pair of blades). Going from Hiller to Bell is to change from slow initial response, with fair sustained response, to quick initial response with slower sustained response. The Hiller servo rotor is parallel connected to main rotor cyclic, and has 100 percent authority. The pilot has to precess the servo rotor in order to put a control into the main blades. Once a rate of precession has been established, it will continue at that rate until the control is neutralized.

The Bell stabilizing bar is connected differentially to the main blades through a mixing lever, as is the pilot's cyclic input. The bar has limited authority. Either the pilot or the bar can instantaneously change blade pitch without moving the other. However, after a pilot initiated control, the helicopter tilts while the bar lags behind. This wipes out part of the control the pilot put in. Ernie found that adding 30 gm of weight to each main blade tip, and putting 40 gm of friction in the stabilizer bar pivot took away some of the extreme sensitivity around neutral, and increased the following rate of the bar. This initial sensitivity of the controls is not necessarily bad. Some pilots like it that way. On real helicopters it is called "quickening." If a control happens to be a bit sluggish, it can be made to move farther initially, and then be partially washed out as time goes on. Too much quickening, however, makes it difficult to apply a control correction smoothly. The Hiller system can be quickened as desired by increasing paddle area and aspect ratio, increasing control throw, increasing rotor rpm, or decreasing paddle weight.

Model Helicopter Association: Biggest news in RC helicopter flying in the U.S. is the impending formation of an association of model helicopter builders and pilots, as the official governing body for that sport. This organization will be responsible for running national contests, setting up rules and sanctioning U.S. records. It is being organized through the mighty efforts of Dario Brisighella, with help and advice from prominent RC chopper pilots. Considering that the blades of one of these choppers can (at full throttle) slice up a broom handle like a piece of balogna, SAFETY is uppermost in the minds of the organizers. If you have ideas on rules, maneuvers and organization, get in your two cents worth by writing to Dario at 1032 E. Manitowoc Ave., Oak Creek, Wisc. 53154. The rules must be published far in advance of the contest so that the pilots can get in some meaningful practice before hand.

RC Helicopter Club: Dave Keats and some friends around Troy, Micigan, have formed perhaps the first RC helicopter club in the country—the Michigan Whirlybirds RC Club. Beginning helicopter fliers need more help and advice than other RC pilots, both in adjusting the machine and in flying it. In a club, someone is sure to have experienced any problem that the new flier comes up against, possibly saving him crashes and hours of rebuilding time. In addition, a club with good workers is what is needed to put on a successful contest.

My New Year's Resolution: I promise to try to catch up with my correspondence, in which I am many months behind.



The Michigan Whirlybirds RC Club, the first club specifically formed for the rotor crowd. (Left to right) Al Stein, Chuck Sherman, Pete Nill, Jim West, Harry Brady, Carlos Iobannitti and Dave Keats. A very active group, by the looks of things.

JOHN BLUM ON NAVY CARRIER

Pair of Judys: Chuck Herron of Wichita, Kansas, able assitant, pit man, and handy man behind son Terry, sends along info on Terry's Class II NATS winner. Having had such success with the Class I Judy, the subject was a natural for the larger class. The photos show the model and engine. Chuck relates that the engine is a cross between on OPS Ursus 60 RC and an ST G65. The OPS case was modified to accept a G65 front end, crank, rod and wrist pin. The backplate and rotor are strictly G65, with Chuck's original carburetor/venturi/metering system completing the setup. The greater the stroke of the G65 resulted in an increase in the displacement to .639.

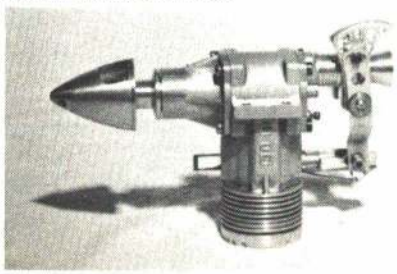
Big Judy has a 38-in. span, is 32¼" to tip of spinner and has a 9½-in. root chord. The best prop to date is a 10-5/8 x 7¾ Rev-Up. The best high speed run has been at 15.2 (118 mph). Construction is standard crutch, former, and balsa skin, with carved canopy and cowl. Engine mounting is on an H-shaped magnesium mount. Control line hookup of solid lines is achieved with mono-line buttons. These are located under a hatch, which is actually the wing insignia on the lower left wing panel.

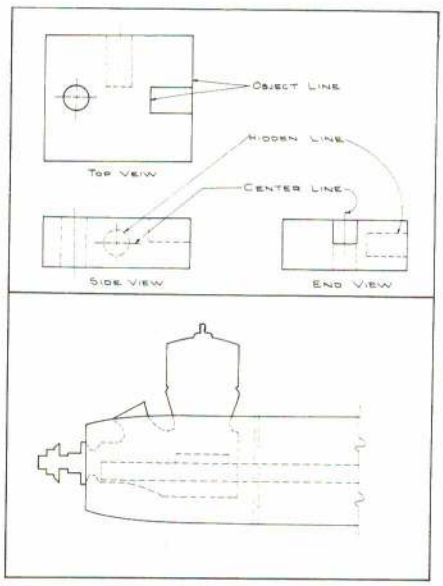
Profile Engines: That lead-off sounds strange, doesn't it? But the reference is to engines for Profile Carrier, and what's wrong (or right, depending on what you are using) with that! "Factory-produced, ready-to-run units," as discussed in the rules, are being taken to task quite strongly in some circles. As has happened to other events in the past (and UC modelers never learn), the intent of Profile Carrier is slowly being overshadowed by the hard working expert. The hard work, the experimentation, the burning of the "midnight oil" by these people is commendable: the expertise and intent is beyond question; but, is it healthy for the event? The flat-top piston controversy needs a realignment of the rules, and the improbable, monstrous, tedious detection of a "stock" engine (or lack of), almost places the whole rules' enforcement on the honor system.

(Continued on page 98)

Fuel and pressure lines are easily accessible on the Judy (Class II).

Take a little OPS 60, mix in a little ST 65, and you have Terry Herron's power plant, as used in his Class II Judy.





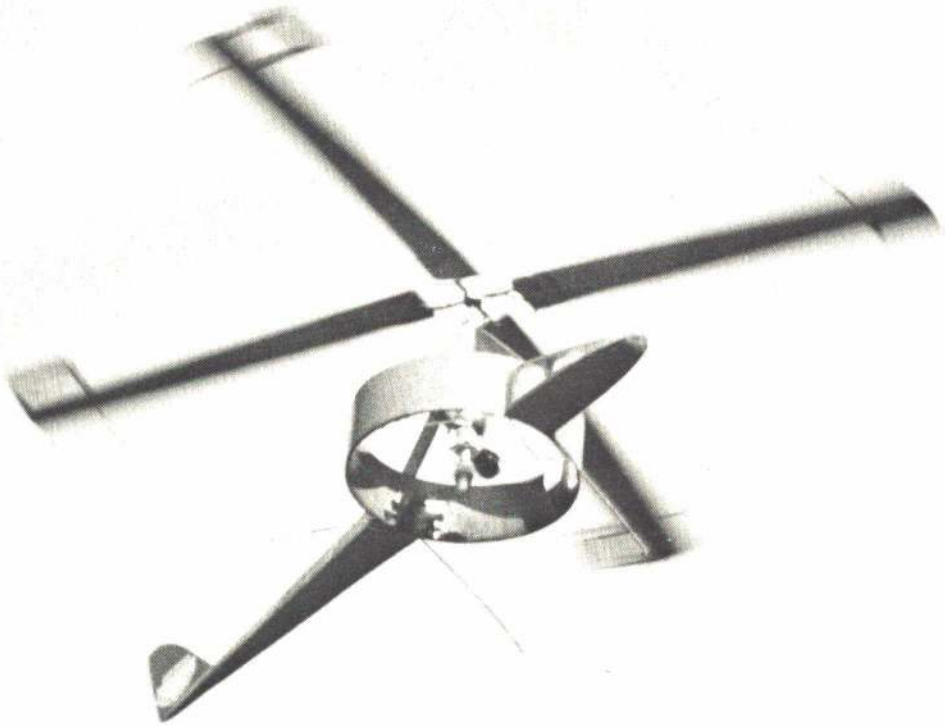
Hans-Michael Bosch, son of Fritz, lands his Kavan Jet Ranger on the stabilizer of a huge model of the Lockheed C-5A Galaxie. Is this model radio-controlled, or does the pilot ride inside?!

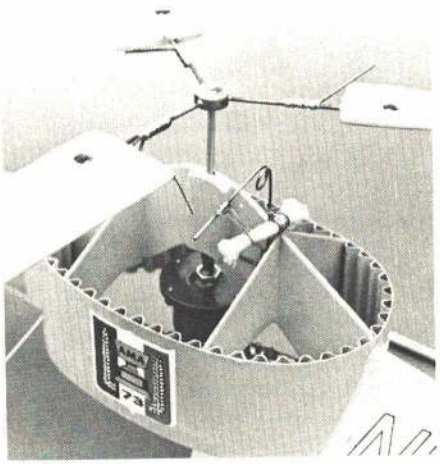
SPECIAL INTEREST

BOOMERANG

A free flight chopper with some unusual twists,
like controllable flight and reliable autorotation. / by E. A. Thompson

Photos by Harvey and Meuser.





TOP: The Boomerang whirls upward on another "controlled" flight. Adjustable trip switch system allows for preset flight patterns. Perhaps some ingenious modeler could incorporate a multiple timer system to program a sequence of flight maneuvers.

ABOVE: Pay no attention to the elliptical-shaped shroud—the latest model uses a circular one for greater prop efficiency. Rotor hub requires a few minutes of simple lathe or drill press work.

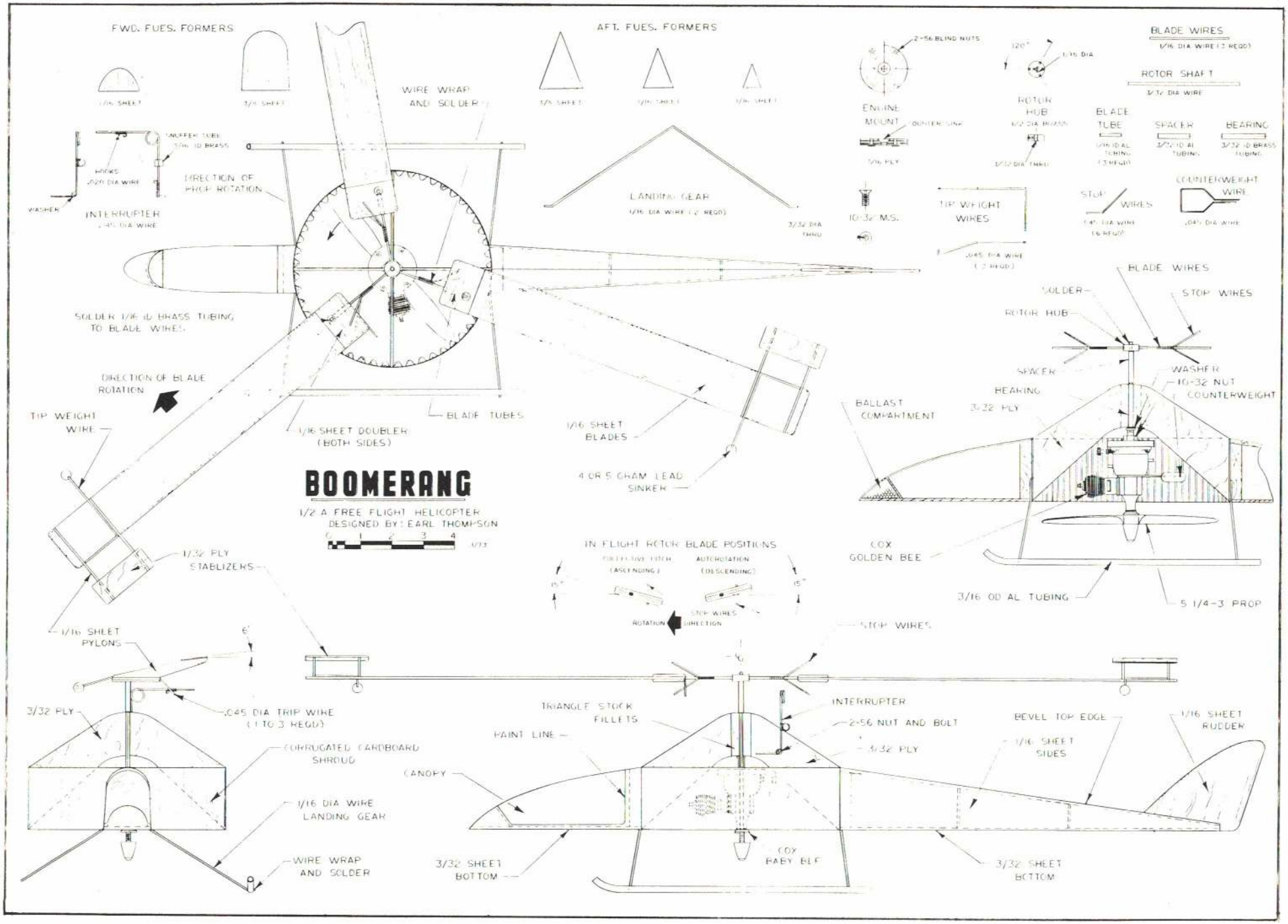
RIGHT: Author revs up the 049 before a flight. A little experimenting with proper engine rpm will reap rewards in terms of reliability.

Hurray for the helicopter! The modeling world has turned its fancy to the rediscovery of rotary wing flying machines. The RC fraternity has firmly come to grips with this new modeling challenge by scaling down prototypes. However, the extreme cost, as well as lack of machining skill and flying proficiency, deters most of us from attempting this approach. If your interest in model helicopters is high but your funds are low, why not take a look at a rigid rotor, torque reaction free flight model?

Helicopters were flown for many years as an official event at the NATS. Unfortunately, the participation was rather limited and the event reverted to unofficial status. A general absence of published information and the lack of understanding of basic stability requirements has all but denied helicopters a large following. So here is my big chance to re-invent the wheel and put it all together with a new twist or two in Boomerang, the plagiaristic free flight helicopter.

Plans on following page
Text continued on page 80

FULL-SIZE PLANS AVAILABLE – SEE PAGE 84



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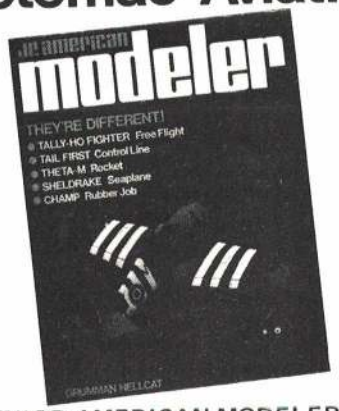

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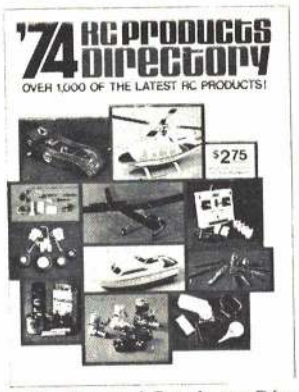

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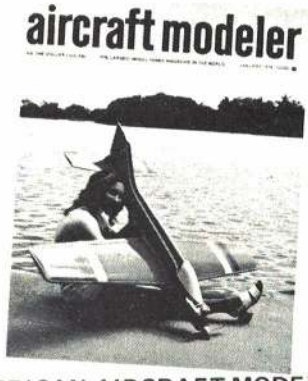

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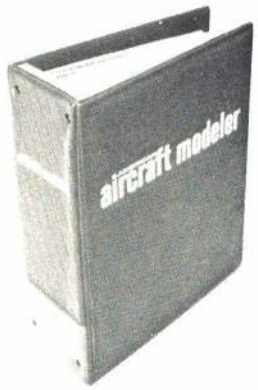

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FLEXI-FLIER

(Continued from page 23)

The model didn't take long to assemble, but working with 0-80 screws involves some fumbling, at best. I bought a 12-ft. length of 1/4" 2024-T3 aluminum tubing from a nearby industrial supply house and settled for .028 wall thickness, rather than the more scale .008. This was a good thing because it has to take some lumps. All the rest of the materials are available at hobby shops or hardware stores, although finding long steel 0-80 screws is something of a challenge. I made a drill jig out of a block of wood to help get the little holes lined up properly.

The rest of the assembly is pretty much straightforward, with just a few exceptions. The thimbles for the cable loops were made by threading bare copper wire through a piece of 1/16 aluminum tubing. This was wrapped tightly around a long 4-40 screw and chucked up in a drill motor. After filing half way through, the copper wire was removed and the aluminum tubing sawed lengthwise with a modeling saw. This provided a handful of split rings which resembled thimbles. The crimped ferrules were made of short bits of brass tubing and crimped carefully with wire cutters. They're too small to crimp any other way.

The control bar was made of 1/8" soft aluminum hobby tubing but, since strength was necessary here, I selected a coat hanger which fit inside snugly. Music wire won't do because it has to be drilled. Bending is easy with the wire inside.

Now that the hang glider is finished, you'll need a pilot. You've survived the jibes about playing with little toy airplanes, so don't worry about playing with dolls again. GI Joe is really a remarkable doll, beautifully articulated to move in all the proper places. Pull an arm and a leg out of their sockets and snip the elastic holding them on. Now saw through the torso at shoulder height. I did this on my table saw and found it to be a curiously satisfying experience! My radio is a six-channel Kraft with KPS-10 servos and I found it necessary to discard GI Joe's hip sockets to make room for the radio. With a two- or four-channel rig and KPS-12 servos, you might be able to retain them, but it's not terribly important.

The two servos are taped together back-to-back with the rotary shafts available for attaching to the arms at the shoulders. The receiver can now be slipped between the bottom mounting ears of the servos. This will locate the "brains" appropriately in the seat of his pants. The flat battery pack will fit in the chest area. There's even room for a switch under the battery in the general vicinity of the belly button. An S-shaped wire hook can attach the head to the neck, and a 4-40 screw holds the legs together in the upper thigh. A big rubber band holds the head and legs on like suspenders.

Drill out the wrist and elbow rivets and tap to accept 4-40 headless set screws. Carve these joints until they move freely. Remove the rivet from the shoulder area of the upper arm, and with a small soldering iron, fill in the area where the hook had been. The plastic melts and fuses easily. When cool, cut a square hole to accept the servo output shaft and screw on the arms. The flight suit can now be slipped over the pilot and when zipped, he can't be distinguished from the original GI Joe. At this point, he is capable of doing push-ups to get in training. With the doll suspended from his armpits, and his hands attached to the control bar with little rubber bands, the effect is absolutely captivating! He swings around in a very realistic way.

Flight characteristics of the completed model were very realistic. It has about a five-to-one glide path (remember, this is a glider, not a sailplane), and will flare out very nicely for landing. Upon landing, the legs swing back gently and everything is protected by the hang bar and rigging. Control capability is about the same as the prototype, but I found that control could be overpowered by a strong updraft. A half-oz. fishing sinker in the nose corrected this.

For the first few test flights, follow the technique used by the big ones. Find a gentle slope which the prevailing wind blows toward and which has a loose sand surface. Start at the BOTTOM and, holding the model loosely at the top of the control bar, get the feel of wind filling the sail and lifting the

craft. Avoid touching the transmitter antenna while holding it sideways because it will detune somewhat. Now make sure that the sail is filled. Ease it gently straight into the wind and slightly downward. The shove will cause the body to swing aft, giving it a tendency to pitch up a little.

After a few preliminary flights like this, you can start working your way up the hill. Notice that you haven't gotten into a dangerous situation yet. If nothing works, the worst thing that can happen is a mild jolt. The jump suit helps to keep sand out of everything but doesn't prevent it. Finally, standing on the edge of the cliff, point the hang glider directly into the wind and launch. It will gain altitude as it moves through the updraft, and the model can compete with a full-size manned hang glider on absolutely equal terms. Sink rate, glide path, and directional control are all quite comparable. The only problem is that everyone stops flying and crowds around to watch when the model is there!

If you become inured to the thrills of jumping off cliffs in relative safety, you can add the tow hook release mechanism. Full "up" control pulls the body back, and a string from the chest releases the catch. Full-size ones use a motorcycle clutch cable. Towing is much more dangerous than cliff jumping, because the rigging can be overstressed at high angles of attack. Higher speeds are attained, and it is possible to get into a condition which cannot be corrected before impacting. Longer flights can be sustained with the model though, and it makes for another interesting novelty. With the tow hook, the model can be flown like a kite, towed aloft like a tow line glider, launched with a long rubber band, towed from another RC craft (I'd like to try water skis behind an RC boat, but GI Joe hasn't learned to swim yet), or dropped from a weather balloon. My longest flight so far was from a manned hot air balloon at 5000 ft.

Braided fishing line is hollow like polypropylene water ski tow rope, and a loop can be formed by threading an end back into the core. This bridle can be attached to the control bar with a clove hitch. The towline has a drapery ring on the end, through which the bridle is threaded. The ring can ride up and down the bridle freely and the pitching moment induced by towing can be overcome. (If the towline is attached directly to the control bar, the pitching moment will cause an immediate problem.) Upon release, the bridle pulls through the ring and comes free. For the balloon launch, I melted a small hole in the sail with a soldering iron and allowed the bridle loop to pull through at release.

Under tow, the model has much more lateral control than in a free glide, due to the way the different forces act and the moments associated with them. For this reason, the kite technique is suggested for training purposes before attempting a tow. The ground speed is initially zero. It is still possible for undampened oscillations to build up, with hard dirt at both ends; so be prepared to release the instant a dangerous situation develops. If you can find another RC modeler willing to tow you up with his airplane, the following precautions are important: attach the airplane tow hook just behind the cockpit, not at the tail. Also, arrange for either end of the line to be released in an emergency. The tow plane can use a spare channel or release with full left rudder. The glider can get airborne in the first few ft., then after a brief period of uncertainty, both can fly together. Use a 50-ft. towline of four-lb. test nylon monofilament fishing line. It will stretch a little, maintaining tension under load, and will break if overstressed. Teamwork is required to pull this off. Gentle turns and a steady pull are important. The tow pilot should throttle back a bit at release to avoid overstressing the glider rigging, but also the release will pitch the glider up, slowing down the tow plane. If the tow plane turns down and left at release while the glider turns right and down, there will be less of a tendency to interfere with one another.

If you like something different, try a hang glider. It is in no way an improvement over more conventional aircraft, but it's fun and very easy to fly.

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BOOMERANG

(Continued from page 75)

A lightweight, profile fuselage version—called Bormer for short—placed first in the 1973 BMA Scholarship Contest. Our interest in helicopters was kindled when Marty flew a Glenn Lee design (Chopper 64) at the 1972 BMA contest, and lost it OOS on the first official flight. The flight potential and design challenge caught my attention.

Many design features of the Bormer were derived from published information by Glenn Lee and Dr. Lee Taylor. However, a new innovation was devised to achieve cyclic pitch control in order to generate forward flight. Basically, it consists of a fuse-operated interrupter wire which contacts trip wires on the blade cuffs. The advancing blade is tripped as it goes by, thus causing loss of lift over a portion of its circular path. When set up to happen in a planned manner, forward flight is achieved.

Vertical ascent with collective pitch, and descent by autorotation, is controlled by the blade limit wires on the rotor hub. Collective pitch and autorotation angles of 12-15° seem to work best. When the collective pitch is increased beyond 15°, the rotational speed is greatly slowed by high drag, resulting in little lift. Autorotation angles below 10° are tricky too. An excessively low angle (less than 5°) will cause the model to tumble out of the sky. Under power, the tip weights provide a pitch increasing moment to the blades and, with loss of power, these weights and blade drag help pivot the blades over into autorotation. That should be enough backyard helicopter theory to get you through the "what-makes-it-fly" questions. Before I get in deep trouble with the theory, I'll shut up and let you start building.

The construction is straightforward and should offer no real problem. Epoxy is used for all glue joints. Corrugated cardboard has been discovered to make the building of the propeller and engine shroud a snap. Get the kind that has a thin facing on one side only, and put the corrugated side inward for a smooth appearance on the outside. Cut a piece to 2 x 18½". Trim to exact length by fitting it around any six-in. dia. cylinder (a three-lb. coffee can is perfect), and tape the butt joint with magic mending tape.

Cut out four mast support pieces from 3/32" plywood and epoxy one on either side of the bearing tube. After curing, the remaining two are epoxied at a right angle to the first pair. Triangular balsa fillets are also epoxied on and this whole subassembly is glued into the ring, with the tape joint at the rear. A couple of coats of clear dope and sanding complete the unit.

The forward and aft fuselage sections are just as easily built. Cut out bottom pieces and formers from balsa stock, as specified on the drawing. The two 3/8" sheet formers are contoured on one side, to fit the shroud, by using the coffee can as a sanding mandrel. Epoxy the formers to the bottom sheets in positions shown, and finish the inside of the forward section by covering it with colored craft paper. A canopy of your choosing is epoxied on and trimmed to final shape. Bevel the top edge of the two side sheets for a backbone joint and epoxy them to the aft fuselage section. After trimming and sanding, epoxy the rudder in place.

Notch the forward and aft bulkheads to receive the landing gear wires and epoxy them on. Glue the forward and aft fuselage assemblies to the shroud, making sure everything lines up as shown on the drawing. To avoid messing up the canopy surface, mask off the portion to be left clear. Clear dope two coats; sand and cover all bare wood with Jap tissue.

Rotor blades, doublers and stabilizer pylons are cut from 1/16" RC balsa or good "C" grain stock. Drill the 1/4" dia. access holes exactly as shown, and cut a slot in the blades for the aluminum pivot tubes. Epoxy pivot tubes in place, with balsa doublers on each side. Sand this assembly; clear dope two coats and cover with Jap tissue. Epoxy on the stabilizer pylons, stabilizers and tip weight wires.

Clear dope three or four coats onto all parts constructed thus far, and sand between coats with 400 grit paper to get a smooth finish. A final finish in your choice of color dope or a brightly colored epoxy paint can be applied. If colored tissue is used, it may be left natural.

The rotor assembly requires two special parts to be made with a lathe or drill press. Take a 1/2" 10-32 flat head machine screw and drill a 3/32" dia. hole through it lengthwise. Cut a piece of 1/2" dia. brass rod to 3/16" thickness and drill a 3/32" dia. shaft hole and three 1/16" dia. blade support wire holes, as shown in the blade hub detail. The 3/32" dia. shaft wire is soft soldered into the 10-32 machine screw with a butane torch. Make the engine mount, and assemble to the shaft wire. Use a nut and washer to pull it together. Check to be sure the shaft is perpendicular to the engine mount. Coat the machine screw and nut assembly with epoxy.

Slip a No. 3 or No. 4 washer onto the shaft and put the shaft through the bearing tube The aluminum spacer is slipped on next. Finally, the blade hub is soldered to the shaft. Be sure to leave a little end play in this assembly, so no binding is present. The blade support wires are also soldered to the hub.

The counterweight wire is slipped over the engine, wrapped with fine serving wire and soldered. A lead counterweight is cast onto this wire, or lead sheet is rolled on, until sufficient weight is obtained to counterbalance the cylinder. Be sure this weight cannot come off. It will do a lot of damage if thrown off, or strained through the turning propeller. Mount the engine, check its balance by holding the fuselage horizontally on its side, and trim weight off until balanced.

Attach the stop wires to the blade support wires with a tight wrapping of fine serving wire. Slip the blades on and solder 1/16" ID brass tubing keepers in place. The stop wires are adjusted until a 15° angle of collective pitch and autorotation is obtained. A simple jig made

from 1/16" balsa sheet is used to set the angles. Take a three-in. wide piece, cut to a six-in. length. With one end perpendicular to the edge and the other at 15°, set the model on a flat surface. Hold the jig out in front of the model and rotate each blade around to it in turn. Place each blade on the jig and adjust the stop wire until it just touches the blade. Turn the jig around and repeat for the opposite stop wire. Then very carefully solder the stop wires in proper position and make a final check with the jig. Keep this jig for future checking of the blade angles. If later you want to experiment with different angles, the same procedure should be followed.

Landing skid tips are bent as shown and cut to length. Drill 1/16" dia. holes and slip landing gear wire through tubes. Wrap a turn or two of serving wire on ends and solder. Drill a small hole into the ballast compartment. Turn the model on its side, holding the engine in your hand, and add sufficient weight (lead or BBs) to the nose until the fuselage balances horizontally. Small lead sinkers of about 5/16" dia. are added to each tip wire for blade control weights. The interrupter assembly is bolted to the model as shown. For the first forward flight attempts, use only one trip wire and set it so the blade is not tripped below the horizontal plane. Later, you can add one or two more as needed.

The engine must have its fuel pickup tube positioned to run with the shaft pointed downward. I found the tubing should be trimmed to just reach the reed valve end of the tank. Put a regular 5¼-3 or 5½-3 tractor propeller on backwards. Always run the engine clockwise. Set the needle slightly rich, start it up (making sure the prop blast is downward) and release the rotor, but hold onto the fuselage. A few practice runs in this manner will allow you to pre-set the needle valve, check for excessive vibration, and get familiar with the starting/handling procedure before flying.

Fly this model in a wide open area away from buildings, people, trees, etc. A full tank on a Golden Bee will run about three min. After starting the engine, let it run for about one min. before launching the model. Hand-launch the first flights, making sure the rotor is up to full speed. It should turn smoothly with very little vibration and try to lift out of your hands with a positive upward pull. After release, it should climb until it runs out of fuel and then autorotate down. If it does not do all this, go back and check everything again. The balance, blade angles, etc., must be right.

Most likely, it flies just fine. If so, you can slip a piece of Sig fuse through the rubber band on the interrupter and into the snuffer tube. With its length set for 30 sec., start the engine, light the fuse from a punk and let her lift off. It will rise until the interrupter takes over. Fly horizontally in forward flight until the tank runs out. Then autorotate down. If it zeros out (dives in) or flips inverted, the blade is being tripped too much. If it does not fly forward, another trip wire (or even two) should be added to the rotor blades. With the right combination, on a calm day you can have a ball with forward flight. Circular flight is achieved by setting the engine slightly rich with the interrupter set for forward flight.

UPLIFT

(Continued from page 18)

former flier gave a brief rundown on the flying characteristics of a full-size A-4 Skyray (lands like a rock in a stiff breeze). Since Jacksonville is a Navy town, all the ex-pilots were interested in the SN-J.

Our display was set up from 9:00 AM to 9:00 PM. If your club plans to set up a similar display, plan to draft enough volunteers so that those on the floor may be relieved every two or three hours. Believe us, between answering questions, keeping an eye on the kids and keeping the area clean, there isn't much time to sit down and rest.

The success of the display, although too intangible to measure exactly, was huge; so much so that we plan to have one every year. The next should be easier, more efficient and more interesting. For those contemplating a project such as this, we wholeheartedly recommend that the affair be handled by a committee. This will insure adequate **pre**planning—which is a must.

Sunday, the last day at Imeson Airport, dawned cloudy and rainy. After all our efforts with the display the day be-

fore, and the letters we had sent to club members informing them of the television coverage, our spirits were as damp as the weather. Several hurried phone calls revealed, however, that some club members would fly rain or shine, as long as the TV cameraman was there to take the publicity pictures. Fortunately, luck was on our side. The weather cleared around noon and provided a warm, sunny day. Our activities made several local television news casts and provided more coverage than was anticipated.

Promoting our hobby is hard work, but worth it. Sunday night, many more people knew about radio-controlled model airplanes than did prior to that weekend.

ON THE SCENE

(Continued from page 16)

bove the floor to discourage 45° ballistic-trajectory launches.

For the model designer, the compromises and trade-offs were maddening. When a wing with dihedral is rotated, it acts as if one tip is washed in and the other washed out. Compensate by warping the wings and you lose points for practicality. Use very little dihedral, and you have spiral stability problems. Some fliers chose to use high fins or high pylons to compensate for small dihedral, but lost practicality points. If you make the model only slightly asymmetrical, it will fly well, but will have a bad degree-of-asymmetry factor.

Overall winner was NASA model builder Bill Vanderbeek, flying a simple high-aspect-ratio model. Bill also tied for first place in the Distance category. The audience clapped and cheered when he made his flight of 82 ft. 3 in. The model flew steadily without zooming, depending solely on its lift-drag ratio. Young Gerry Geraghty made the longest Duration category flight with a flight of 29.5 sec. Author Bob Meuser placed first in the Design category.

An outstanding model was the Canard entered by Al Boissevan, a Wakefield modeler of 20 years ago. The model had dihedral in only one wing tip, and very little of it at that. High fins fore and aft appeared to provide the necessary roll stability—the model could be thrown hard and high, and would make a perfect recovery just like a conventional hand-launch glider.

Regardless of the scores, it was great sport for the 25 entrants and a welcome break from flying look-alike Duration competition models.

GETTING STARTED IN RC

(Continued from page 52)

Flatlanders are more comfortable with the country club set. You will frequently see them in tennis shorts and Addidas, trotting merrily about as they retrieve high starts and climb trees to save aircraft.

"Sports" sport the greatest variety of clothing. Such diverse garments as earmuffs, hunting caps, hobnail boots, levis, bib overalls and surfing shirts are often visible at the same flying site on the same day. Whatever the specific articles of clothing worn, there are cer-

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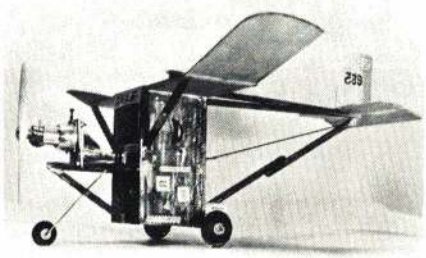

0443/THE FLYING OUTHOUSE—CL semi-scale 049 rendition of an EAA project. Not necessarily aerobatic, but an attention-getter that is strictly for fun. Special Tenderfoot Price. **$1.00**

0441/FLEXI-FLIER—Scale version of an RC rogallo hang glider uses a GI Joe doll as a control surface. A highly unusual slope soarer, it can also be used on tow. Uses two standard servos. **$1.75**

0444/BOOMERANG—Free flight helicopter has dethermalizer-activated trip switch to give forward flight and autorotation. Simple construction employs cardboard engine shroud and full-balsa fuselage. 049 engine. **$4.00**

0341/SUNDAY FIGHTERS—Small, responsive biplane is quick to build with Ace foam cores. Two versions are shown on plans. Ken Willard design. For 10 engines. **$2.50**

0342/BIPES 'N TRIPES—Snappy stunting 049-powered biplanes and triplanes can be built in three styles. Ships are quicky-built and are great for WWI Combat. Tenderfoot plan special. **$1.00**

0343/DAS KRAUT—Crazy, capable stunter incorporates features such as moving rudder, shock LG, tip weight, etc. For 40 engines. Nice WWI styling. **$3.50**

0344/TOADSTAR—Huge 150-in. span Toad is constructed of foam, ply, Manila folders, anything! Great payload carrier with two 61s. Not full-size plans. **$2.50**

0345/WEDGY—An 020-powered revision of 40s NATS winner. Bold lines highlight proven performance. **$3.00**

0241/NEBULA—Dick Sarpolus' unique RC sailplane can be built with polyhedral or dihedral and optional flap system. All-balsa fuse, sheeted foam core wings. All-moving tail. Plug-in panels. **$5.00.**

0242/PAZMANY PL-1—Scale EAA home-built aircraft model by Nick Ziroli. Features include all-moving stab, balsa construction and a 45 size engine. Two detailed plan sheets. **$6.00**

0141/SHRIKE—Fabulous RC Pattern ship designed by pylon champ Bob Violett is very smooth, fast flyer. Design is intended for fiberglass fuse, foam wing, retracts and a hot 60. **$4.50.**

0142/FAIRY UNLIMITED—Rubber FF design with lightweight construction for good performance. Features many innovations. **$3.50**

0143/METEOR MK8—CL Scale model uses unique ducted fans (2) and 40 size engines. Text and plans explain fan construction. Large ship has 58-in. wingspan, 66-in. length and weighs 12-13 lb. **$6.00.**

1231/T-19 TRAINER—CL Tenderfoot design has flat fuselage for easy construction and a unique removable wing and tank. 36-in. span, for 19 to 25 size engines. Special price. **$1.00.**

1232/FAIREY BARRACUDA—Unusual-looking Scale FF project is rubber-powered. Stick and tissue construction. Good flying characteristics. 35-in. span. **$2.50.**

1131/ELECTRA-FLI—Easy-to-build Sport ship is electric-powered for fun, quiet flying. Ship is designed for use with the Astro-10 motor. **$4.00.**

1132/FAIREY FIREFLY—Dave Platt's four-view scale drawings of a proposed NATS level Scale project. The drawings do not contain construction information, but are well-detailed for scale assistance. **$3.00.**

1031/WARLORD—This great RC ship was designed to win in FAI competition. With a 61 the Warlord becomes a highly competitive plane. **$4.25.**

1032/CONSOLIDATED B-24D LIBERATOR—Would you believe a 55" wingspan, four-engined, RC, three-channel B-24D with a flying weight of 36 oz.? It flies great with our 020 PeeWees. Two sheets for **$7.00.**

1033/FOCKE-WULF TA 152—Hal Cover's design fits right into the Annual Flight Masters Jumbo Rubber Scale Meet. Construction methods make this a strong plane. **$2.75.**

1034/BOSTA—Try Neal White's unique design of an elliptical combat plane. Not only is it good looking, but it flies great! **$2.50.**

0931/SPEZIO SPORT TUHOLER—Smooth and responsive CL Scale ship flies like a typical non-flapped stunter. For 35 to 40 engines. Two sheets. **$4.50.**

0932/PISCES—RC pattern ship by Dave Hale for AMA-FAI patterns. For side-mounted 60 engine and retracts. Ship has 710 sq. in. area and clean lines. **$4.25.**

0933/SPARROW—Ship used by Air Force in RPV program presented for modelers wishing to take home movies in flight. Uses Ross four or twin 60s or 80s. Two sheets. Fiberglass and foam construction. **$7.00.**

0934/CURLEW—Sport FF model has unusually graceful lines and performs quite well. Rubber-powered, the ship has a 24-in. span. **$2.00.**

0831/OLE TIGER—Sleek Quarter Midget racer uses fiberglass arrow shafts as spars for simple wing construction. Built-up fuselage. Complies with all QM racing rules, by Don Panek. **$3.75.**

0832/INDOOR TANDEM—Meets the new one ounce FAI rules. Unusual design has two wings and no stabilizer. Design lends itself to experimenting. **$1.50.**

0833/SPECTRA—Semi-scale RC version of an amphibian with engine mounted on a pod in tail. Plane has T-tail stabilizer, wing ts, 48-in. span for 23 to 40 engines r-channel radio. **$4.00.**

SPITFIRE III—Large UC stunt ship features near-scale appearance for impressive looks. Has removable 58-in. span wing, by Mark Freeman. **$4.50.**

0731/DELTA DIAMOND—Sport and slope glider has an unusual delta shape. Uses aileron and elevator control. Small, lightweight design by Ed Erfurth. **$3.50.**

0732/"OSPREY I"—18-in. span FF seaplane uses Brown CO-2 power in a pusher configuration mounted on a pod above the wing. Fun flyer for ROW. **$1.25.**

0733/SKYPHONIC—An easy to fly, 40-in. span ship designed for two channels and 049 engines. Has trike gear, swept wing, inverted engine. **$2.50.**

0734/CRITTER—Marblehead Class racing yacht by Victor Migllerina has an all built up construction. 50-in. length, hull is built inverted. Xerox copies of drawings accompanying article available for 50 cents each. List drawing by figure number and order through plans service manager. **$3.50.**

0631/UPPER CRUST—Very strong 1/2 A FF ship has a pre-stressed wing with full ribs in a geodetic-type construction. Has English-style fin located behind stab on a most triangular cross-section fuse. **$2.50.**

0632/PRAIRIE DUSTER—Small, lightweight RC pattern ship uses built-up balsa wing with built-in ailerons and a plywood wrapped fuselage. For retracts and 60 engines. **$5.50.**

0531/FRIEND SHIP I—Streamlined RC Pattern ship for 60s, retracts. Uses foam wing and fairly simple balsa fuse construction. **$4.75.**

0532/FRANTIQUE I—WWI type plane with open framework fuse, built-up wing. Can be built in three different sizes according to engine—19 to 35. **$5.00.**

0533/THE RELIANT—Sound Wakefield design creates a consistent flyer. Torque-actuated stabilizer and rudder. **$3.75.**

0534/SCORPION—Straightforward Combat ship is designed for strength and speed. For hot 35 engines. **$2.25.**

0535/QUICKFLOAT—Specially designed single float for six to ten lb. low-wing stunt aircraft has minimal effect on flight performance. **$3.25.**

0536/NORD N.C. 853 S—1940 French private plane in scale FF rubber form. Has twin rudders, 22-in. span. **$1.50.**

0431/SIRIUS—Foam and fiberglass RC scale beauty is a fine flying low wing, early Lockheed plane model by Bud Philips. **$5.50.**

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0432/SKYHAWK—Navy Profile Carrier model is mostly wing. A winner in competition and easy to build. Very rugged. **$3.25.**

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0434/BOUNTY HUNTER—Outstanding ½A Speed model is a frequent winner and Canadian record holder. **$1.25.**

0435/TANGERINE—FOR THE TENDERFOOT a stick and tissue, built-up wing model with easy building and fine flying. Tenderfoot decal included. Special price, **$1.00.**

0436/AAM GLIDER WINCH—Hefty 6V winch for launching three-lb. RC gliders or on 12V for six-lb. models. Lightweight, uses turnaround pulley. Well-detailed plan. $2.75.

0331/CAJUN QUEEN—Frequent winner in RC Pattern down South is Lou Penrod's graceful design. Takes 60's and retracts. **$3.75.**

0332/MACCHI C. 202—Semi-scale profile stunter for 15 through 25 size engines, great for Slow Combat and practicing the pattern. Flaps. **$2.50.**

0333/CURTISS ROBIN—Rubber scale model for AMA events. Easy flying. Stick and tissue. Square shape builds easily. **$2.00.**

0231/MUSTUNT I—Primary profile fuselage, upright 35 engine, thick airfoil stunt trainer. By Al Rabe. **$2.25.**

0232/MUSTUNT II—Advanced stunt trainer, same aerodynamics as Mustunt I but fully shaped fuselage and upright 35 engine capable of winning any meet. **$2.75.**

0233/MUSTUNT III—Nats-level 35-powered non-scale competition CL stunter is exactly like Mustunt II but has many detail refinements and tapered wing. **$1.00.** You'll need 0232 for complete construction details, order separately.

0234/SUPER GOOSE—Very unusual flying wing RC has swept forward wings for better flying, balance, and construction. Uses a 40, stunts real well for fun flying. **$3.75.**

0133/MO-BIPE—Contest-winning Navy Carrier profile fuselage biplane. Thin wings go fast and slow. Takes a throttled 35. **$1.75.**

0132/VIPER—Toledo Design and Finish winner, big State-of-the-Art Pattern ship by Dario Brisighella, Sr. for good 60s and retracts. **$2.00.**

0131/720 TURN—Clarence Haught design Class B FF. Conventional design, high pylon wing, big plan. **$4.00.**

1224/SNOOPY—Sport flyer and trainer for 09 thru 35. Can use Top Flite Headmaster wing. **$2.25.**

1223/QUICKY 500—Glen Spickler's club pylon racer goes fast but is very quick-building, long-lasting, easy to fly and land. For TR type 40s. Great for grass-field sites. **$2.75.**

1222/DAVID—An AI Nordic for competition with A2s is stronger, smaller, easier to make, and has lower wing loading. **$1.75.**

1221/SPITFIRE—Highly detailed, two sheet plans for 60-powered retract-geared CL scale model. A Nats winner and seventh in CL Scale World Champs. **$7.00.**

1122/SWEET PEA—"V" tailed CL stunter by Dennis Adamisin is consistent winner with semi-scale Goodyear racer appearance. Takes smooth 35 or muffled 40. **$3.50.**

1121/WARLOCK—Mid-wing tandem bicycle retractable, all-flying stab, and swept wing are features of this 60-powered Pattern ship by Jim Wilmot. Large plan. **$6.50.**

1023/QUASIMODO—An odd-looking four-channel RC Sport job for 35s. Shoulder wing, tail dragger. A fun flyer. **$4.00.**

1022/LOCKHEED S1—Unique highly-detailed scale biplane of Lockheed's first airplanes. Original dates to 1921. Design by M. Groves, uses a 40. Two sheets. **$7.00.**

1021/BRONCO—A Class I or II Navy Carrier plane for two 19s or two 29s of the OV-1A C.O.I.N. fighter. The large plan sheets. **$6.00.**

tain marks or accoutrements to be noted. The lower part of trouser legs is soaked in castor (or synthetic) oil. Bits of dope and epoxy are displayed cleverly over the remainder of the trousers, shirt, shoes, etc. Two or three bandages are draped neatly over the fingers. The knees of the trousers have large grass and/or mud stains. Above the roar of engines can occasionally be heard the mating cry of Sport, "I ain't got it!"

The Aerobat, normally a descendant of the Sport, carries many of the Sport characteristics and markings. The Aerobat is usually addicted to bowling shirts covered with patches, indicating frequent forays into other kingdoms. Other attire includes baseball caps and aviator type sunglasses.

Wild Men are a group unto themselves. They were spawned by a chance mating between Sports and motorcycle gangs sometime in the dim past. They can be distinguished by their high leather boots, wide belts, hard hats, and the nitro burns on their fingers. When not participating in tribal rituals, they can be seen walking in left circles.

We won't go on and on about other groups like the G.I.s, with their white scarves, puttees and riding crops, or the Barnstormers, with their caps on backwards. These hints should be enough to get you started. Good luck!

MODELER MAIL

(Continued from page 8)

turn may be quite a trick without a little added power or retrimming. Try it the next time you're flared out over the runway! Doesn't anyone think that the stall of a plane is a function of angle of attack? Isn't it only airspeed, when seen as a function of wing loading commonly known as the stall.

—Editor

The illustration submitted in the February 1974 Modeler Mail by Mr. Calkins is not really accurate due to the use of inaccurate, and thus misleading,terminology, as well as a seemingly limited understanding of the problem (or lack of problem).

The whole idea is possibly more easily understood if one visualizes himself in a balloon gondola. Assume the wind is at 16 mph. While still tethered to the ground, you would feel the breeze blowing past. But once you lift off or separate from the ground, you and the balloon are now moving along with the mass of air and at the same speed. You will no longer feel the breeze blowing past, because you are now moving with the breeze.

Now think. What is your balloon's airspeed? It's zero. In other words, since your balloon is not powered, it cannot move through the air. It can only move with it. So airspeed is zero, groundspeed is 16 mph.

Take this now one step further. Assume you turn your nonpowered balloon to face the exact opposite direction. Has your airspeed changed? No. It is still zero. Now run this same thinking

through again, this time putting some power on your balloon and assigning speeds of 5, 10, 20, 50 mph etc. It should start to make sense by now.

If you do understand the fact that there is no wind moving past you when aloft in the balloon gondola, then a closing question might possibly help keep this subject alive for another couple months.

Assume you were aloft in the balloon and traveling over the ground with the wind at a speed of 60 mph in one direction. Assume you then toss a 20-cent glider out of the gondola. Would it fly? Would it make any difference in which direction you tossed it?

David Burroughs
Normal, Ill.

Very interesting, but is a balloon a good analogy? A balloon perpetuates lift by the specific gravity of trapped gasses. A plane, on the other hand, generates lift by displacing air in direct proportion to its speed. The plane must have speed to have lift, while the balloon has lift regardless of speed. A balloon can have zero horizontal airspeed, but this is not a good speed at which to attempt to fly a model.

One of the AAM *staff rented a balloon and purchased a 20-cent glider (now 39 cents) in order to answer Mr. Burroughs' "final question." Airspeed indicator in hand, he launched himself over Washington, D.C. Unfortunately, before he could toss the glider, the earth rotated below his stationary balloon and he was lost over Virginia!*

—Editor

There is no excuse for an aircraft magazine to publish a letter like the one from Wendell Calkins (February 1974 issue) without some editorial comment. It's even worse when you title it, "Some Practical Advice."

Mr. Calkins says he's not an expert pilot. Neither am I, but I do have several hundred hours of piloting time in both powered aircraft and sailplanes, and have been an active model airplane flier for more than 30 years. And I, like every other competent pilot, know the difference between airspeed and groundspeed.

Since Mr. Calkins is a Marine Engineer, I'd like to pose the following problem to him: you are driving a power boat upstream in a river. Your speed relative to the water is 65 mph. The speed of the current is 15 mph. Therefore, your speed relative to the shore is 50 mph. Now you execute a 180° turn, without changing your throttle setting. Will your speed through the water now be 50 mph minus 15 mph? Why?

I suggest that your water speed will still be 65 mph (because your boat is still operating in the water, and you have not changed throttle setting) and your speed relative to the shore will be 80 mph. If your boat were an airplane, the river were the air, and the shore were the ground, the result would be the same.

I needn't go on. The letters from Messrs. Welter, Malinka, and Plunnecke in the June 1973 issue say it all.

Donald G. Typond
Little Ferry, N.J.

The letter by Wendell H. Calkins in the February 1974 issue proves exactly what he says, "I am not an expert pilot." Mr. Calkins is confused and not knowledgeable about the different types of speeds encountered in flight. There are four types of airspeeds: indicated, calibrated, equivalent and true. There is one type of speed over the ground: groundspeed.

Without going into the definitions of all of the above (ref. *FAA Instrument Flying Handbook* AC 61-27A, p. 62), the only speed we would be concerned with, in keeping our model aircraft flying, would be calibrated airspeed—if we had an airspeed indicator. This is the airspeed to which performance data is referenced in FAA-approved flight manuals of aircraft. The only time you add or subtract wind speed and direction (the wind blowing across your face when you are stationary) is to determine groundspeed. And at that, you do it to true airspeed for the altitude you are flying, ergo, groundspeed.

But the aircraft does not care about

groundspeed at all (except when it hits the ground). Its bread and butter is calibrated airspeed (CAS). Not enough will stall it. Therefore, if an aircraft has a minimum controllable flying speed of 50 mph CAS and heads into a headwind of 15 mph, its CAS is still 50 mph, its groundspeed is 35 mph. If this aircraft now turns 180°, its CAS is still 50 mph but its groundspeed is now 65 mph. On the crosswind legs, either way, the CAS will still be 50 mph, groundspeed approximately the same, but tracking over the ground at a 9° diagonal with the wind, (this is called drift). Without going into the bank angles, speeds and Gs in turns, the aircraft has not stalled at all.

Naturally, it will take more time and a longer runway to take off downwind than up wind. But not because of "absolute velocity," which Mr. Calkins seems to attach to anything that moves. If an aircraft's minimum flying speed is 50 mph CAS and was headed into a 50 mph gale, it would lift off with zero groundspeed in zero time when released (wind tunnel effect).

Turn the aircraft around and it will have to roll some distance to match the 50 mph tail wind. At this point, the airspeed indicator will still read zero, but the groundspeed will be 50 mph. From this point on, the airspeed indicator will start to increase until it reaches 50 mph. The aircraft will become airborne and the groundspeed will be 100 mph. Obviously, some distance and time will have been consumed. It's just as safe, or dangerous, to take off either way. Just make sure you have good lateral control going downwind, and enough runway to clear the fence and first row of spectators that should not be there in the first place.

Alas, the moment of truth—why did it STALL! Viewed from the ground, the model, when headed into the wind (on takeoff), appears to travel slowly. As the pilot turns downwind it rapidly picks up speed in relation to the ground. WOW! The pilot thinks, "It's gonna get away from me." Slow'er down—throttle back— whoops— snap— stall— crash— what happened?

Vincent Arias, Jr.
Flight Instructor
Miami, Fla.

PAUL HARVEY VIEWS

(Continued from page 8)

But there is no substitute—if you wish to refine our art—for watching an experienced builder build.

Mostly you'll learn patience.

The kit directions emphasize careful sanding before finishing, but an old pro's criteria for what's "careful" is inspiring to observe and thrilling to imitate.

His minimal use of adhesives; most beginners over-glue. His initial neatness, minimizing re-doing. His decision to use which grade of sandpaper when. The way he scrapes a run from doped silk with a razor blade... Or removes a blemish by holding the sandpaper on the spot with his thumb—while drawing the sandpaper out-from-under with the free hand.

Written directions are second best to watching an expert use the bench edge as a guide for his sanding block to produce an even bevel on a hinged edge.

From the old hand you learn how neatly to putty pinholes or, better, to avoid pinholes by using masking tape to hold parts in place.

The book says, "Strain paints through a scrap of nylon,"—but there's a trick to it if you would avoid unnecessary mess.

Where there's room, the experienced builder's workbench is an "island," out from the wall where a wing-mounted plane can be worked on from all sides.

There's a knack to scanning a curved surface for inundations before the spray begins to fly.

Each new generation of builders adds to the know-how of predecessors which is as it should be—but the joy of our hobby is the anticipation of improvement—in our building and our flying.

We always insist that beginners get help learning to fly. It would save them time and money and give a whole new dimension to their pride if they'd seek help in building, also—just watching over somebody else's shoulder.

If you've a minute more, A. A.

Faranda of New Canaan, Connecticut, recently called my attention to one of our colleagues who was able to extend this helping hand even outside the fraternity.

The factory smokestacks in the Chicago area were designed to disperse pollutants into the atmosphere. Reserachers wanted to know how they were affected by wind and temperature conditions. And they wanted to measure the SO-2 and particulates in the air and chart plume patterns.

Researchers considered a helicopter, but decided that was too expensive and too hazardous.

They considered attaching instruments to balloons, but the balloons wouldn't stay put.

Private aircraft could not fly close enough or slow enough for the studies.

A shift foreman at the plant, C.G. Vernon of Glenwood, Illinois, has a son who is an RC modeler.

(Now, don't get ahead of me. . .)

And as the research experts were about to abandon their project, Mr. Vernon volunteered his son's services.

In no time, a model plane equipped with an instrument payload was circling the stacks, penetrating the buffeting, measuring temperature and inversion patterns, charting the plumes.

Even the experts learn from the experts.

KNIGHT TWISTER

(Continued from page 48)

The scene was the first Reno Air Races, where a dry patch of plateau in the Sierra Nevada Mountains was to be the site of the awakening of pylon racing after a 15-year sleep. Along with the tried-and-true Formula Ones and Unlimiteds was something new: the Sport Biplane class. A bunch of West Coast biplane pilots had convinced the father of the Reno Races, Bill Stead, that they should be allowed to race their cute little airplanes around his oval course.

Bill bought the idea, but a lot of other people didn't because, among the ten airplanes ready to race, were three Knight Twisters. And that could mean trouble. One accident and air racing would sleep for another 15 years.

It could easily have been the start and the finish for the new era of air racing. . .but it was just the start. The Knight Twisters not only raced without incident, they took the first three places in the main event. Clyde Parsons was the winner in the Twister that had been built back in 1947 in Oregon. Tom Shannon flew all the way from Pittsburgh, Pennsylvania, to place second. And Bill Nagle flew his Twister in from Kalamazoo, Michigan, to finish in third place.

Knight Twisters flew in races all through the 1965 season, with Parsons placing a strong second at Reno that year. And then, just as it looked like the long-suffering design was getting some much deserved credit, the roof fell in. After the end of the 1965 season, the Professional Race Pilots Association decided that the casually created Biplane class deserved some carefully drawn

rules, in place of the few lines they had gotten so far. The class looked like a success, and that would mean that pilots would be modifying their racers, and building new ones that could prove dangerous, if not regulated.

And the first result of the new regulations was a limit on wing area, which eliminated all Knight Twisters! The graceful tapered wings of the Twister were considerably short of the minimum 75 sq. ft. demanded by PRPA. So the short racing career of the old design ended after one brief year of action. No one was claiming that any Twisters had been involved in accidents, for there hadn't been a single accident in the Biplane class (nor would there be for many years). It was just that some minimum area had to be set, and it turned out to be larger than the Twister's. This didn't help the airplane's reputation, either.

The Sport Biplane class thrived, and speeds steadily rose from the 140-150 mph of those early years to 180 mph by the revolutionary "Mongster." And then a stocky, jovial flying school operator from Cincinnati, Ohio, entered the picture. Don Fairbanks, now PRPA Vice-President for the Sport Biplane class, had been in love with the Knight Twister since he was a youngster, before WWII.

His mother sent away to Vernon Payne for drawings of the Twister as a Christmas present for her little boy, back in the early 1940s. The everyday doings of having a family and a career, however, left no time for little airplanes until 1968. Don bought a partially completed, standard size (meaning awfully small) Twister, and then providentially met Vernon Payne at the EAA Fly-In, in Rockford, Illinois. From their extended conversation came plans to develop a racing version of the airplane that would meet PRPA rules.

The main difference between the standard airplane and that built by Fairbanks (at least at first) was a set of much larger wings on his "Imperial" Knight Twister. The beautifully tapered planform of the wings remained, but the fuselage gradually became quite unique. Fairbanks moved the cockpit aft, and so had to move the engine forward for balance, thus giving the airplane much greater length and a very racy appearance. The headrest faired into the vertical fin like some of the classic old Thompson Trophy Racers.

N5DF first left the ground on June 19, 1970, and greeted the public at the EAA Fly-In at Oshkosh, Wisconsin, six weeks later. It attracted a lot of attention—it was probably the fastest looking airplane on the field. Mechanical problems kept Fairbanks out of competition until June, 1971, when he placed a strong third in the Cape May, New Jersey, races at 158 mph. A couple of months later, at Reno, he won the Consolation Race at 160 mph.

Even though the Twister was one of the largest Sport Biplane racers active, and had the usual prototype bugs, it was faster than any of the other standard types. It could hold its own with some of the specially designed Sport Biplanes

that were coming into the game. Unfortunately, the Biplane class lacked some of the glamour of the Unlimiteds or Formula Ones, and so there were fewer opportunities to race. When there were, Don Fairbanks and his "White Knight" were there; his enthusiasm for the sport being great enough to earn him the confidence of his fellow competitors, who elected him leader of the class.

In 1972, there was but one major event for the biplane racers: Reno, where Fairbanks and his Twister again won the Consolation Race, and at almost the exact speed as the year before. At Miami in early 1973, a lot of the hot West Coast biplanes remained at home, and Fairbanks captured third place.

In the long interval between the Miami and Reno races, Fairbanks and his crew made the first big changes in the airplane: A fuel-injection system for the 135 hp Lycoming 0-290 engine, and a new cowling which the first change made possible. The result was certainly encouraging, as he qualified fifth at Reno at better than 173 mph, and then placed fifth in the finals at 169 mph.

The future of the "White Knight" and of Knight Twister in general isn't at all clear. Fairbanks may not have many more big changes to make on his airplane, and may soon follow the lead of an increasing number of Sport Biplane racers by building an entirely new airplane just for racing. The class, as its name indicates, was intended for sport racing—the airplanes for both sport and for racing—and, for the first few years, it lived up to its promise.

But then the pressure of competition began to tell. If a sport plane would do well, then one modified for racing would do better. . .and a pure racing biplane would do the best. While stock Knight Twisters were the cream of the crop in 1964, a decade later the irreversible trend was toward craft like the super sleek "Sorceress," the "Sundancer" and Dave Forbes' "Olympia Swallow."

But Don Fairbanks' Knight Twister still has a couple of good years left. . . and that isn't bad for an airplane which was designed just a year after Lindbergh flew the Atlantic.

RC SUPERSTAR

(Continued from page 72)

receiver power lead, battery lead, and antenna through the autopilot hole in the fuselage, and secure the antenna by running it through a hole in the stabilizer. If the 100 ma pack is used, charge it for two min. with a six-volt lantern battery (red charge lead to positive terminal of lantern battery). This will give 20 min. of operation. Check the setup for even pulsing to the left and right, and for any binding.

Editor: On my plane, the receiver and actuator are mounted together on a 1/16" plywood bulkhead. One photo shows the arrangement as viewed

through the nose. My actuator is glued to the bulkhead using silicone adhesive, with the control arm projecting through the plywood toward the rear of the plane. A pushrod bearing, like Mitch's, is positioned behind it. Receiver is simply rubber-banded to the plywood above the actuator. The bulkhead is retained in the fuselage by a tight fit at the rear of the third cabin stiffener, and by a ridge of servo mount tape inside the bottom of the fuselage. The receiver/actuator unit, in effect, clips into place. I think this installation is safer, simpler, and locates the receiver further away from the noise source power motor. Incidently, I have also added a 100 ohm resistor across the motor terminals and a .01 mf 100V disc capacitor from each motor terminal to the motor case, to virtually eliminate motor noise.

CHARGING: A lantern battery, as recommended by Mattel, is satisfactory for either the 100 or 500 ma power unit. The charging current is two amperes. Maximum charge times with this battery is three min. for the 100 ma cells and 15 min for the 500 ma cells. Use only a lantern battery for the 100 ma version. A six-volt motorcycle battery can be used for the 500 ma version, but definite precautions have to be considered. These batteries cannot withstand a fast charge rate once thay are 100 percent charged. Internal gas pressure builds up very fast, to thousands of lb. per sq. in., after 100 percent charge. The resulting explosion can be bad for the airplane, the operator and the spectators.

Use two 1/2 ohm, ten watt resistors in series, as shown in Fig. 3, to limit current to 2.8 amperes for the motorcycle battery. Maximum charge time is ten min. for this setup. Five-min. charges give very satisfactory flights. Remember, be safety conscious: be sure to use the resistors, and keep a watch on the charge time.

If you really like the idea of electric flying, or if you don't get satisfactory flights with the 6V lantern battery for charging, we highly recommend the motorcycle battery power source and the DC to DC charger presented in the January '74 **AAM** issue. With an accurate and easy-to-read charger that has a variable charge rate control, you can get ideal charging conditions flight after flight. The original charger was made by **AAM's** Editor simply because good flights with the SuperStar happened only once out of every five or six tries. With accurate and full quick charges, every flight is now a five-min. performance.

FLYING

The Mattel trimming instructions are good; follow them. Fly in grass fields with the landing gear on to protect the propellor. The airplane flies slowiy and gently, so don't fly in winds over ten mph. Charge either version for two to three min. Launch gently—a hard throw is not required—and let it climb out for 100 ft. At this point, it should be about

ten ft. high. Fly in a rectangle, using left turns, about 150 ft. between turns. Land into the wind to prevent propellor damage. Once the plane is trimmed, the sky's the limit. Go out and amaze your friends, good luck and good flying!

ADDENDUM

Now that you have flown the RC SuperStar, let's get some extra performance. Cut the top off the battery compartment above the charger/motor lead, and cut the lead just where it bends into the autopilot compartment. Remove the battery clip, and pull out the batteries as a unit. They are welded together, and will be used as a lightweight battery pack for the radio, so do not attempt to pry them apart. Pry the charger lead from the positive end of the battery, and bend the clip and the motor lead to the dimensions shown. Mark these dimensions on the leads before bending. The leads are brittle and will break if bent twice. Trim away the tab between the battery and autopilot compartments.

Hold the propellor countershaft with pliers and pull off the propellor gear (nose cone removed). Remove the countershaft, worm gear and bearing. Cut the worm gear to 1/8" and the countershaft to 1-19/32" length. Trim off any plastic bits on the bearing, and reinstall the bearing, worm gear, and countershaft. Push on the propellor gear, and place the bearing so that it projects 1/32" from the bearing frame. Epoxy in the bearing, and make sure the alignment is straight.

Trim 1/2" of insulation from the negative end of one pencell, and clean the ends of both pencells so that they are bright. Use a 30 watt pencil iron and printed circuit solder. Deposit a spot of solder on both ends of the fully insulated cell, and a spot of solder on the positive end of the partially insulated cell. Connect the two cells with five 3/4" pieces of insulated hookup wire. Put a spot of solder on the charge clip, and two solder spots on the motor lead. Solder on the charge clip, and two solder spots on the motor lead. Solder three 2½" pieces of insulated hookup wire to the clip.

Slip the partially insulated cell into the battery compartment, and the other cell into the autopilot space. Solder the charge clip wires to the motor lead, and solder-weld the positive end of the cell in the autopilot compartment to the motor lead.

Install the charge clip and make sure that it engages the tip of the charging plug. Check the partially insulated cell to see if it is fully seated in the battery section. Epoxy it and the charge clip. The motor switch must make solid contact with the bottom of this cell, i.e., it must snap on. Reinstall the battery clip.

Editor: It is also possible to locate one of the AA size NiCad batteries slightly off center in the motor unit without cutting off the motor unit right side. However, this also requires making a shim brass connector from the upper motor terminal over to the plus side of the battery, instead of just re-bending the present motor terminal. The only real difference between my motor and

Mitch's might be that my unit is stronger, but it also prevents locating the receiver up front, as described below.

The flying weight of the 500 ma version should be nine oz. or less. Make a lightweight receiver battery pack from the 100 ma cells. Wrap them in tape and solder five in. leads to them. Use the same color coding for the leads and connector pin as on the Ace battery pack. Make a charging cord with the same color coding as the Ace charger. No switch is used for the batteries. Just unplug them.

PARTS LIST

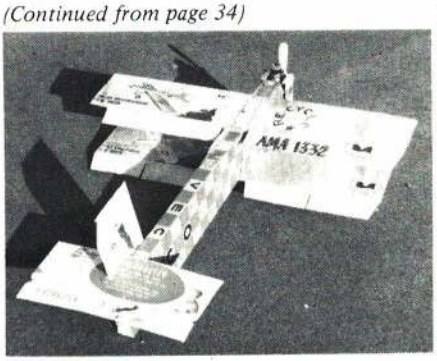
Ace Radio Control, Inc., Box 301, Higginsville, Mo. 64037.
- Ace Baby System
- Two-pin connectors
- 38 KB40 Gould NiCad cells

Mattel, Inc., P.O. Box 2350, Hollywood, Calif. 90029.
- Power Plant 5973-9981 $7.50

Most Hardware and Electronic Shops
- Two General Electric GC-1 500 ma NiCad cells
- Two 1/2 ohm, ten watt resistors

PAPER CUB

(Continued from page 34)



For the serious modeler, a double fold of the carton flap—before turning under and stapling—will give a thicker airfoil and more lift a la Al Rabe. The boundary layer control techniques which were applied seemed to have very little effect.

The builder may note some sag (the correct term is anhedral) in wings so constructed. This is a design feature that gives a lower center of gravity while the craft is on the ground. The flexibility is an asset; the wings bend upward in flight. This gives a higher center of lift. We achieve great stability in both disciplines. Just common sense engineering.

The original model used six in. of solder as a wing tip weight. This was attached with masking tape. We had an adjustable weight just as in the most modern stunt ship. Leadouts are adjustable too. Just put the line guide on backwards.

Model J-2—The sign of a really good design is its ability to accept modification Thus was the J-2 conceived. It proves again that if God had meant man to fly with one wing, then man would have been born with one arm. The J-2 is a delight to fly. Light on the controls, easy to break ground (no pun intended), it floats through the air with ease. Some difficulty has been experienced in land-

ing. Less area is now required.) A pair of scissors proved to be a useful tool for field modifications. (A linoleum knife isn't bad either.)

Recommendations: (1) Avoid flight in conditions of precipitation at all costs. Buildup of weight exceeds the craft's load carrying ability in a rainstorm. Craft is to be dried out with great care in front of a fireplace. A sturdy umbrella should be standard field equipment. (2) Always have a fire extinguisher handy (non-liquid type). The craft seems to attract discarded cigarettes and matches. (3) Do not make early morning flights from grass fields. The dew seems to affect tensile strength of materials used.

A key feature of the J-2 is: Interchangeability of wings! The addition of incidence blocks under the leading edge and over the trailing edge, or both, will enable the builder to interchange the upper and lower wings without ill effect. The lack of incidence in either wing will increase the takeoff run, perhaps beyond the capacity of the fuel tank. There's food for thought.

The technically minded modeler may investigate flight characteristics with one wing at a greater angle of stagger than the other (as in that other classic biplane, the Beech Staggerwing). Those individuals with access to a wind tunnel will find the J-2 an intriguing research vehicle. Perhaps the F-111 and B-1 cost overruns could have been avoided with Paper Cub carton techniques.

The Paper Cub variants are as follows: J-1: Single Wing (May be upper or lower). J-2: Biplane (Regular or reverse stagger). J-3: To be Announced (Hint—it will be our Baron Model)..

FLYING

The contest record for our craft is spotty. When allowed to compete in Novelty, it took Third. With subsequent improvements and modifications, it came in Sixth. Judges in Scale and Beauty have seen fit to disquality both models. Such is the life of the innovator.

Pull tests are no cause for alarm. Merely make a cat's cradle with both hands, being careful to place the little fingers aft of the down line, the middle two fingers between the up and down line and the forefinger forward of the up line. With a little practice at home, this can be done nonchalantly at contests. It is advisable to wear gloves.

Actually the foregoing procedure is not really necessary, since most judges don't expect the plane to get off the ground. This leads to lethargic pull tests.

Regarding the question of structural integrity, it should be mentioned that Paper Cubs will fly well with the right-hand side of the fuselage missing. A greater degree of "cost effectiveness" could be achieved by not using this part of the carton. But then the question arises: Where would you find enough left-handed control line fliers to utilize this side of the body? It's best to move on to some of the ethics involved in building Paper Cubs.

The average model does not rock the boat. The Paper Cub does. We consider

the building of a model airplane out of cartons or boxes that were not MODEL AIRPLANE KIT BOXES to be unspeakably poor sportsmanship. No further comment will be made. Likewise, buying model airplane kits and DISCARDING the contents to make use of only the box is not in the spirit of things. Some purists, looking ahead, feel that Paper Cubs should only be built from boxes that contained kits built in the past. I leave this to the Scale and CL Contest Boards who have proper authority in such matters.

What does the future hold? We at the Paper Cub plant have the J-3 under fabrication already. Beyond, the world of ducted fans, amphibians and multi-engines beckons. We need not mention that the term RC is well known at the Clean Room. Unfortunately, the Accounting Department forbids moving into this fertile area. Therefore, we sportingly toss out a friendly challenge to that fraternity. Can you follow in the Paper Cub's footprints? For the glory of the hobby, our patents are freely given to the public domain.

Free flighters, do not feel left out. With carton technology, you no longer have to retrieve those fly-aways. It's only a carton. Ukie Combat pilots will no longer have to roll up streamers. Go for the plane, it's only a carton. This type of thinking will alter the industry. A whole new world of model aviation is out there! Come on along!

Test Flight Report

Model J-1—Flight actually was achieved with the J-1. However, a small engineering change was made. We doubled the wing area by the simple expedient of adding the spare wing we had. Builders of the single wing model will still achieve flight by the use of a larger engine, hotter fuel, judicious whipping of the plane or a combination of all three. Remember that the J-1 had economy as one of its primary design parameters.

TESTS / P.R.E.

(Continued from page 42)

be worked out in the production models. The main ones listed by the manufacturer are: good top-end performance, good mid-range performance, and a reliable idle. There also seems to be some problem with starting. Still, these are minor problems, and we can expect these great new engines on dealers' shelves across America in the very near future.

Fuel	9-2 wood	6-1 plastic	4-1 rubber
75-24	6,201 rpm	6,201 rpm	6,201 rpm
24-75	6,201 rpm	6,201 rpm	6,201 rpm
100-0	6,202 rpm	6,202 rpm	13,000 rpm

The Editors hope that the ethnic references in this article are taken in the good humor in which it was written.

TESTS / 5-CH. SPORT SERIES

(Continued from page 42)

excellent instruction booklet is provided. Orbit now warrantees their sets for 120 days.

Criticisms: Placement and lead dress for a number of the capacitors used on the servo

amplifier were awkward. As for any manufacturer, we would like to see an isolation transformer charger because they are safer. The three-pin connectors used for airborne power supply and for charging are a bit difficult to mate properly. The switch lock is apparently useful only for shipment.

Specifications

Dimensions*
Transmitter: 6½W x 6¾H x 2-1/8T.
Receiver: 1½W x 1H x 2½L.
Servo:** 3/4W x 1-5/8H x 1-7/8L.
Transmitter output*:** 2 microvolts for full control of decoder.
Receiver sensitivity*:** 3dB @ ± 6 kHz. 30dB ± 10 MHz
Image rejection*:** 3dB (72 MHz set).
Servo thrust and torque: 3.1 lb. @ 7/32" radius for .7 in.-lb. torque.
Servo transit time: 0.7 sec. end-to-end.
Airborne weight with four PS-6 servos, square battery pack: 12 oz.

* In.
** Length includes mounting lugs; height includes output wheel.
*** Manufacturer's data.

To be continued on the second Tuesday of next week on page 999

BOSS ON CL

(Continued from page 45)

will permit the construction of a full cockpit above it (as you would in a super scale plane), positioning the systems components becomes critical.

The Top Flite P-40 has been designed for RC use and, therefore, does not provide instructions or parts for a CL conversion. Consequently, I first had to restructure the center portion of the wing. I constructed the wing per the kit, except for the center portion where the control system was to be installed. The center 1/4" rib was eliminated, and ribs 2 and 4 were replaced with 1/8" plywood. A 1/8" plywood platform for the control system was made to fit between the two No. 2 ribs, and run the full chord of the wing. The 1/8" ply ribs served as a good base for holding the control system platform, and also provided additional strength for the landing gear mounting.

Rather than give you a full description, the accompanying photos provide an overall view of the control system and how it works.

Photo A—Arrows show direction of travel of the various parts: R—Heavy Duty Roberts; M—medium-size Perfect bellcrank; N—90° nylon aileron bellcranks by Carl Goldberg (one arm of the bellcrank is cut off); D—Du-Bro Kwik-Link connectors.

Photo B—Standoffs holding multiple bellcrank unit are nylon control horns, with an appropriate hole enlarged enough to accept the 1/8" brass tubing on which the crank arms are mounted. Small brass washers are soldered at the desired spacing (after three center crank arms are mounted on the control rod) between nylon supports, to keep the rods from shifting during system operation. Bellcrank arms provide operation as follows: A—master operating arm; B—operates split flaps; C—operates auxiliary fuel tank release; D—throttle control.

There is nothing special about the mounting of the main or intermediate bellcranks. However, the nylon crank arms on the rear assembly require some special treatment. First, use a small round file to enlarge the mounting holes, so they can be forced onto the 1/8" brass tube. After the three crank arms are in place, solder small brass washers at desired locations, then place control horns on tubing. When you are sure that the tubing turns freely, install the master crank arm and throttle control arms with the same snug fit as the three center crank arms.

After the rear assembly is put together, and the proper position of the crank arms has

been determined, drill holes (use a No. 60 drill) through the nylon crank arms and 1/8" brass tubing. Then force an extra heavy straight pin through the hole and bend it over. Cut off the straight pin, leaving just enough of the pin as a locking device. Final adjustments of the system are made with the Kwik-Link connectors.

The question may come to mind—Why use the intermediate bellcrank? Well, the use of the intermediate bellcrank provides a straight-line thrust to the rear assembly, and can be adjusted for various amounts of torque by placing the pushrods in the various holes. In addition, the use of this bellcrank provides complete freedom for connection and operation of the bellcrank pushrod through the entire high-low speed range of the main control unit.

While this system has been designed for use in the P-40, there isn't any reason why a similar system couldn't be used in any of the low- and mid-wing planes.

Next Month: Auxiliary fuel tank construction and release mechanism.

Reminder: For those who may have missed the article in Claude McCullough's RC Scale column (February '74 **AAM**) on the Color Guide Book put out by the Chicago Scalemasters, I recommend that you avail yourselves of the opportunity to obtain one of these excellent books. Any serious scale builder shouldn't be without it.

One Last Word: About six or seven months ago, this column contained many words about newsletter articles aimed at generating interest in CL Scale. There were so many newsletter articles, and so much activity (according to these articles), that I expected to be deluged with information for use in this column. But, alas, hardly a word was received.

What happened to all the enthusiasm for CL Scale that I read about? Did any of those "Getting Started" articles bear fruit? Did any of those club projects ever get off the ground? How about letting me know what happened.

To those of you that have been consistent contributors (Chicago Scalemasters, Aero Modelers of San Jose and a few individual modelers), my many thanks—keep the info coming. I'm sure there are many of you out there that have something to say, so why not drop me a line and some photos about your latest project? c/o **AAM**.

MARONEY ON RC

Continued from page 20)

23 and 24. Following the Soaring NATS, on July 25 there will be a one-day conference to discuss soaring matters on a national level. This will be an opening meeting, and all interested soaring enthusiasts are invited to attend.

World Speed Record Trials: The Torrey Pines Gulls are holding RC glider record trials on April 13-14, 20-21, 27-28. The six days will be dedicated to shattering the 113.24 mph World Record set by Leonid Aldochine of Russia.

The Gulls will award $1000 in merchandise to the one who brings the Speed Record to the U.S. Trophies will also be awarded to those with the fastest three times. Paul Denson, CD, 7902 June Lake Dr., San Diego, Calif. 92119.

LSF Change of Address: Dan Pruss is the 1974 President of LSF. All LSF correspondence should be addressed to: League of Silent Flight, Box 39068, Chicago, Illinois 60639. Be sure to include $.16 return postage. For those who might have just dropped their achievement forms in the mail box before they read this, the old California address is still temporarily in use.

New FAI Rules: At the annual meeting of the FAI's Committee for International Aero Modeling (CIAM), a completely new set of RC Soaring rules evolved. The rules are set up in two categories: Series A for Thermal Soaring, and Series B for Slope Soaring. Series A is most significantly different from the earlier Class A, which was pure Duration. Each round now consists of three tasks, which are: Duration, Distance and Speed. The contestant's score for each task is a partial score, which is calculated against the winner's score for that task. The total score for each contestant is then compiled by adding the partial scores. The maximum time of flight has been reduced from ten min. to six min., with a 50 percent decrease in the launching line. With a 150 meter towline, the absolute maximum altitude is 328 ft., and that's not realistic unless hand towing is used.

Auxiliary power (RC Motor Gliders, as the name has been coined), can compete along side the purest in each task. Motor launches are allowed a max engine run of 45 sec., and engine shutoff can be radio controlled. No fuel restrictions, regarding type, are imposed. The competitor may use two models during the contest, and intermix parts of these during the contest, provided that the resulting model conforms to the common characteristics for the model as provided for in the rules.

Each pilot is permitted two helpers. However, they cannot signal the pilot during the flight. Since the organizer must provide a radio monitor for the purpose of detecting possible interferences, it is unlikely that any other contests will be run in the U.S. in '74 except for the Internats.

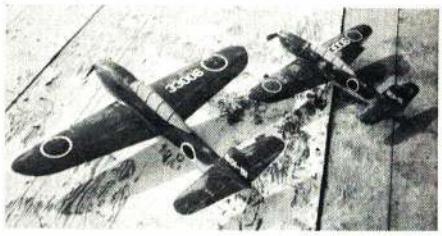
Promotional Soaring Meet: The site for the '74 AMA National Model Airplane Championships has been officially approved for Lake Charles, Louisiana, by the NATS Executive Committee. The expected starting date is Monday, August 5. The AMA would like to promote RC Soaring at the event, and therefore, is considering the possibility of some type of Soaring event. This would permit contestants, helpers, interested modelers and spectators to get an introduction to, and panoramic view of, this fast growing aspect of the hobby.

Foam Ribs: Sailplane building can get expensive, due to the quantity and cost of balsa wood today. However, Bud Pell has a substitute. For the past couple of years, Bud has been using a relatively new, less costly material called "foam board," which is the same type of material used for artists' posters. Foam board comes in several thicknesses, from 1/8" to 5/16", and is covered on both sides with a semi-gloss paper. A standard size sheet, 30 x 40", will cost about $1.50, and is available at most art and/or office supply stores.

Pell has constructed two sailplanes thus far, using foam board for wing ribs and span webbing. Test results indicate good success. However, close attention should be paid to fit and structural design to optimize strength. The advantages of foam board are: lighter than balsa of the same thickness, no grain to be concerned with when cutting out parts for fabrication, and low material cost. Foam board cuts easy with standard modeling tools, can be constructed using ordinary glue, and requires no special building techniques. At the '73 NATS, Pell's eight-ft. glider was constructed of foam ribs, with spruce spars and leading edge, and then sheeted with 1/16 balsa. The completed wing, having 875 sq. in. of area, weighed 18 oz.

BLUM ON CL CARRIER

(Continued from page 74)



Class I and II Judys by Terry Herron.

There are formal proposals that the engines of the NATS winners—through the first five places—be impounded, disassembled, and checked dimensionally against factory specs. This sure removes Profile Carrier from the novice "let's-get-everyone-flying-Carrier" class, doesn't it! Is this what you want? Perhaps some soul searching is in order!

Blueprint Reading: Have repeated the sketch of last month to again illustrate lines. The notched and drilled block is a typical drawing example, used in all blueprint reading and drafting courses, since it satisfactorily illustrates many points.

The openings in the block are shown in all views, through the use of object or hidden lines. This is necessary to depict the exact location, geometric shape(s) and size.

For example: (1) the circular and rectangular shapes, indicated by object lines in the top view, show two-dimensional shape, but do not tell the reader whether the shape is negative (opening into the block), or positive (protrusion on block).

(2) This same circular and rectangular shape of the view is depicted in the side view with hidden lines to show depth, thus creating three dimensions: area, shape and depth.

(3) The shape given with hidden lines in the top view does not tell the reader shape, but gives depth, and is represented by hidden lines in the side view, showing circular shape.

(Note: This opening does not show in any of the three basic views with object lines. If the opening was a difficult shape and needed to be shown in object line form, it could be presented in an auxiliary view or back view).

(4) The same line of reasoning and/or study is then applied to other openings and configurations.

In an effort to relate this to a modeling subject, a sketch is presented, showing a nose section with engine. A series of object and hidden lines is presented, to depict a basic engine installation. The engine mounts are shown in hidden lines in this view, as is the part of the engine concealed by the fuselage and the firewall. The exposed portion of the engine is shown using an object line. In a "working" drawing (construction drawing), a top view, and perhaps the other side view, would be necessary for clarity.

Again, continued practice at reading a blueprint, with an effort toward part and object identification from view to view, is paramount.

FLYING OUTHOUSE

(Continued from page 68)

Finishing: This is where you can let your imagination run wild. We used Magic Markers followed by two coats of clear dope: brown cabin, purple wings, brown booms and yellow tail surfaces. The backwards 559 was cut from paper and glued to the fin and rudder as was the "SMILE" over the front window. Remember, the worse the Outhouse looks, the better Add any other leftover decals lying around.

FLYING

Pick a day with little or no wind for the test flight. Make sure the model rolls to the outside of the circle. Fly from a smooth surface. Make sure you added the washers between the engine and mount in the lower left corner. Rev the engine up to top speed and let it roll. Slowly feed in the up control. The original lumbered into the air after an eight- to 12-ft. roll. The Outhouse flies very slowly, and control reaction is the same. When ready to land, keep it low. Due to the large frontal area, the glide is poor. When flying, try not to laugh so hard that you lose control. This happened with one fellow whom we let fly ours. He simply collapsed with laughter and bounced it off the concrete. One thing is for sure, you and your Flying Outhouse are sure to attract a lot of attention.

BILL OF MATERIALS

QTY	ITEM
2	1/4" sq., 36" balsa
1	3/8 x 1/2 x 5" balsa
2	1/8 x 3 x 36" sheet balsa
	1/16 x 1/4 x 24" spruce (or coffee stir sticks)
	1/8 x 2 x 2" plywood
1	1/16" dia. music wire
1	1/32" dia. music wire
1	1/2A bellcrank
3	wheels, 1½" dia. or less
1	1/2A elevator horn set

LSF TOURNAMENT

(Continued from page 13)

fliers had completed quite a few of their six scheduled rounds. No one at the meet had to be disqualified Sunday because of failure to complete three rounds on Saturday.

At the Saturday evening banquet, after everyone had chewed on a mountain of barbequed ribs, the speakers of the evening held forth. Ken Willard, the Sunday Flier, entertained us with a series of anecdotes. Dr. Larry Fogel of Decision Science fascinated the crowd with a speech on the "Flight of Birds." His information on little known aspects of flight by birds and insects kept the audience captivated. He left us with ideas for the possibility of new types of flight in the future.

Sunday

Sunday dawned grey and foreboding; in fact, it looked like rain. Le Gray threatened that it would hail at 11:30 a.m., so get those flights in. It would be interesting to see what a sudden summer hail storm would do to from 50-100 MonoKoted sailplanes.

Due to the type of contest, it was difficult to determine any individual standings at this time. Some fliers had three mediocre rounds, and were still waiting for opportunity to knock. Others had already completed all six rounds.

By 10:30 a.m., there was hardly a transmitter in the impound area, and the flight line looked deserted. When the Scoremaster went through the score cards to list names and tasks to be completed, the list was extremely small. An occasional pilot would walk directly to the flight line, and put his plane into the air. There would be a moan from a small group of supporters when the contestant blew his task, a cheer when he aced it.

Since the official contest was at an end, two of the winches were opened up for fun flying until the lines wore out. Then, to relax the nervous tension while the scores were being tabulated, fliers started hauling sailplanes up on towlines. At 3:00 p.m. it was announced that the final results were available.

The first award was the Team Trophy. The Torrey Pines Gulls did it again, first the 1973 Soaring NATS, then the LSF Team Championship. The team contestants were Andre "Buck" Faure, Kelly Pike, Jim Haldy, Ed Hoppe and Randy Warner.

Event winners were: Precision—Dave Shadel (first); Glenn Lee (second); Joe Kriz (third). Speed-Distance—Rick Walters (first); John Baxter (second); Jim Haldy (third). Scale—Hans Langer (first), ASW 15; Dave Shadel (second), ASW 17; Col. R. E. Thacker (third), Kestrel.

Overall standings:

Place	Name	Plane
1	Andre "Buck" Faure	Presbyterian
2	Kelly Pike	KA6
3	Frank Finney	Cumulus
4	Rick Walters	Modified White-Trash
5	Ken Willard	Top Sailer
6	Ken Wagner	Cirrus
7	John Donaldson	Windfree
8	Jim Haldy	Original

Buck upset the experts with his win. He knew the plane had to be large, so he flew a wingspan of 12 ft. The fuselage was 50 in. long, but it wasn't a heavyweight. It weighed in at 61 oz., which made the wing loading 9½ oz./sq. ft.

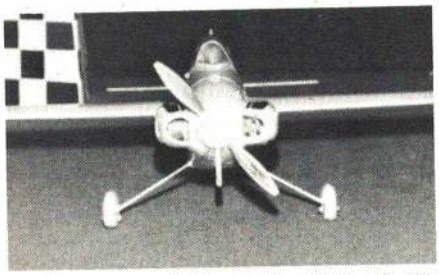
While the speed boys were clocking 1:30 plus, Buck did an impressively consistent 2:00 for the mile. The "moose" pilots had problems controlling their heavyweights on landing. They would hit the runway, bounce, and spend the next 30 sec. coming back to the spot, only to slide right through the scoring zone. Buck consistently managed precise landings at exactly two min. It was a good tradeoff: give a little in speed, and take a big hunk in precision.

A few words of thanks are due the clubs which made this contest a memorable event. The host club, the Flying Circus bunch from Camarillo, made all arrangements for the site. The Pacific

Soaring Assn. took care of the gates for the mile Speed event. The Scoremaster and his crew are also to be commended for the expeditious manner in which they finished the scoring, and had the results ready within two hr. of the final flight.

MISSY DARA

(Continued from page 65)



Canopy and Cockpit: Part of the character of Missy DARA is in the shape of her canopy. If you don't want to mold one, you can still maintain her beautiful curves by carving a balsa canopy and painting it. Since you have to carve one in either case, to get the proper shape, you may as well use it for a mold.

Sig's .015 heat forming plastic works well for the canopy. Use a piece of 1/4" ply, large enough to allow a firm grip, for pressing the hot plastic over the mold. Cut a hole in the center to the top view shape of the canopy, making it 1/8" oversize. Attach plastic to the plywood with wood screws and two strips of wood on the bottom side. Drill two holes part way into the bottom of the balsa mold for 1/4" dowels and mount them in a firm base, such as a length of 2 x 4". Clamp the 2 x 4" to your beautiful dining table or a Sherman tank, or whatever you can find around the house to hold it. Preheat the oven to 425°, and put the plastic in the oven, setting it across a cake pan or the like so that the soft plastic won't touch the oven shelves. Now, wearing gloves, snatch the plastic from the oven and press down, with a quick, firm action, over balsa mold. The trick is to do it fast, without doing it crooked. The balsa canopy mold does not have to be coated with anything to fill the pores. Sand it with the grain to lay down the nap.

The two-in. Williams Bros. racing pilot had its head twisted to the left by holding a hot soldering iron close to its neck. Its shoulders must be trimmed to get it into the cockpit.

Finishing: The full-size Miss DARA was canary yellow with blue racing numbers, but somehow all my models end up white. Choose your colors and favorite finishing method.

I finished the wings with Super MonoKote. The fuselage was done with surfacing resin and auto enamel. The trim and racing numbers are from MonoKote trim sheets. The fillets were made with white General Electric brand silicon rubber. I have seen other colors, but they are not as easily available. This material can be smoothed with a finger dipped in alcohol, but cannot be reworked much. Practice on scrap first.

The panel separation lines and rivet marks were made with a black Bic fine line ball-point pen. Electrical tape works better than masking tape for the line guides. The ink lines must be fuel-proofed. The clear epoxy finishes do well here, except over white, where they have a varnish tint to them. I used Testors Top Coat over the ink only—it is not a durable coating for large areas. The lettering was done with drafting dry transfer letters; later it was fuelproofed.

FLYING

You won't have to take a tranquilizer after every race. Missy DARA does her thing so calmly you'll hardly believe she is racing. She will not snap out of tight turns.

Be sure test flights are conducted, just as if it were the real thing, with a helper releasing her at full throttle. Face her a bit to the right of the direction of takeoff if the rudder is not used. Vertical fin is effective after a few ft. of takeoff role and a touch of right aileron after lift-off will straighten her out. Hold some up elevator after release until speed is increased; then ease off at lift-off for a gradual climb. She lands with a long, flat guide, ailerons remaining effective through flare out.

Keep the control travels to a minimum. For a smooth race, they should move only enough to do their job. Carefully observe her flight path characteristics during trim flights and eliminate any hunting tendencies she might have. Fine tune her grooving ability by raising or lowering the ailerons one or two turns. Try different combinations of minor adjustments in the horizontal thrust line and balance point; this will aid in producing a well-trimmed model.

I would like to thank St. Paul RC Club members, Don Granlund and Jim Cournoyer for their assistance. Don helped me with my first attempt at foam wing cores and even offered the lead spars he said I would need for such a wing. Jim advised, constructively criticized, and otherwise encouraged me to complete the material for presentation of Missy DARA in **AAM**. Thanks also go to a long time friend, Max Robinson, for his fine photo work.

Gentlemen. . .start your engines!

LOWE ON RC

(Continued from page 31)

crossover right in front and at a good altitude. Many fliers do a pretty one, but it's something that looks like two climbing split S's. Start this maneuver fairly low, and begin the pullup sufficiently to one side to allow a 45° climbing leg and half roll right in front.

Continue climbing momentarily and pull around with the bottom of the loop at entry altitude. Then climb to a 45° angle and half roll, intersecting the first half roll. Continue around and complete the maneuver where you started. Try to avoid the common mistakes: not pulling up steep enough, waiting too long to pull up, and failing to accomplish both half rolls right in front. This maneuver takes concentration on the crossover. Have a buddy critique your crossover in practice until you get it right. In fact, it is always a good idea to have a knowledgeable critic around when you practice—one who won't praise you when praise isn't due!

Now we'll head on upwind, turn around and do the Slow Roll. This maneuver is always done downwind, as are all rolling maneuvers. To me, this is the most beautiful maneuver of all, especially when it's done by

pilots like Dave Brown or Mark Radcliff—they roll from county to county. One word of caution: the new FAI Pattern calls for all rolling maneuvers to be completed in a nominal five sec., and downgraded for less than four, or more than six. (FAI kind of sets the pace, so. . .) Of course, a 100 mph pattern ship will cover over 700 ft. in five sec.—that's a pretty good stretch. Enter the Slow Roll absolutely straight and level. Do not cheat by pulling up slightly at the start—this is very commonly done, and is grounds for downgrading. Start the maneuver sufficiently early, so that you are inverted right in front of the judges. As you start to roll, immediately blend in top rudder and adjust the elevator to keep straight and level. You can't throw a fixed amount of anything in, except possibly aileron. You must add rudder slowly to reach the maximum when vertical, take it out slowly as you approach inverted, and reverse the procedure in the second half. If you roll to the right, this means that you begin by adding left rudder in the first half, and right rudder in the second half. **A proper roll cannot be accomplished without this blending of rudder and elevator.** Many people cheat by humping up and down with the elevator to avoid using the rudder. You must remember that, as the airplane rolls, the rudder and elevator reverse roles as a function of aircraft attitude. The fuselage also provides lift as you roll, and acts as a wing in banked attitudes. This maneuver is much easier when performed at high speeds—a lot less rudder and elevator are required as the fuselage attitude change will diminish.

Let's head out, turn around and perform the 180° Turn on an upwind heading. Begin the maneuver by pulling up after passing in front of the judges. Pull straight up at full power. When vertical, perform a quarter roll, throttle back and coast on up. As it slows, and certainly before stalling, push over to a vertical flight path straight down. You may want to add a little throttle on the way down, after the quarter roll, to regain a little speed for the pull out on the bottom.

A couple of pointers: lean the airplane a little into the wind to keep the vertical track straight; and don't be afraid to use the rudder to straighten things out. Don't get too slow on top; this will insure a crisp (not mushy) pushover. Be careful to execute a precise 90° pitch up, or you will be woefully off the track on the way up. Also, your quarter rolls must be precisely that, or the track is a mess. Concentrate on each part as a segment and get it right; otherwise the rest of it will suffer. If you make a slight mistake in one segment, correct it before proceeding.

Well, folks, thanks for bearing with me. We will try to complete the last four maneuvers next month.

So until then, may your rolls be axial
and your loops be round.
May your rudder awake
and 10s abound.

Oh, well, I never claimed to be a poet.

SUDDEN SERVICE PLANS
CHECK PAGE 84

SEE PAGE 80!

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APRIL 1974

THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

BEGINNER'S GUIDE

(Continued from page 26)

ways bring a shopping bag to a contest. You'll need it to carry your plane home. If the contest is held over concrete, just bring an envelope and a pancake turner.

WAKEFIELD: Wash your hands in rubber lube. Be able to take the full force of 16 broken strands of 1/4" Pirelli hitting you smack in the face with no more than a grimace. Be convinced that a model with a gas engine is not a true model.

ROCKET: Develop an asbestos thumb and forefinger for pulling out fuses. Be convinced that a model with a propellor is not a true model.

NORDIC: Be able to run the mile in 4:15.0 while looking backwards over your shoulder. Never release your model unless you feel the king daddy of all thermals tugging on your line. Learn to be nonchalant when you wind up towing through the combat circles in the Ukie area. Be convinced that a model with any engine at all is not a true model.

COUPE d'HIVER: Learn how to pronouce *coupe d'hiver.*

HAND-LAUNCH GLIDER: Grow your right arm four ft. long. Be a lanky Indiana farm boy, or a freckle-faced fourteen-year-old girl who once broke her arm falling out of a tree, or two brothers from Arkansas, or everybody who comes to the NATS to fly another event.

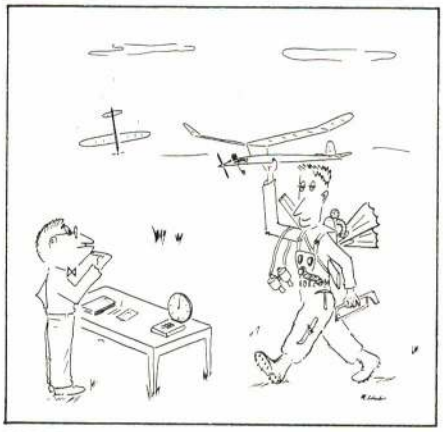
INDOOR: Think light. Never sneeze. Practice walking around under water. Do everything in slow motion. Wear a sweatshirt or button that says, "The Akron is alive and well in Lakehurst, New Jersey." If you fly Indoor Hand-Launch Glider, never start to build your model until 2:00 AM on the morning of the contest. If you fly Paper Stick, say that the condenser paper comes from the dialectric of a two kilofarad capacitor. If you fly, Microfilm, commit yourself to the nearest lunatic asylum. If you fly Cabin, apply for the maximum security ward. If you fly Ornithopter or Autogyro, don't bother—even they won't accept you. (However, any government research center would be glad to have you.) An advantage to

(Continued on page 106)

BEGINNERS GUIDE

(Continued from page 105)

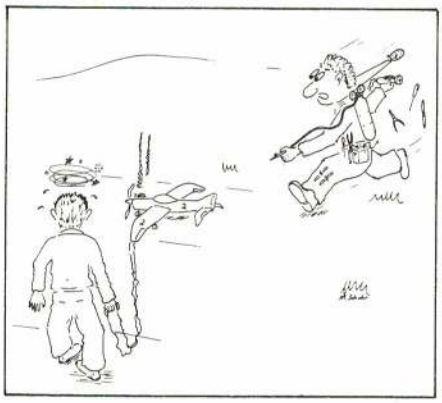
flying Indoor is that the Microfilm makes a dandy excuse for the ring around your bathtub. A disadvantage is the need to build a 50-lb. box in which to carry your .050-oz. model.



FREE FLIGHT: Bring a complete free flight retrieval kit to the field. . .

FREE FLIGHT POWER: Come from California or Texas or Kansas, or *anywhere* but the East Coast. If you fly ½A, own stock in Cox Mfg. If you fly Class C, own an open topped two-seater sports car. If you fly FAI, be able to curse in French. Bring a complete "Free Flight Retrieval Kit" to the field with you. This should include a trail bike, climbing boots, ropes, pickaxe, oxygen mask, chain saw, water wings, lollipops (for pursuading little kids), money (for pursuading bigger kids), and a shotgun (for pursuading anyone!). Be able to convince a farmer (in three different ways) why you should be allowed to drive your car through his alfalfa patch. When you have become a truly sophisticated contest Free Flighter, your model should include engine timer, dethermalizer, pendulum control, auto-stab, auto-rudder, auto-ailerons, auto-incidence, power steering, power brakes, power seats and a windshield washer. Make certain that at least one of these gizmos fails when you're getting thermals that are carrying away small children.

SCALE: Have your eyeballs calibrated. Learn how to make scale paint, scale rivets, scale dust and scale crashes. Find a way to make an 18-lb. model become airborne by wishing. Under no circumstances should you have any knowledge of how to break-in an engine, particularly if your plane has more than one. Only in extremely unusual circumstances, should you know how to fly. Put a flawless, shiny, glossy finish on everything including a Spitfire, a Fokker D-VII, a Curtiss Pusher, your shoes, your house and your children. Learn at least four things to say to the people in the car next to you in a monumental traffic jam on the Long Island Expressway to justify the existence of an eight-ft. B-29 strapped to the roof of your Volkswagen. Build a retracting landing gear. See if you can keep it from retracting during landings. Build operating machine guns and rockets. Strafe the judges if you don't win. Always build to some weird scale like 3.85 centimeters to the foot. If you fly U-control, use at least six lines. If you fly RC, use at least sixteen channels. If you fly free flight, never go to a contest with winds under 37 mph.

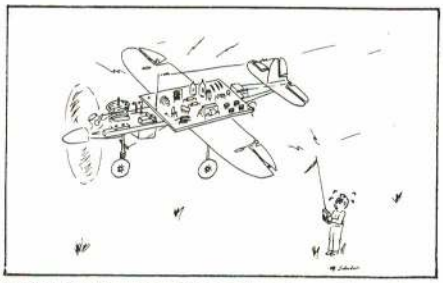


RAT RACE: If you are a pilot, grow your right leg eight inches longer than your left. If you are a pit man, cover yourself with enough wiring and plumbing to service a small apartment house. . .

RAT RACE: If you are a pit man, undergo surgery to imbed electrical contacts into your left thumb and middle finger, a gas tube in your left index finger, and an electric starter at the end of your right arm. Cover yourself with enough wiring and plumbing to service a small apartment house. If you are a pilot, develop large pointy elbows and grow your right leg eight in. longer than your left. Be able to run the mile in 4:10.0 on a ten-ft. dia. track.

CL SCALE RACING (GOODYEAR): Be a very tall Junior and refer to the section above on **RAT RACING.**

RC PATTERN: Be filthy rich. Arrive at the flying field in a chauffeur driven Rolls Royce and have the chauffeur take the model out of the trunk. Call everyone you know by his last name. . . even your spouse. Know which color box the experts are flying this week. If you fly Novice class, say unconvincingly that you are just out for the fun of it and are not out to win. If you fly expert, say equally as unconvincingly that you are out to win, not just for the fun of it. If you have started flying within the past four years, be totally unfamiliar with the words "balsa wood," "ribs," "X-acto" and "dope." If you have been flying longer than four years, have vague recollections of these terms, but don't let it worry you.



R/C PATTERN: Think of some really original excuses for pilot error. . .

Think of six ways to blame your equipment for pilot error. (Interference doesn't count. Anyone can think of that and no one believes it. Be more original: say that you had an epileptic fit and the shaking vibrated loose a wire in the transmitter battery pack.) At the same time, be ready to defend the integrity of your particular brand of radio equipment to the hilt when challenged. Demand exact servo resolution from the system and have four in. of slop in your pushrods.

Explain to people that radio control is the epitome of modeling because it most closely duplicates the real thing. Then try and figure out just what exactly is being duplicated by your 4 x 5 x 36" box with square wings, rudder, and stab, and no cowl or canopy. Point out the skill involved in flying RC. Don't point out that your plastic and foam craft could have been assembled in half an hour by a somewhat intelligent sand turtle. Keep saying that one of these days you will build the Proctor Nieuport 17 if you can *ever* find the time! Then sit back down, open another beer, and watch the football game on TV.

RC PYLON RACING: Drive too fast, eat too much, and go to the bathroom a lot. Be very nervous. If you fly Formula I, be hypertense. Be able to explain why a device that comes attached to the engine that progressively slows it from 18,000 rpm to 17,000 rpm and then shuts it off entirely, can be called a "throttle."

RC SOARING: Have a list of excuses to the six other guys on your frequency of why your model is still airborne after an hour and a half. Explain also that, as soon as you come down, OF COURSE they can get in a flight!

RC WWI SCALE: Wear your "Curse you, Red Baron!" sweatshirt all the time, even when swimming, taking a shower, or making love. Make an annual holy pilgrimage to Rhinebeck, New York. If you are a typical RC type turned Scale buff, *believe* that a deBolt Jenny with Finishing Touch maltese crosses looks like an Eindecker. If you are a typical scale flier turned RC buff, good luck! And refer to the section on **SCALE** above.

Well, there you are, contest-minded hopefuls, out there in model land. Just one word to all you serious contest-going, go-for-broke, cutthroat competition types out there. It's all in fun, and I've mocked my own event as much as the rest.

MODEL AVIATION
Official Magazine
Editor: Carl Wheeley

AMA NEWS

ACADEMY OF MODEL AERONAUTICS
806 Fifteenth Street, N.W.
Washington, D.C. 20005

World's Largest Sport Aviation Organization

Model Aviation Hall of Fame

Reactivated for Operation on a Regular Basis

The year 1974 marks the resumption of a regular program of Hall of Fame selection and presentation. In this program to honor those who have contributed greatly to the history and progress of model aviation, the Academy of Model Aeronautics is assuming sole sponsorship. AMA's Council of Past Presidents (18 members currently) will serve as the selection committee under the chairmanship of Dr. Walter A. Good, former AMA president number eleven (1958-60). Good was appointed to this position by current President John E. Clemens.

Model aviation's Hall of Fame was initiated in 1969 under joint sponsorship of the Washington State Air National Guard and the Academy of Model Aeronautics. Nine awards were made under this program, six in 1969 and three in 1970. But no awards were made in 1971 because the State of Washington was unable to continue sponsorship, and AMA was not ready to go it alone. However, AMA was able to make one award in 1972 and approve another in 1973, while exploring ways and means to reactivate the program on a larger scale.

The most recent Hall of Fame award, for 1973, was made to Ocie Randall, now deceased, of Fresno, California. Formal presentation was made on Jan. 26, 1974, by AMA Vice-President Alex Chisolm who made the award to Mrs. Randall at a special ceremony in California arranged by the Fresno Gas Model Club. This award was approved by AMA's Council of Past Presidents during special balloting in late 1973.

In late 1971 a similar procedure was used to approve a Hall of Fame award to Howard McEntee (now also deceased) which was presented in 1972. AMA President Clemens authorized a special 1971 vote of past presidents as a means of keeping Hall of Fame activity alive while

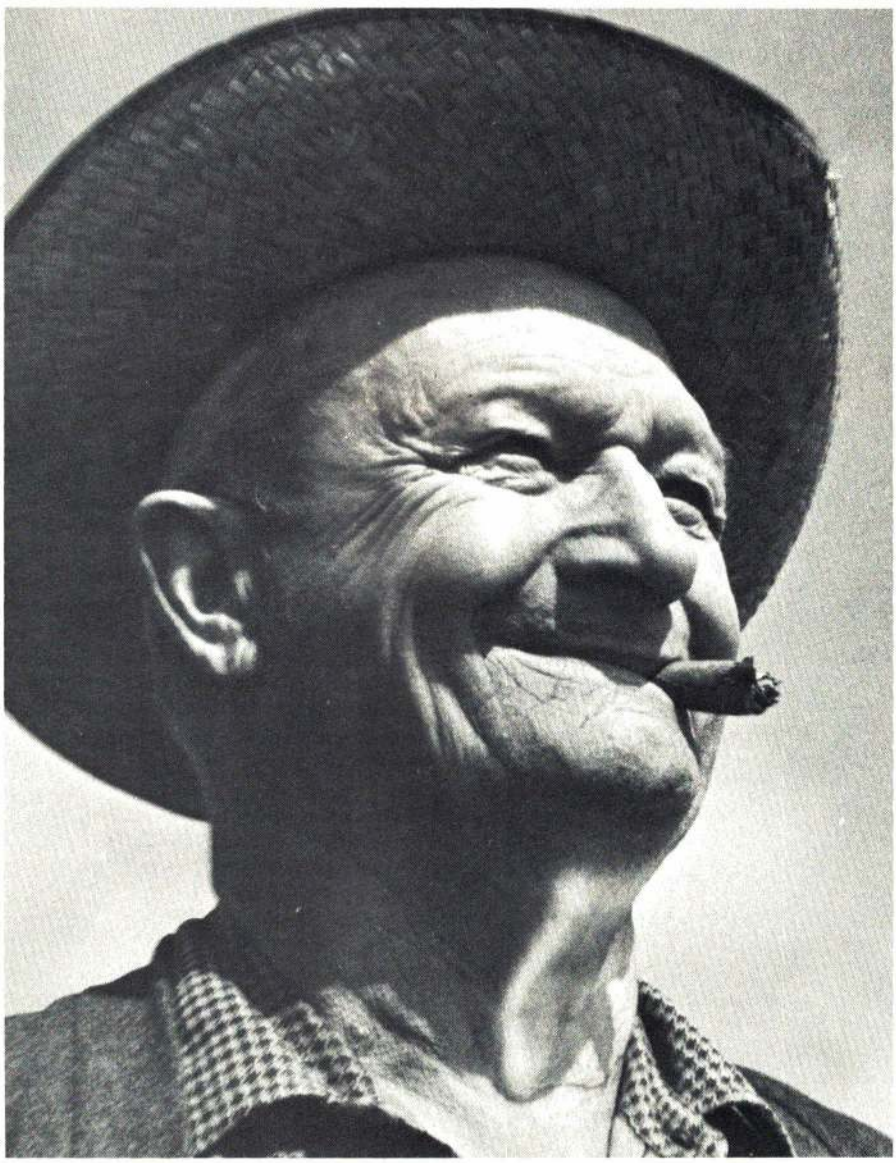


Photo of Ocie Randall taken by Bob Meuser during one of the West Coast FF Championships is an interesting character study. Prior to his death in 1972, Ocie was a prime mover of California's Fresno Gas Model Club since its formation in 1940. The club is famous for its Monthly Free Flight Contests, many of which were directed by Ocie, and for its monthly *Free Flight News* which Ocie wrote and produced. Ocie's installation in the Model Aviation Hall of Fame is a tribute to his extraordinary dedication and service to modeling.

searching for a regular means of presenting annual awards. The effort was hampered by difficulty in getting someone to chair the program and to work out new procedures. Other than the presentation to McEntee of the 1971 award, no other Hall of Fame activity occurred in 1972.

In 1973, however, Walter Good—himself a former Hall of Fame award recipient—agreed to take the responsibility, and he put together the details of the current program which are described elsewhere in this article. The program was then approved by President Clemens acting on behalf of AMA's Executive Council (AMA's equivalent of a board of directors) which had previously approved the concept of the Hall of Fame under AMA sponsorship.

The Council of Past Presidents is uniquely qualified to serve as the selection committee. The council members span the history of model aviation with many pioneers of the activity as well as contemporary active leaders. This assures that old-timers will not be forgotten while currently deserving candidates are not neglected. In other words, the Hall of Fame will consider candidates of all ages and periods of activity—it will not be oriented only to the past. On the other hand, it is likely that pioneers may dominate for a while simply because so many deserve recognition, and the opportunities for providing it have not been previously available on any consistent basis.

AMA's Council of Past Presidents reads like the Who's Who of Model Aviation. Most, if not all of its members, could themselves qualify for the Hall of Fame (three have already been so honored). But this is not a self-perpetuating group. Its purpose is to act on nominations from many sources, and no member of the council may nominate himself. The council currently is as follows, in order of AMA presidential service, with the years of office indicated.

1. Willis C. Brown 1936-37
2. Albert L. Lewis 1938
3. Edward Roberts 1939-42
4. Irwin G. Ohlsson 1943-46
5. Everett N. Angus (deceased) 1947
6. C. O. Wright 1948-49
7. Kenneth G. Held 1950-51
8. Frank B. Bushey 1952
9. Keith H. Storey 1953-56
10. Claude McCullough 1957
11. Dr. Walter A. Good 1958-60
12. Peter J. Sotich 1961-62
13. John Worth 1963
14. Maynard L. Hill 1964
15. Howard E. Johnson 1965-66
16. Clifford G. Weirick 1967-68
17. John E. Patton 1969-70
18. John E. Clemens 1971-74

Hall of Fame Awards to Date

1969: Walt Billett (deceased)
Willis Brown
Carl Goldberg
Walt Good
Charles Grant
Jim Walker (deceased)
Frank Zaic

1970: Richard Korda
Albert Lewis
William Winter

1971: Howard McEntee (deceased)

1973: Ocie Randall (deceased)


Academy of Model Aeronautics
Ocie H. Randall
Model Aviation Hall of Fame

Presentation of the special certificate naming Ocie Randall to the Model Aviation Hall of Fame was made to Mrs. Hazel Randall by District X Vice-President Alex Chisolm on behalf of all AMA officers and the Council of Past Presidents. The occasion was the Annual Awards Dinner of the Fresno Gas Model Club on January 26. About a dozen of Ocie's and Hazel's family attended the gala event. Photo by Bill Booth.

The Model Aviation Hall of Fame

Purpose: The Model Aviation Hall of Fame has been established to recognize aeromodelers who have made outstanding contributions to model aviation over the years, their contributions having improved the hobby and increased its prestige and stature. Each year several modelers are selected as members of the Model Aviation Hall of Fame. The selection is based on the individual's contributions to model aviation as a competitor, designer, experimenter, leader, organizer, Contest Director, writer, publisher, manufacturer—and other related activities. The emphasis is on the accumulated contribution in one or more of these categories over a period of years. The program is operated by the Academy of Model Aeronautics and by the Hall of Fame Selection Committee, which is the Council of Past AMA Presidents, whose accumulated knowledge of American aeromodeling and aeromodelers is unparalleled.

Eligibility: A person is eligible for nomination to the Hall of Fame if he is:

1. A modeler who has made the kinds of contributions listed above.
2. A U.S. citizen.
3. An AMA or non-AMA member.
4. Living or deceased.
5. Nominated by the submission of a nomination form by a sponsor who knows of his contributions.

Mechanism of Nomination: A sponsor should submit a nomination form to AMA HQ—Model Aviation Hall of Fame prior to April 30, 1974. Forms are available from AMA HQ. Nominations may be submitted by any person, club or organization in the U.S.A.

Selection: 1. Each year the Hall of Fame Committee, composed of the Council of Past AMA Presidents, will select five Hall of Fame recipients from the nominations which have been submitted. At least three of the recipients must be living.

2. Announcements and presentations of the Hall of Fame Awards will be made at appropriated model aviation occasions during the remainder of the year.

No Energy Shortage With AMA!

PRESIDENT'S MEMO

How will the energy crisis, if it is true as alleged, affect model airplane activities and the activities of the Academy of Model Aeronautics? I predict that since model plane builders are keen improvisers, and since AMA has excellent organization and leadership, we will be fully able to continue as one of the nation's most dynamic sports organizations. Certainly we can continue to enjoy model aviation if we all work toward solving the problems in a progressive and intelligent manner—we will adjust as we find a need for adjustment. I will try to offer my viewpoint on some of the questions probably in your mind.

AMA President John Clemens. He's back in action and well on the mend from last year's surgery—witness the resumption of his "President's Memo." He attended the Nats Executive Committee meeting in January and was planning to attend the Hobby Industry Association Trade Show and the Toledo RC Conference.

First off, what will happen to our National Championship Meet (or Nats)? As of right now we are planning for it and even on an expanded basis! I have just returned from a 500-mile auto trip and found no shortage of gasoline. Just a few days from now (this being written in mid-January) the Nationals Executive Committee (our Nats planning group) will meet to start putting together the "nuts-and-bolts" of this year's meet. We will gather at the actual Nats site, the former Chennault Air Force Base at Lake Charles, La. We will also be meeting with the enthusiastic "city fathers" of Lake Charles to plan the **best-ever Nats** at the **best-ever location!** We are such believers that we are working on a much-expanded Nats.

Of course we cannot predict what the so-called energy crisis will cause, but under any circumstances we are smart enough people to "make do," and fine enough to aid our country through any crisis.

Since it is too early to tell about the eventual effects of the energy crisis, it would be wise for the AMA "family" to plan in both directions: "business-as-usual" or under forced curtailment of our normal broad activity. The focus is on availability of gasoline.

What can we do if critically serious travel problems actually materialize? In my opinion we should simply emphasize, expand and improve all of our **local** activities. Remember that all other forms of recreation will be affected if we are—and some of them far more seriously—so this might be a golden opportunity to gain ground!

We should broaden our local contest and competition efforts, making sure that we have the maximum of local and near-local participation. This would provide an excellent opportunity for encouraging novice participation (the experts will be there anyway), impressing the community with the fact that we are eager to help youngsters and newcomers. We would be aiding the beginner to get into an activity that we already have proved to ourselves to be tremendously enjoyable. Thankfully, our communities are now realizing that air modeling is excellent recreation for the individual, for groups, for youth, and for families.

This would be an excellent time to improve club meeting programs as an interest holder should our flying activities be cut down some. Ways to do this could be through movies (from AMA HQ and many other sources), slide shows, guest speakers, show-and-tell, technical discussions and demonstrations of proper use of tools and materials, and programs provided by hobby materials suppliers. Planning of flying sites and/or their improvement is terribly important, so invite local city and parks officials to "sit in" with you at meetings. You are certainly justified in requesting their consideration of your problems for recreational purposes; don't forget that tennis courts, golf courses and swimming pools were obtained because someone believed in those activities and pursued the projects. Those activities benefit the community no more than does air modeling!

An energy cut-back would also afford us an excellent chance to expand our efforts toward aiding and directing youth programs. These kids will run our world some day, and we should do everything we can to help them be smarter and better citizens. Aiding youth pays off doubly, because it makes us look mighty good.

Our AMA chartered clubs could use the extra "stay-local" time to improve their administrative strengths and expand and improve their communications which can always stand bettering at all levels: between members, in neighborhoods, city-wide, with other clubs, to magazines and papers, and with our national AMA efforts. Be an active part of your club, and be proud of it!

If this period in our history should turn into a "stay-at-home" time in our modeling lives, then this should be a super time for you to be building that "really super model" that you have always promised yourself you would someday build. It would be a fine time to tackle the more time-consuming projects such as building Scale models or research and experimental models. Express yourself!

And let us all express **our own energy** through airplane modeling and by being active in the Academy of Model Aeronautics!

John E. Clemens
AMA President

Proposals Now Accepted For Competition Rules Revision

The time is now (and up until June 1, 1974—postmark deadline) **to submit rules change proposals** which, if accepted by Contest Board vote, will be effective in 1976 and 1977. (**If you miss this time period, the next opening for accepting proposals is January 1-June 1, 1976—for effect in 1978-79.**)

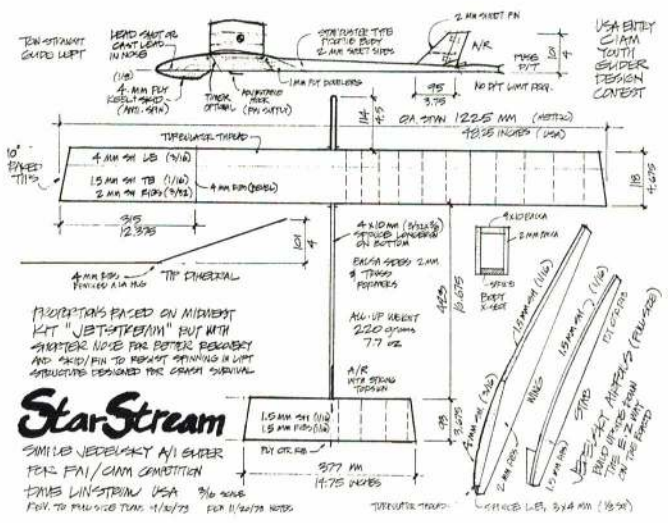
It seems like only yesterday that the AMA Contest Boards were dealing with member proposals to change the competition rules for 1974-75 use; in fact, such new rules were reported in the January and February issues of this section. Those are the last of the AMA competition rules to be developed under the one-year schedule where the rules were up for change every year.

From here on out (or until the system is changed) rules change proposals will be handled by the Contest Boards on a two-year cycle. This should result in more stability to the rules than before, but it also means that there will be a longer wait to propose a change if you happen to want a rule changed and just miss a cycle.

The standard Rules Change Proposal Form must be used in order for proposals

(Continued on page AMA 6)

U.S. Entry Wins FAI Design Competition



Above: M.A. Chiati of Egypt and Luigi Bovo of Italy examine the prototype of Dave Linstrum's Star Stream which won the FAI competition for a beginner's towline glider. Chiati is chairman of the CIAM Education Subcommittee; Bovo chairs the FF Subcommittee. Design sketched at left, proportions based on the Midwest Jetstream.

New Competition Rules Also Developed in CIAM Meeting

A towline glider designed by Dave Linstrum, named Star Stream, has won the FAI competition for a beginner's towline glider—narrowly edging out the entry from Great Britain. The competition was judged during the 1973 annual meeting of the Federation Aeronautique Internationale (FAI) Committee for International Aero Modeling (CIAM) in Paris November 30 and December 1.

Linstrum's design is A-1 size, and Dave indicates that the proportions are based upon the Midwest Products Jetstream kit but with a shorter nose for better recovery from towline release and a front skid/fin to resist the spiral dive which sometimes results when a model is riding a thermal. Wing construction is by the Jedelsky method, and the entire structure is intentionally designed for crash survival.

The Star Stream A-1 Towline Glider is now available for kitting (without royalty payment) in all of FAI's more than 50 member nations. This is the idea behind the design competition: to provide a useful tool in developing youth aeromodeling programs in all countries.

Most of the new competition rules for World Championships and International Contests (and also AMA contests with these events) that were approved during the meeting concern Radio Control—a new aerobatic pattern has been adopted, linear dimensions of mufflers for FAI Pylon Racers have been specified, and new provisional rules for RC Soaring have been approved which involve the task concept for Thermal Soaring.

The calendar of World Championships for 1974 and 1975 was set, including approval for the U.S. to be host to the Scale (Control Line and Radio Control) and Indoor World Championships at Lakehurst, N.J., July 1-7, 1974. As reported last month, this event is being arranged in a package called the AerOlympics. In addition to the three World Championships, plans are to include international class RC Soaring and Pylon Racing, and the Old Timers Nationals will be held July 2-4 at the same site.

Particulars from the meeting follow.

Radio Control Aerobatics

There was widespread feeling that a new maneuver schedule was needed because of waning interest in the existing pattern which had been in use several years. One of the proposals included a free-style maneuver of the flyer's own choice and other new ideas, but the delegates felt that the proposal was too radical for the present —although indicating that some parts of the proposal should be pursued for future implementation.

The new pattern which was approved (and which also is the AMA Class D pattern) is not such a wide departure as the one mentioned above, but it does contain new maneuvers and a new feature which requires performing the maneuvers in an uninterrupted upwind-downwind sequence starting upwind with the Figure M, the first maneuver following Takeoff (which, of course, also is upwind). The new maneuver schedule, together with the K-factors for each:

1. Takeoff ..... K = 10
2. Figure M ..... K = 15
3. Cuban Eight—Savoy Knot .... K = 10
4. Double Immelmann ..... K = 10
5. Slow Roll ..... K = 15
6. Three Outside Loops ..... K = 15
7. Four-Point Roll ..... K = 15
8. Three Inside Loops ..... K = 10
9. Eight-Point Roll ..... K = 15
10. Running Eight ..... K = 10
11. Three Horizontal Rolls ..... K = 15
12. Top Hat ..... K = 15
13. Rolling Eight ..... K = 10
14. Three-Turn Spin ..... K = 10
15. Rectangular Approach ..... K = 10
16. Landing
    K = 15, within 15m circle
    K = 10, within 30m circle
    K = 5, outside 30m circle

Flyers should note that the new maneuver schedule calls for performing some of the maneuvers differently than before, even though the names of the maneuvers have not changed. For instance, the Figure M now requires a half roll in each of the four vertical legs—the first two half rolls in the same direction and the last two in the opposite direction. Outside Loops are started from upright level flight at the top of the figure; the model is then half-rolled to inverted for flying the loops, and at the exit the model is again half-rolled to upright.

The Running Eight (which gives the appearance of a horizontal eight) is begun in upright flight at the top of the figure; the model then completes one and one-quarter outside loops (at which point it is vertical) followed by one and one-quarter inside loops; model then recovers in upright flight and on the same heading as entry, although at the bottom of the figure. For the Top Hat, full rolls are performed on the vertical legs instead of the previous half rolls. The Rolling Eight gives the appearance of a vertical eight; entry at the mid-point of the figure is in upright flight followed by a half roll to inverted and one full outside loop; at the point of entry the

model again half rolls to upright and does another complete outside loop immediately below the first; recovery is on the same heading and altitude as entry.

A new rule to limit time-wasting was also approved. This provides for starting the allotted 10 minutes flight time one minute after the contestant has been given takeoff clearance—whether or not he begins to start the engine.

The new pattern takes effect in 1975 for World Championships and FAI International Contests; for U.S. purposes it is effective immediately.

Pylon Racing

The new muffler requirement is intended to provide more understandable guidelines for contestants and officials alike: "The engine must be fitted with an effective muffler which must extend from the center line of the cylinder not less than 100mm (3.94") and not more than 200mm (7.87"). The expansion chamber must be not less than 25mm (.984") diameter. The muffler, fitted to the engine, must be gas tight, except for a single orifice, maximum diameter 15mm (.590")." For U.S. purposes this new requirement is effective immediately, but like the previous lifting of the tuned pipe ban, the new requirement is not applicable to World Championships and FAI International Contests until 1975.

Also, the use of crash-type helmets (with chin straps) by competitors and officials is now required—to be provided by the individuals involved. In addition, new wording was approved to make the status of a race more specific: "The winner shall be flagged with a checkered flag. The results of the heat will be decided prior to the start of the following heat or within five minutes after the winner has been flagged, whichever is sooner."

RC Soaring

A whole new set of provisional rules has been approved involving the task concept (similar to AMA rules) in Thermal Soaring for duration, speed and distance. Launching can be by hand towing, high-start catapult, or winch [all with 150m (492') towlines]—and in addition, gliders with auxiliary power may compete. The latter are called motorgliders, limited to 2cc (.122 cu. in) displacement and maximum engine run of 45 seconds. There is also a new requirement for line launched models to be released from the line within 60 seconds after being launched or else the flight is annulled.

The duration task is scored one point per second up to a maximum of 360 (6-min. max) plus spot landing which is awarded 100 points if within one meter of the spot (reduced by five points for each meter farther away, except no points for landing over 15 meters from the spot). Flights over 360 seconds are penalized by deducting one point for each second over, and no landing points are awarded if flight time exceeds 390 seconds.

Distance is based upon the number of crossings of a 150m (492') course in a maximum of four minutes flight time. Partial laps are counted if a model lands before the four-minute flight time has expired.

Speed is for two crossings of the 150m course.

The combination of the three tasks is a round. The top man in each task receives 1,000 points, and the other entries each receive points according to the relationship of their scores with the top score. The winner of the contest is decided by adding the partial scores.

Two models may be used in the contest (and the model parts may be interchanged if the resulting model complies with the rules), but each round must be completed with the same model; during a round the only permitted changes are the addition of ballast and/or change in angle setting of the flying surfaces. Variations in geometry area are allowed if actuated at distance by radio command.

The new FAI Slope Soaring rules are quite similar to the previous ones except for a provision for no landing points to be awarded if flight time exceeds 420 seconds (seven minutes).

Free Flight

The fuel formula for FAI Power models was changed to 80% methanol and 20% lubricant (castor oil or synthetic equivalent). To aid in contest processing, the weight of Wakefield models is now specified differently than before: 190 grams minimum model weight without the rubber motor. Affecting flying procedure at World Championships, a new ruling was made for the starting line—from which models are launched—to be at a right angle to the wind at the start of each round.

Elections at CIAM meeting in progress. U.S. Delegate (and AMA Executive Director) John Worth is shown at extreme left foreground. Worth was elected CIAM secretary, and Tony Aarts of the Netherlands (in foreground left of center) is the new technical secretary. RC World Champs followers will recognize Wolfgang Matt (just right of center) who represented Liechtenstein. Photo above and on opposite page by Ron Moulton, retiring technical secretary.

Control Line

The big news here is that the provisional FAI Combat rules have been accepted as official, meaning that there is the possibility of World Championships for these models in the future. The earliest this could be is in 1976, since the rules do not become official for World Championships purposes until 1975—and there is a requirement for at least three FAI International Contests to be held prior to approving any offer to host the World Championships.

Basically the FAI Combat rules provide for a maximum engine size of .1526 cu. in., line length of 52'2⅜", minimum wire size of .012" (single line not permitted), two models allowed each entrant in each time period (four minutes after signal to launch, five minutes after first signal to start engines). Points are awarded according to the number of seconds a model is airborne during the four-minute flight period, plus 100 points for each cut of the opponent's streamer (no points for cutting the leader).

World Championships

Proposals to be host in the next two years were approved as follows: Scale (RC & CL) and Indoor, U.S.A., July 1-7, 1974, at Lakehurst, N.J.; Control Line, Czechoslovakia, July 24-29, 1974; Free Flight, Bulgaria, July 5-10, 1975; Radio Control Aerobatics, Switzerland, September 8-13, 1975.

Tentative offers for 1976: Scale (RC & CL), Germany; Control Line, Netherlands; Indoor, England. There is also the possibility of the U.S. offering to be host to the CL World Championships in 1976.

'74 CIAM Officers

Sandy Pimenoff (Finland) was re-elected as president, and Luigi Bovo (Italy) and Vilim Kmoch (Yugoslavia) were re-elected

as vice-presidents. Tony Aarts (Netherlands) was elected technical secretary. John Worth, AMA executive director, was elected to serve as secretary—to be assisted by J. Ganier (France).

Elected subcommittee chairmen: CL, P. Freebrey (England); FF, L. Bovo (Italy); Scale, H. Ziegler (Switzerland); RC Aerobatics, C. Olsen (England), RC Pylon, C. Telford (U.S.A.); RC Soaring, L. Kanneworff (Italy); Spacemodels, O. Saffek (Czechoslovakia).

All delegates accorded a round of applause to three retiring officers, each of whom has been a major participant in annual meetings and at World Championships for more than 10 years: Ron Moulton (England) who had served as technical secretary, Maynard Hill (U.S.A.) who had served as RC Subcommittee chairman, and Harry Stine (U.S.A.) who had served as Spacemodels Subcommittee chairman.

General

No change was made to the Scale or Indoor FAI rules.

Forty-two representatives from 29 countries attended the annual meeting. There were three from the United States: John Worth, Cliff Telford and Harry Stine. Worth attended as U.S. voting delegate, Telford as chairman of the RC Pylon Subcommittee, and Stine as chairman of the Spacemodels (Rocketry) Subcommittee. Two others from the U.S. were authorized but were unable to attend: AMA President John Clemens was still recuperating from surgery, and Maynard Hill (who was chairman of the RC Aerobatics Subcommittee) had to cancel due to the pressure of his employment.

'Youngster' Leads Way

The First Annual Aeromodelers Show organized last year in conjunction with a nearby shopping center so impressed the center that the chief organizer, Gary Hunter (AMA 42155), now 18, has been asked to do it again. The show was a two-day affair, held at Echelon Mall, Voorhees, N.J., with trophies and gift certificates awarded the winners by the Echelon Mall Merchants Association and local hobby shops. After the show, winners displayed their models on WPVI TV-6 which, combined with the show itself, introduced modeling activities to thousands of new people.

This year's show is scheduled for March 28, 29, and 30. Entry of models is invited (no fee). For more details contact Gary Hunter, 508-8th Ave., Lindenwold, N.J. 08021.

Rules Revision (continued)

to be considered by the Contest Boards; it may be obtained by sending a request accompanied by a pre-addressed stamped envelope to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

The Rules Change Proposal Form is applicable to all kinds of AMA competition rules: General, Free Flight, Control Line, Radio Control, Scale. In completing the form the proposer must provide (1) a brief summary of the proposed change, (2) the exact wording proposed for the rule book, (3) the logic behind the proposed change, including alleged shortcomings of the present rules, and (4) the proposer's signature and AMA number plus endorsement by signature and AMA numbers of two other members; all must be adult AMA members, and at least one must be a current AMA Contest Director.

Chartered Clubs

Many of the AMA Chartered Clubs were listed in this section last month (March *AAM*, pages 110-114). Additional clubs are listed here. Contact the person named for the clubs of interest—for meeting time, place and date. The one-letter code at the end of each listing indicates the principal kind of model interest as follows: R—Radio Control, C—Control Line, F—Free Flight, S—Scale, I—Indoor, M—multi-interest.

NEBRASKA

Fremac's Fremont M.A.C., David Brandert, 1003 E. 6 St., Fremont 68025 C
Frontier Fliers, Larry Boles, 1725 S. Maxwell, Fremont 68025 . . . . . R
Lincoln Sky Knights, Allen L. Graves, 1815 Devoe Dr., Lincoln 68520 . . . . . R
Mid Nebraska RC Model Club, Richard Hansen, Box 373, Cozad 69130 . . . . . R
McCook Area RC Society, Jack W. Merritt, 215 Park Ave., McCook 69001 . . . . . R
Ogallala Gophers RC Club, Garry Lacy, 215 E. 10th, Ogallala 69153 . . . . . R

Orbiting Eagles of Greater Omaha, E. Prohaska, 8004 S. 36th St., Omaha 68147 C
Hastings Skylarks RC Club, Ronald L. Frame, 906 Pine Knoll, Hastings 68901 . . . . . R

NEVADA

Las Vegas RC, Albert Johnson, 904 Rookway St., Las Vegas 89128 . . . . . R
Reno Radio Control Club, Philip Abbinanti, 3330 Norman Dr., Reno 89502 . . . . . R

NEW HAMPSHIRE

Ashuelot Valley Flyers, Max R. Ruelke, 90 River St., Keene 03431 . . . . . R
Concord Aeroguidance Society, Harrison Morgan, 110 Rowe Ave., Concord 03301 . . . . . R
Down East Model Soc., Lt. Col. Albert Sambold, Sr., 35 Milbern Ave., Hampton 03842 . . . . . M
Southern N.H. RC Club, Inc., Chester Doolittle, 35 Marlowe Rd., Nashua 03060 . . . . . R

NEW JERSEY

Atlantic County Sky Blazers, Ted Woodo, 607 N. Indiana Ave., Atlantic City 08401 . . . . . M
Atom RC'ers, Clifton Kuhn, 83 Meadowbrook Dr., Somerville 08876 . . . . . R
Bergen County RC, Inc., Elliott J. Janss, Jr., 48 Emeline Dr., Hawthorne 07506 . . . . . R

Berkeley Blade Busters, Fred L. Wolff, 68 Berkshire Dr., Berkeley Hts. 07922 C
Burlington County RC Club, Owen D. Gearhart, 80 Middleton Ln., Willingboro 08046 . . . . . R
Camden County Condors RC Club, V. Gould, 144 B Haddon Hills, Haddonfield 08033 . . . . . R
Clayton RC Club, J. D. Quirin, Little Mill Rd., Monroeville 08343 . . . . . R
Crossing Free Flight Group, E.E. Pierre, 76 Linden Ln., Princeton 08540 . . . . . F
East Coast Indoor Modelers, Emanuel Radoff, 61 Springbrook Rd., Livingston 07039 I
Edison Recreation M.A.C., James King, 82 Plainfield Ave., Edison 08817 . . . . . M
Esso Engineering Club, R. L. Thomas, 19 Cedar Ave., Madison 07940 . . . . . R
Garden State Circle Burners, Mike Turo, 43 Old Orchard Ct., Cedar Grove 07009 . . . . . M
Hackensack Valley Flyers, Inc., Richard Shy, 466 Third St., Palisades Pk. 07650 . . . . . R
High School East M.A.C., George Connors, Sr., 421 Jasinski St., Manville 08835 C
Jersey Aero Modelers, Bill Corwin, 4 Enderly Lane, Willingboro 08046 . . . . . M
Jersey Coast RC Club, Inc., Walter Palukanis, 247 Delaware Ave., Oakhurst 07755 . . . . . R
Jersey Tailwinds, George A. Drechen, 120 S. Jackson St., Woodbury 08096 . . . . . M
Lakeland RC Club, Richard Woznicki, 85 Biltmore St., N. Arlington 07032 . . . . . M
Livingston M.A.C., Kevin E. Sabin, 145 Woodland Ave., Convent Station 07961 C
Mahwah Model Club, Victor Cioffi, 102 Deerfield Terr., Mahwah 07430 . . . . . M
Mercer County RC Soc., William Ashbridge, 203 Centre St., Trenton 08611 . . . . . R
Middlesex Modelers, Inc., A. W. Koenig, 1613 Frase St., S. Plainfield 07080 C
Monmouth M.A.C., Gregory Malinowski, 16 Teabury Ln., Oakhurst 07755 . . . . . R
Morris County Aeromodelers, Frank M. Costello, 27 Kearney St., Dover 07801 . . . . . M
No. Valley Sport Flyers RC, B. Buschow, 220 David Cooper St., Westwood 07675 . . . . . R
North Jersey RC Club, Timothy Duffy, 110 Robertson Dr., Wyckoff 07481 . . . . . R

Oakland RC Club, William C. Stumpf, 166 Beech Terr., Wayne 07470 . . . . . R
Ocean County Modelers, N. Hank Likes, 106 Attison Ave., S. Toms River 08753 . . . . . R
Old Time Eagles, John W. Kungl, 20 Sylvan Rd., Clifton 07012 . . . . . R
Over the Hill Soaring Soc., Rick Musnick, 138 Ramapo Valley Rd., Mahwah 07460 . . . . . R
Pascack Valley RC Club, Mariano Pagano, 277 Hillsdale Ave., Hillsdale 07642 . . . . . R
Rockaway Valley RC, Robert Hoeckele, 9 Manchester Way, Pine Brook 07058 . . . . . R
Roxbury Area M.A.C., Charles F. Curnow, Maples Lane Mine Hill, Dover 07801 . . . . . M
Salem County RC M.A.C., Tom Kurtz, Jr., Michigan & Elm, Pennsville 08070 . . . . . M
Somerset Signal Senders, D. Moore 1275 Rock Ave., Apt. CC-6, N. Plainfield 07060 . . . . . R
South Jersey Aeromodelers, Gary Haffke, 1038 W. Elmer Rd., Vineland 08360 . . . . . M
South Jersey Flyaways, Inc., Paul Hirschman, 410 Tea Rose Ln., Cherry Hill 08034 . . . . . R
South Jersey RC Society, Robert Wesley, Box 163, Elmer 08318 . . . . . R
Somerset Soaring Society, Joseph J. Fabula, 1034 Tysley Pl., Raritan 08869 . . . . . R
Starlifters M.A.C., Bruce Mills, Box 29D, Rd 1, Mt. Pleasant Rd., Columbus 08022 . . . . . R
Top O New Jersey RC Club, Louis Lucatelli, Jr., 19 College Rd., Netcong 07857 . . . . . R
Tri-County RC Club, Brian Hoffman, 1448 Axel Ave., N. Brunswick 08902 . . . . . R
Township of Ocean Prop Swingers, Joseph DeMarco, 18 Doreen Dr., Oceanport 07757 C
West Jersey Radio Flyers, L. Jezorek, 1701 Oakwood Terr., Scotch Plains 07076 . . . . . R
West Jersey RC Club, Edward J. Fahey, 14 Redwood Dr., Woodbury 08096 . . . . . R
West Windsor Flying Club, Greg Hazen, Apt. 122, Princeton Arms West, Cranbury 08512 . . . M

NEW MEXICO

Alamogordo Model Aviators, Herby White, 2501 Baylor, Alamogordo 88310 . . . . . M
Albuquerque RC Club, John Capo, 3100 Vermont, NE, Albuquerque 87110 . . . . . R
Clovis M/A Drivers Soc., T. J. Watson, Box 1169, Clovis 88101 . . . . . R
Hobbs Aero Radio Kontrol Soc., Inc., J. R. Cox, 1917 N. McKinley, Hobbs 88240 . . . . . R
South West Aero Team, Buzz Averill, 9117 LaBarranca, N.E., Albuquerque 87111 . . . . . F
Remote Piloted Vehicle Assn., Walter Snyder, 8700 Osuna N.E., Albuquerque 87111 . . . . . R
Royal City RC Club, Richard R. Miller, 2920 Calle Princesa Juana, Santa Fe 87501 . . . . . R

NEW YORK

Aeroguidance Society, Inc., W. D. Leaf, 3627 Leonard Dr., Endwell 13760 . . . . . R
Aero Radio Club of Syracuse, C. Wilson, 2 Cowance St., Cortland 13045 . . . . . R
Balsa Busters, William R. Narby, Cameron Road, RD 4, Bath 14810 . . . . . M
Bayside Wiretappers M.A.C., Edward Tomanek, 38-30-205 St., Bayside 11361 . . . . . M
B & N Holdout Ukie Club of Western N.Y., N. Adel, 234 Starin Ave., Buffalo 14214 . . . . . M
Bethlehem RC Club, Robert E. Pike, 17 Morningside Dr., Delmar 12054 . . . . . R
Blue Angels, Ernest M. Olsen, 465 Westchester Ave., Mt. Vernon 10552 . . . . . R
Brentwood Aero Masters, Wilfred Wederhoff, 15 Crocus Ln., Commack 11725 . . . . . R
Brooklyn Eagles, Tom Polito, 2121 Shore Pkwy., Brooklyn 11214 . . . . . M
Dawn Patrol RC Club, Douglas Rajski, 650 Warburton Ave., Apt. 5M, Yonkers 10701 . . . . . R
Flying Knights M.A.C., Inc. Jean Hultberg, RFD #1, Box 140, E. Nassau 12062 . . . . . M
Flying Knights of Hamburg, N.Y., Inc., N. Mathien, 64 Randall Terr., Hamburg 104075 . . . . . R
Flying Live Ones, Michael Heller, Sr., 227 Sibley Rd., Honeoye Falls 14472 . . . . . R
Flying Rebels, Calvin R. Carr, 14 Weeks St., Jamestown 14701 . . . . . R
Flying Sparks, Inc., Timothy S. Shaddock, 209 W. 5th St., Corning 14830 . . . . . R
Gee Bees RC Club, Inc., Martin Berman, 2249 E. 28th St., Brooklyn 11229 . . . . . R
Green Bush Pilots, Richard Jacker, Box 146, Niberville 12130 . . . . . R
Griffiss Academy of Aero Modeling, Earl Hadler, 120 Lyndale Dr., Rome 13440 . . . . . M
Harris Hill Lift Over Drag, Dick Pike, RD 1, Lowman 14861 . . . . . R
Hudson Valley RC Club, Fred A. Bange, 64 Farm Rd., Briarcliff 10510 . . . . . R
Island Model Plane Society, Ted Thompson, 2483 5th Ave., E. Meadow 11554 . . . . . R
Kingston Aeromodel Club, Inc., T. Terrenoire, 7 Redwood Rd., Saugerties 12477 . . . . . R
Lazy Eight RC Club, W. Dmyszewicz, Indian Village Trl. Pk., Broadalgin 12010 . . . . . R
Long Island Aero Radio Soc., Robert Aguis, 216 Central Ave., Bohemia 11716 . . . . . R
Long Island Drone Society, Ronald Spieler, 90 Calla Ave., Floral Park 11001 . . . . . M
Long Island Fly Together Soc. H. Maiman, 176 Harbor Ln., Massapequa Park 11762 . . . . . R
Long Island RC Society, F. Glen Nesbitt, Jr., 125 President St., Hempstead 11550 . . . . . R
Meroke RC Club, Inc., Frederick Gogelman, 35 Northgate Dr., Syosset 11792 . . . . . R
Mid Hudson RC Society, Inc., Damian Amodeio, Hill & Hollow Rd., Hyde Park 12538 . . . . . R
Midstate Modelers, William Taylor, 131 Kensington Pl., Syracuse 13201 . . . . . R
Modelers of Binghamton, Inc., Frank Garger, P.O. Box 51, Conklin 13748 . . . . . R
Mohawk Valley RC Modelers, Robert Niziol, 2918 Mohawk St., Sauquoit 13456 . . . . . R
Monroe County Circle Burners, Jack Harrison, 45 Christian Ave., Rochester 14615 C
Niagara Co. M.A.C., Ian McKerlie, c/o Sky Craft Hobby, 311 Payne Ave., N. Towawanda 14120 R
Niagara Sunday Flyers, Don Cameron, 420 12th St., Niagara Falls 14303 . . . . . R
Onondaga M.A.C., Eugene Tucker, Green Lake Rd., Fayetteville 13066 . . . . . R
Oswego Valley Modelaires, Paul Daly, East River Rd., Oswego 13126 . . . . . R
Pan American Model Aero Club, Jay Stahl, 254 Springdale Dr., Ronkonkoma 11779 . . . . . M
Pelham Bay Aero Club, Robert Crossland, 1946 E. Tremont Ave., Bronx 10426 C
Penn. Ave. RC Society, Bernard Sanders, 14 Arrowwood Ln., Huntington Sta. 11746 . . . . . R
Prop Busters, II, Mahlon Irish, Jr., 5 Rob San Dr., Homer 13077 . . . . . M
Queen County RC Club, Robert Bove, 1307 5th Ave., New Hyde Park 11040 . . . . . R
RC Aircrafters, Stanley Duszczak, 60 Winona Rd., Elma 14059 . . . . . R
Radio Control Club of Rochester, David F. Smith, 51 Wyndham Rd., Rochester 14609 . . . . . R
RC Soc. of Marine Park, Al Seidenberg, 18 Paerdgat 2 St., Brooklyn 11236 . . . . . R
RC Pulsers of West. N.Y., Richard Gordon, 236 St. Lawrence Ave., Buffalo 14216 . . . . . R
Red Barons M.A.C., R. Kidner, 7707 Jennings Rd., Liverpool 13088 . . . . . M
Richmond Model Flying Club, M. Campanelli, 363 Maine Ave., Staten Island 10314 . . . . . R
Rochester Aeromodeling Soc., Inc., R. Rambo, 14 Frederick Rd., Pittsford 14534 . . . . . M
Rockland Co. RC Club, Harvey Landis, 14 Rosemont Dr., New City 10956 . . . . . R
Saratoga Co., Aeromodelers, John Thomas, 115 Ellsworth Ave., Mechanicsville 12118 . . . . . R
Seaway Valley Modelaires, Thomas L. Silver, #35 Marie St., Massena 13662 . . . . . R
Sky Rogues Aeronautics Club, Ian MacLennan, 71 Oxford St., Roslyn Hts. 11577 . . . . . R
Sky Rovers Flying Club, Inc., Elaine C. Lukowski, RD #2, Rt. 89, Romulus 14541 . . . . . M
Sky Scrapers, Frank Tartaglia, 58 Dollard Dr., North Babylon 11703 . . . . . F
Squadron Escarole, Inc., John A. Sbare, P.O. Box 26, Mahopac Falls 10542 . . . . . R

Suffolk Falcons, Inc., James C. Reid, 752 Pease Ln., West Islip 11795 . . . . . M
Suffolk Wings RC M.A.C., Lionel Bernstein, 6 Norman Dr., Bohemia 11716 . . . . . R
Sullivan County RC, Robert Schoch, 3 Edward Ave., Monticello 12701 . . . . . R
Sullivan, Orange, Ulster Radio Soc., Marie Tomcho, 90 Glenmere Ave., Florida 12721 . . . . . M
Syracuse Thunderbirds, Lon J. Sauter, 103 Brookfield Rd., Mattydale 13211 . . . . . R
Thundervolts RC Club, Inc., David C. Fifield, 11 Lace Ln., Elnora 12065 . . . . . R
Tri-County RC Modelers, Al Marcantonio, Sr., 81 McDonald St., Glen Falls 12801 . . . . . R
Tri-States Model Flying Club, D. Gore, 22 McAllister St., Port Jervis 12771 . . . . . R
Westchester Radio Aero Modelers, R. VanWart, 124 Vail Ave., Peekskill 10566 . . . . . R
Wingmasters, Charles Baxter, 29 Gehrig St., Commack 11725 C

NORTH CAROLINA

Burlington Aircraft RK Soc., B. Williams, 1314 Briarcliff Rd., Burlington 27215 . . . . . R
Cedar Lodge RC Assn., Tony McDowell, P.O. Box 976, Thomasville 27360 . . . . . R
Charlotte Aeromodelers, Don R. Hall, 6120 Rosevalley Dr., Charlotte 28210 . . . . . R
CL Soc. of Charlotte, Larry V. Hill, 90 Countrymens Ct., Charlotte 28210 C
Coastal Carolina RC Club, Robert T. Myers, 165 Cherry Cir., Havelock 28532 . . . . . R
East Carolina RC'ers, S. A. Rhodes, 100 Brock St., Goldsboro 27530 . . . . . R
Ft. Bragg M.A.C., Paul A. Yacobucci, 6408 Winthrop Dr., Fayetteville 28301 . . . . . M
Gastonia RC Club, Inc., Danny Jenkins, Apt. 8, Woodbridge Dr., Gastonia 28052 . . . . . R
Golden Triad Model Masters, James Hayes, 3948 Talcott Ave., Winston-Salem 27106 C
Greensboro R/M Club, Charles B. Nickles, Rt. 6, Box 188, Greensboro 27405 . . . . . R
Greenville Flight Club, Joseph A. Edmondson, 116A N. Meade St., Greenville 27834 . . . . . M
Ground Pounders, Cecil Boyde, Sr., Rt. 1, Box 246, Grimesland 27837 C
Henderson RC Modelers, Barry H. Horton, 511 Sunset Ave., Oxford 27565 . . . . . R
Hickory RC Prop Twisters, Shirley L. Teague, 625 5th Ave., SW, Hickory 28601 . . . . . M
Johnston Co. Aerosporting Club, Joe Nall, 608 S. Second St., Smithfield 27577 . . . . . R
Kinston Greenville Aeromodelers, C. Buchanan, 404 Edgehill Ave., Kinston 28501 . . . . . R
Monroe RC Club, W. Ray Whitaker, 304 Winburn, Monroe 28110 . . . . . R
Montgomery Randolph RC Club, J. C. Pugh, RFD #1, Box 455, Franklinville 27248 . . . . . R
Nash County RC Club, Roland Harper, Rt. 5, Box 130A, Rocky Mount 27801 . . . . . R
New Bern RC Club, Jack D. Slavin, 1812 Wilmington St., New Bern 28560 . . . . . R
Prop Twisters of Greensboro, K. Springer, 4304 Whippoorwill Dr., Greensboro 27407 . . . . . M
Raleigh Durham RC Club, Thomas A. Stevens, 2256 The Circle, Raleigh 27608 . . . . . R
Rutherford-Cleveland RC Club, A. Weisner, 5109 Canterbury Rd., Shelby 28150 . . . . . R
Tar Heel RC Flyers, Ken Gurganus, Box 370, Rt. 5, Rocky Mount 27801 . . . . . R
Wenoca Radio Control Club, J. K. Laws, 509 Dogwood Dr., High Point 27260 . . . . . R
Western NC RC Soc., Inc., Dale Wright, RR 4, Box 172, Candler 28715 . . . . . M
Wilkes Co. RC Skymasters, Danny Blankenship, Rt. 1, Box 5A, Millers Creek 28651 . . . . . R
Wilmington M/F Club, Jack J. Jenkins, 205 Horn Rd., Wilmington 28401 . . . . . R
Wilson RC Modelers Assn., John W. Scott, 615 Glendale Dr., Wilson 27893 . . . . . M

NORTH DAKOTA

FM Skylarks, Lonnie Kroeber, 1754 South 9th, Fargo 58102 . . . . . M
Red River RC Club, Dennis Heikura, 2028A J St., Grand Forks AFB 58201 . . . . . R
Valley RC Flyers, Inc., James J. Joyce, 2706 N. 9th St., Fargo 58102 . . . . . R
Williston Balsa Busters, Martin Tracy, 910 University Ave., Williston 58801 . . . . . R

OHIO

Alliance Balsa Bees, Oliver Archer, Jr., 1839 Fairview Pl., Alliance 44601 . . . . . M
Canton Nitro U-Control Fliers, Don Slusser, 574 W. Vine, Alliance 44601 C
Canton RC Club, Howard L. Burns, 215 Woodard Ave., N.E., Louisville 44641 . . . . . R
Capital City Controlliners, Richard Kanoski, 839 Meadowview Dr., Columbus 43224 C
Centaur RC Club, Wilson A. Esken, 712 W. 9th St., E. Liverpool 43920 . . . . . R
Central Ohio FF Club, Floyd T. Miller, 1313 Brookridge Dr., Columbus 43220 . . . . . R
Central Ohio RK Soc., Desmond L. Cook, 1047 Sunny Hill Dr., Columbus 43221 . . . . . R
Champaign County Modelers, D. Fridenmaker, 218 E. Columbus St., W. Liberty 43357 . . . . . M
Cinn. Aeromodelers, R. Hesselbrock, 6320 Blueberry Hill Ct., Cincinnati 45211 . . . . . R
Cleveland FF Soc., David Pishnery, 22650 Fox Ave., Suite J, Euclid 44123 . . . . . F
Cleveland RC Club, Phil Hanscom, 1154 Mayfield Ridge Rd., Mayfield Hts 44124 . . . . . M
Cleveland Radio Controlaires, R. Gaffney, 1168 Dorsh Rd., S. Euclid 44121 . . . . . R
Columbia RC Assn., Ken Laurich, 4305 W. Ridgewood Dr., Parma 44134 . . . . . R
Coshocton Co. Cloud Climbers, H. Blust, 534 E. Fourth St., W. Lafayette 43845 . . . . . M
Drake Co. Aeromodelers, Keith Menger, RR 4, Box 190, Greenville 45331 . . . . . M
Dayton Area Thermal Soarers, L. Gleason, 108 Cushing Ave., Kettering 45429 . . . . . M
Dayton Buzzin Buzzards, W. Keller, 1340 Mintwood Dr., Centerville 45459 C

Dayton Wingmasters, Kenneth B. Eubanks, 5491 Harshmanville Rd., Dayton 45424 . . . . . M
Electronic Flyers, D. Schneider, 1775 Yorktown Dr., Mansfield 44906 . . . . . R
Fairfield Ohio RK Society, Robert E. Nutter, 1015 Pratt Ave., Lancaster 43130 . . . . . R
Flying Aero Sport Team, Daryl Grossnickle, 113 Weaver St., New Lebanon 45345 . . . . . R
Flying Circuits, Richard Williams, 648 N. Main St., Arlington 45814 . . . . . R
Flying Tigers RC of Toledo, H. Minke, Jr., 1958 Garden Ridge Dr., Toledo 43614 . . . . . R
Greater Cincinnati RC Club, Gary Trout, 11926 Elkwood Dr., Cincinnati 45240 . . . . . R
Goodyear Model Aircraft Club, Bill Peel, 116 Donovan Ave., Mogadore 44260 . . . . . M
Hi-Fliers M.A.C., Chuck Macuga, 15728 Sandalhaven Dr., Middleburg Hgts. 44130 . . . . . M
Hubbard Valley Flyers, Connie Shallenberger, 5886 Cleveland Rd., Wooster 44691 . . . . . M
Jefferson County RC Club, George Radcliff, 314 Leonard, Wintersville 43952 . . . . . R
Lake Erie Gas Model Club, Richard P. Woodward, 4818 Maplecrest Ave., Parma 44134 . . . . M
Lakewood Flite Masters, Edward J. Kaleta, Jr., 1255 Gary Blvd., Brunswick 44212 C
Licking County RC Club, Inc., James Riley, 38 Burt Ave., Newark 43055 . . . . . R
Lima Area RK Soc., Inc., Joseph Nichols, 626 Cornell Dr., Lima 45805 . . . . . R
Lima Beans Prop Busters, Eugene Leidy, Presho Trailer Ct., Spencerville 45887 . . . . . R
Lorain County RC Club, Lawrence E. Muller, 5515 Merkle Ave., Parma 44129 . . . . . M
Loveland Propbusters, Don Frank, 1843 Vanderbilt Dr., Loveland 45140 . . . . . R
Miami RC Flying Club, Harry Woosley, 607 Martin Dr., Xenia 45385 . . . . . R
Mahoning Co. Model Club, D. McMurray, 1294 W. Western Reserve Rd., Youngstown 44514 . M
Marion Air Foils, Vearl A. Gamble, Box 444, Caledonia 43314 . . . . . M
Mentor Area RC Society, H. Rondina, 1458 Golden Gate Blvd., Mayfield Hts. 44124 . . . . . R
Midway Cyclones RC, Stephen Stanford, 602 Woodlawn Rd., Ohio City 45874 . . . . . R
N. American Rockwell Aeromodelers, L. Helm, 3856 Bolton Ave., Columbus 43227 . . . . . M
N.E. Ohio Radio Flyers, Rand Schenek, 1061 Lake Rd., Conneaut 44030 . . . . . R
Northern Ohio FF Assn., Rudy J. Kluiber, 2021 Lakeland, Lakewood 44107 . . . . . F
Ohio Flying Aces, Jim Alexander, 5340 Argonne Ave., Youngstown 44515 . . . . . M
Prop Busters M.A.C., Mark Brunelle, 25520 Farringdon Ave., Euclid 44132 . . . . . M
Queen City U-Control, Vickie S. Morgan, 9333 Wynncrest Dr., Cincinnati 45242 C
RC Thermaliers, Joseph G. Mader, 2708 Scioto Trail, Portsmouth 45662 . . . . . R
RC Short Circuits Club, Inc., H. Hanser, 4283 Maureen Dr., Youngstown 44511 . . . . . M
Ridge Road RC, R. A. Sommer, 563 Adelaide, N.E., Warren 44483 . . . . . R
Riverside RC Hawks, Glenn L. Landis, 6767 N. Free Rd., Piqua 45356 . . . . . R
St. Clairsville R.C. Flyers, Emil Slavik, 124 N. Sugar St., St. Clairsville 43905 . . . . . R
Sharon Center Flyers, Dallas Junkin, 490 Hatch Rd., Wadsworth 44281 . . . . . M
SHOO Flyers M.A.C., Inc., Dick Kraner, RR #1, Ohio City 45874 . . . . . M
Sky Hawks M.A.C., John C. Mullen, 110 Ohio St., Mingo Junction 43938 . . . . . M
Skyhawks RC Club, Sam Barbone, Jr., Box 504, Silica Rd., N. Jackson 44451 . . . . . R
Skylarks, J. W. Stidham, 6067 Sherwood Dr., N. Olmsted 44070 . . . . . M
Snoopy Rejects, Clarence A. Tucker, 1415 E. St., Middletown 45042 . . . . . M
Southwestern Ohio FF'ers, James I. Miller, 827 Yorkhaven Rd., Cincinnati 45240 . . . . . F
Toledo Weak Signals RC Club, Roy Hinger, 502 Louisiana Ave., Perrysburg 43551 . . . . . R
Tri-State RC Club, Stan Edwards, 610 Washington St., Coal Grove 45638 . . . . . R
Trumbull Co. RC Model Club, LaMarr Sheldon, 363 Glendola Ave., NW, Warren 44483 . . . . . M
Wayne County RC Club, Barbara L. Jackson, 930 Spink St., Wooster 44691 . . . . . R
Western Ohio RK Soc., Charles Emmel, III, 1661 Cedar Ct., Bellbrook 45305 . . . . . R
YMCA Electronic Flyers, Jay Spaulding, 1274 Lucas Rd., Mansfield 44905 . . . . . R
Zanesville Area RK Soc., Roderick W. Barnes, 3060 Winding Way, Zanesville 43701 . . . . . R

OKLAHOMA

Controliners Model Club, D. G. McGee, 3175 N. Portland #102, Oklahoma City 73112 C
Enid Sod Busters, Bill Holland, Rt. #6, Box 172, Enid 73701 C
Falcons Model Club, Kenneth Calhoon, 2147 S. Dewey Pl., Bartlesville 74003 . . . . . R
Lawton Area Fun Flyers, John J. Apoka, 4509 Cherokee Ave., Lawton 73501 . . . . . M
Midwest City Prop Choppers, Mike Knouse, 909 Meadowgreen Dr., Midwest City 73110 . . . M
Ponca City RC Modelers, Norman Barnes, 1712 Potomac Dr., Ponca City 74601 . . . . . R
Tulsa Glue Dobbers, William I. Salnikov, Rt. #1, Box 42AD, Coweta 74429 . . . . . M
Tulsa RC Soaring Club, Dale E. Nutter, 2498 E. 49th St., Tulsa 74105 . . . . . R

OREGON

Barnstormers Club, D. Hansen, 17225 S.W. Greentree Ave., Lk. Oswego 97034 . . . . . R
DJ Electric Airplane Club, Inc., L. Well, 1722 N.W. 29th St., Corvallis 97330 . . . . . R
Eugene RC Aeronauts, Inc., Kenneth C. Eaton, 138 Hansen Ln., Eugene 97404 . . . . . R
Eugene Prop Spinners, Richard Chauran, 1040 N. 7th St., Springfield 97477 . . . . . M
Flightmasters of Klamath, Richard Wickline, P.O. Box 623, Klamath Falls 97601 . . . . . R
Fly Aways RC Modelers Club, Hollis W. Oren 12955 S.W. Morrison, Beaverton 97005 . . . . . R
Flying Tigers Flying Club, Chuck Morse, 2 E. Birch St., #312, Walla Walla 99362 . . . . . R
Nor'Westers, Dale F. Adams, 612 S.E. 130th Ave., Portland 97233 . . . . . F
Portland Stardusters, Inc., Ken Thorstad, 4503 N. Interstate Ave., Portland 97217 . . . . . R
Rogue Eagle RC Club, Robert Minear, 3521 South Stage Rd., Medford 97501 . . . . . R
Salem RC Pilots Assn., Robert G. Neer, 3859 Pringle Rd., S.E., Salem 97302 . . . . . R
Sky Knights RC Club, Vernon Ahlberg, 983 Woodlawn Ave., Oregon City 97045 . . . . . R
Tri-County RC Club, Harold Norris, P.O. Box 296, Redmond 97756 . . . . . R
Thundervolts, Inc., Robert Govro, 1103 West 25th, Albany 97321 . . . . . R
Williamette Modelers Club, Inc., Bob Stalick 1120 Shady Ln., Albany 97321 . . . . . F

We started out with the intention that the listing of AMA Chartered Clubs would be completed in two months—the March and April issues. But here it is the April issue, and space just doesn't permit printing them all. But don't give up! Be on the lookout for the May "AMA News" section for clubs in Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming, APO and foreign.

Contest Calendar

Official Sanctioned Contests of the Academy of Model Aeronautics

Note: For quick response and as a favor to those staging, administering and directing the contest, be certain to send a stamped, self-addressed, envelope along with your request to the listed Contest Director (CD) for additional information.

March 16-17—Snohomish, Wash. (AA) Polar Bear RC Meet. Site: Snohomish. P. Williams CD, 5803 East Dr., Everett, Wash. 98203. Sponsor: Seattle Radio Aero Club, Inc.

March 23—Locust Valley, N.Y. LIAMAC Indoor Record Trials for Cat. I. Site: Friends Academy. J. Pailet, 30 Emerson Rd., Brookville, Glen Head, N.Y. 11545.

March 23-24—Carson, Calif. (AA) BIRDS Open RC Meet. Site: Birds Field. M. Smith CD, 4112 Centralia, Carson, Calif. 90712. Sponsor: BIRDS Club.

March 24—Livingston, N.J. (A) Second Flying Tigers CL Air Race. Site: Okner Pkwy. C. Schaefer CD, 514 N. Chestnut St., Westfield, N.J. 07090. Sponsor: Livingston Flying Tigers.

March 23-24—San Antonio, Tex. (AA) A.R.C.S. Spring RC Contest. Site: San Antonio. D. Bottoms CD, 3329 Fredericksburg Rd., San Antonio, TX 78201.

March 24—Sepulveda, Calif. (A) San Valeers Monthly FF (Cat. II) for March '74. Site: Sepulveda. G. Weissenberger CD, 17776 San Francisco St., Fountain Valley, Calif. 92708.

March 31—Fresno, Calif. (A) FGMAC Monthly FF (Cat. II) Meet. Site: Fresno. F. Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727.

April 21—Phoenix, Ariz. (AA) Spring FF (Cat. I) Contest. Site: Pinnacle Peak Rd. & 37th Ave., W. Morris CD, 7422 E. McKinley St., Scottsdale, Ariz. 85257.

April 27-28—Nashville, Tenn. (A) Spring 1/4 Midget RC Ralley. Site: Percy Warner Park. W. Sweeney CD, 3924 Plantation Dr., Hermitage, Tenn. 37076. Sponsor: Middle Tennessee Radio Control Society.

April 27-28—Ft. Worth, Tex. (AA) 4th Annual "Lone Star Aerobatic RC Convention." Site: Ft. Worth. L. Stanfield CD, 1617 Lagoona Ln., Ft. Worth, TX 76134.

April 27-28—Dayton Beach, Fla. (AA) Eagle-Beagle Model Airplane CL Contest. Site: Embry-Riddle Campus. H. Lambert CD, 109 Old Carrage Rd., Daytona Beach, Fla. 32019.

April 28—Westport, Conn. (A) Conn. Old Timers RC Championships. Site: Sherwood Island. A. Novotnik CD, 4 Beverly Pl., Norwalk, Conn. 06850.

April 28—Cincinnati, Ohio (A) 3rd Annual CL Combat Bash. Site: Lunken Airfield. W. Messerly CD, 1122 Eight Mile Rd., Cincinnati, Ohio 45230.

April 28—Warminster, Penna. (AA) Delaware Valley CL Criterium. Site: Warminister. J. Goodman CD, 885 York Rd., Apt. 17C, Warminster, Penna. 18974. Sponsor: Bucks County RC, Inc.

April 28—Sepulveda, Calif. (A) San Valeers Monthly FF (Cat. II) April '74 Meet. Site: Sepulveda. B. Hunter CD, 10701 Sharp Ave., Mission Hills, Calif. 91340.

April 28—Fresno, Calif. (A) FGMAC Monthly FF (Cat. I) Meet. Site: F. Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727.

May 1—Rockford, Ill. Rock Valley RC Flyers 2nd Annual Indoor Static Display. Site: Rockford. F. Vidmar CD, 4705 Highcrest Rd., Rockford, Ill. 61107. Sponsor: Rock Valley RC Flyers.

May 4-5—Huntsville, Ala. (AA) 14th Annual RC Contest. Site: Huntsville. F. Deis, Jr., CD, 7409 Attwood Dr., Huntsville, Ala. 35802. Sponsor: Rocket City Radio Controllers.

May 4-5—Waco, Tex. (AA) The 3rd Texas Open RC Meet. Site: Speegleville Park. M. Blose CD, Box 544, Hamilton, Tx. 76531. Sponsor: H.O.T. M.A.C.

May 5—St. Louis, Mo. Signal Chasers Fly for Fun. Site: Buder Park. M. Hart CD, 936 Dontaos Dr., St. Louis, Mo. 63131. Sponsor: Signal Chasers RC Club.

May 5—Frankton, Ind. (A) 6th Annual Madison County Fun Fly. Site: Frankton Club Field. J. Payton CD, 601 W. Washington, Alexandria, Ind. 46001. Sponsor: Madison County RC Flyers.

May 5—Westport, Conn. Country Squires Spring RC Fun Fly. Site: Sherwood Island State Park. K. Bergquist CD, 45 Lakeside Dr., Fairfield, Conn. 06430. Sponsor: Country Squire Modelers, Inc.

May 12—Palos Park, Ill. (A) 1st Annual RC Sport Scale Fly-In. Site: 107th St. & Rt. 45. B. Johnson CD, 1004 61st St., Downers Grove, Ill. 60515. Sponsor: Palos Park Radio Control Club.

May 12—Fresno, Calif. (A) FGMAC Monthly FF (Cat. I) Meet. Site: Fresno. F. Ginder, Jr. CD, 5740 E. Ashlan, Fresno, Calif. 93727.

May 18-19—Lafayette, La. (AA) 6th Annual Model Aviation Day RC Meet. Site: Lafayette. B. Fehlman CD, 421 Marilyn Dr., Lafayette, La. 70501. Sponsor: Acadian RC Club.

May 18-19—Somers, N.Y. (A) Eastern RC Air Races. Site: Somers. B. Noll CD, 8 Seneca Rd., Danbury, Conn. 06810.

May 19—W. Suffield, Conn. (A) Nor'East RC Air Races. Site: NCRCC Field. D. Laitinen CD, 2 Oakwood St., E. Hartford, Conn. 06108. Sponsor: Northern Conn. RC Club.

May 19—Ft. Worth, Tex. (A) Pylon RC Meet. Site: Ft. Worth. F. Cox CD, 209 Rolling Hills Dr., Ft. Worth, Tx.

May 19—Cleveland, Ohio (B) 2nd Annual Tegel CL Invitational. Site: Cleveland City Field. R. Tegel CD, 425 E. 329th, Kirtland, Ohio 44095. Sponsor: Prop Busters M.A.C.

May 19—Tucson, Ariz. (A) Cholla Choppers MAC Spring CL Slow Fest. Site: Rode Park. B. Reynolds CD, Rt. 8, Box 51, Tucson, Ariz. 85710.

May 25-26—Council Bluffs, Ia. 2nd Annual National Falcon Tournament. Site: Council Bluffs. M. Wilken CD, 136 Zenith Dr., Council Bluffs, Ia. 51501. Sponsor: Cobras RC Club.

May 25-26—Clovis, N.M. (AA) MADS Annual RC Contest. Site: MADS Field. E. Harvey CD, Star Route, Box 48, Clovis, N.M. 88101. Sponsor: Clovis M. A. Driver Soc.

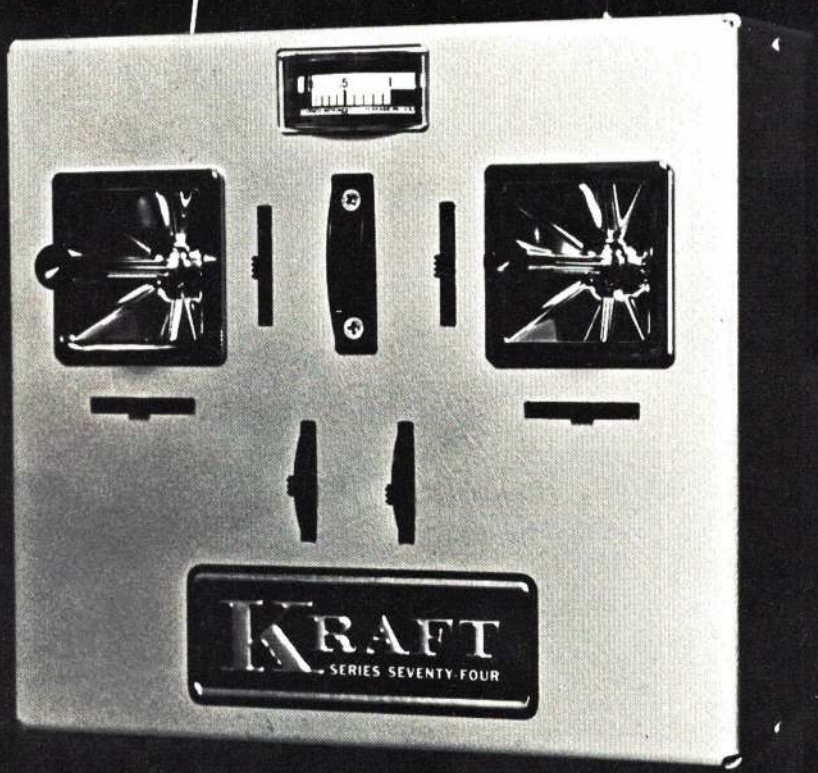
May 25-26—Tullahoma, Tenn. (A) Coffee Air Foilers Thermal Soaring RC Meet. Site: Model Field. C. Tuthill CD, 101 Westwood Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Air Foilers.

May 25-26—Ft. Sill, Okla. (A) Laff's 2nd Annual RC Sailplane Classic. Site: Laff's Field Gate 4. J. Apoka CD, 6532 McGlachlin Ave., Ft. Sill, Okla. 73503. Sponsor: Lawton Area Fun Flyers.

May 25-26—Benton Harbor, Mich. (AA) Third Annual Whirlwinds RC Pattern Meet. Site: Benton Harbor. M. Klintworth CD, 1449 Main St., St. Joseph, Mich. 49085. Sponsor: Whirlwinds of SW Michigan.

May 26—Chardon, Ohio (AA) CRC 12th Annual RC Pattern Event. Site: Chardon. F. Sheplavy CD, 36981 S. Lakeshore Blvd., Eastlake, Ohio 44094.

TOPS



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